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Final Environmental Impact Statement

Volume I

North Billings County Allotment Management Plan Revisions

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North Billings County Allotment Management Plan Revisions
Final Environmental Impact Statement

Volume I

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Abstract: This Final Environmental Impact Statement (FEIS) summarizes the North Billings County Allotment Management Plan Revisions project. It describes the purpose and need for the project, issues related to the project, alternatives considered, and the effects of each alternative on the major resource concerns and issues. The purpose of this project is to continue livestock grazing while meeting or moving toward the goals and objectives of the Dakota Prairie Grasslands Land and Resource Management Plan (Grasslands Plan). Significant issues identified for the project include, riparian conditions, herbaceous structure, woody draws, seral condition, and economics. Alternative 1 proposes the cessation of livestock grazing; Alternative 2 proposes to maintain existing management; Alternative 3 proposes to continue livestock grazing in an environmentally acceptable manner using an adaptive management approach and a variety of structural and nonstructural management practices. Alternative 3A was added to the SDEIS in response to public comment on the DEIS and is now part of the FEIS. It proposes the same adaptive management approach but modifies the proposed action by adding or deleting management actions in response to public comment. Alternative 4 is also adaptive management based but utilizes some initial action nonstructural practices not utilized in the other alternatives. The effects of each alternative are described to compare and contrast the alternatives.

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Table of Contents

LIST OF TABLES ..... **IV**

LIST OF FIGURES ..... **VI**

SUMMARY OF THE FINAL ENVIRONMENTAL IMPACT STATEMENT ..... **I**

INTRODUCTION I
PURPOSE AND NEED IV
DECISION FRAMEWORK VII
PUBLIC INVOLVEMENT VII
KEY ISSUES IX
ALTERNATIVES CONSIDERED IN DETAIL XIII
ALTERNATIVE 1 XIII
ALTERNATIVE 2 XIV
ALTERNATIVE 3 XIV
ALTERNATIVE 3A XVII
ALTERNATIVE 4 XVIII
PREFERRED ALTERNATIVE XVIII
DESIGN CRITERIA COMMON TO ACTION ALTERNATIVES XIX
MONITORING XX
IMPLEMENTATION (SHORT-TERM) MONITORING XXI

Effectiveness (Long-Term Trend) Monitoring xxii
Trigger Points xxiii
Summary Comparison of Alternatives xxiii

CHAPTER 1 PURPOSE OF AND NEED FOR ACTION 1

Introduction 1
Overview 2
Historic and Legal Framework 5
Grasslands Plan Direction Specific to Project Area 7
Management Area 1.31: Nonmotorized Backcountry Recreation 10
Management Area 2.1: Special Interest Areas 10
Management Area 2.2: Research Natural Areas 10
Management Areas 3.51A: Bighorn Sheep, and 3.51B: Bighorn Sheep Habitat With Non-Federal Mineral Ownership 10
Management Area 3.65: Rangelands with Diverse Natural Appearing Landscapes 10
Management Area 4.22: River and Travel Corridors 11
Management Area 6.1: Rangeland with Broad Resource Emphasis 11
Purpose and Need 11
Proposed Action 15
Adaptive Management 15
Scope of the Proposal 17
Geographic Scope 17
Temporal Scope 17
Administrative Scope 17
Decision Framework 19
Tiered and Reference Documents 19
Public Involvement 20
Key Issues 21
Issues Eliminated from Detailed Study 27
Archeology 27
Noxious Weeds 29
Threatened and Endangered Plant Species 30
Sensitive Plant Species 30
Recreation 31
Threatened and Endangered Wildlife Species 33
Sensitive Species, Management Indicator Species (MIS), Raptors 33
Soils 36
Soil Capability 38
Soil Productivity 40
Climate Change 40
Water Quality 42

CHAPTER 2 ALTERNATIVES, INCLUDING THE PROPOSED ACTION 44

Introduction 44
Alternatives Considered in Detail 44
Alternative 1 44
Alternative 2 45
Alternative 3 45
Alternative 3A 47
Alternative 4 49
Preferred Alternative 49
Design Criteria Common to Action Alternatives 49
Alternatives Considered but Dropped from Detailed Analysis 51

Monitoring....54
Implementation (Short-Term) Monitoring....55
Effectiveness (Long-Term Trend) Monitoring....55
Water Quality....56
Trigger Points....57
Riparian....57
Green Ash Woody Draws....59
Herbaceous Structure....60
Seral Stages (Plant Composition)....61
Comparison of Alternatives....62

CHAPTER 3 PART 1 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES....73

Introduction....73
Project Area....73
General Setting....73
Past, Present, and Reasonably Foreseeable Actions....76
Past Actions....76
Present and Reasonably Foreseeable Actions....80
Summary of Past, Present, and Reasonably Foreseeable Actions....82
Affected Environment and Environmental Consequences....85
Range....85
Introduction....85
Spatial and Temporal Setting....86
Methodology....86
Affected Environment—Range....93
Environmental Consequences—Range....101
Consistency with Grasslands Plan—Range....108
Riparian....111
Introduction....111
Spatial and Temporal Setting....112
Methodology....113
Affected Environment—Riparian....115
Environmental Consequences—Riparian....120
Consistency with Grasslands Plan—Riparian....128
Woody Draws....130
Introduction....130
Spatial and Temporal Setting....132
Methodology....132
Affected Environment—Woody Draws....135
Environmental Consequences—Woody Draws....148
Consistency with Grasslands Plan—Woody Draws....165
Herbaceous Structure....166
Introduction....166
Spatial and Temporal Setting....166
Methodology....167
Affected Environment—Herbaceous Structure....169
Environmental Consequences—Herbaceous Structure....178
Consistency with Grasslands Plan—Herbaceous Structure....186
Seral Stages....186
Introduction....186
Spatial and Temporal Setting....187
Methodology....187
Affected Environment—Seral Stages....192

Environmental Consequences—Seral Stages 194
Consistency with Grasslands Plan—Seral Stages 210
Sharp-tailed Grouse 210
Introduction 210
Spatial and Temporal Setting 210
Methodology 211
Affected Environment—Sharp-tailed Grouse 211
Environmental Consequences—Sharp-tailed Grouse 214
Consistency with Grasslands Plan—Sharp-tailed Grouse 221
Economics 224
Introduction 224
Spatial and Temporal Setting 225
Methodology 226
Affected Environment—Economics 233
Environmental Consequences—Economics 243

INDEX 261

VOLUME II – CHAPTER 3 PART 2
VOLUME III – CHAPTER 4, GLOSSARY, LITERATURE CITED, INDEX, APPENDICES

List of Tables

Table S.1 — Livestock grazing allotments included in the proposed action I
Table S.2 — Grasslands Plan desired conditions, existing conditions, and need for action V
Table S.3 — Grazing Management Toolbox XVI
Table S.4 — Recommendations incorporated into Alternative 3A XVII
Table S.5 — Actions not included in Alternative 3A XVIII
Table S.6 — Design criteria XIX
Table S.7 — Effectiveness monitoring schedule XXII
Table S.8 — Summary of how the alternatives respond to the purpose and need XXIV
Table S.9 — Key issue comparison of the alternatives XXV
Table S.10 — Comparison of summer Authorized Use by alternative XXX
Table S.11 — Summary of initial actions by alternative XXXII
Table 1.1 — Livestock grazing allotments included in the proposed action 2
Table 1.2 — Management area acreage in the project area 8
Table 1.3 — Grasslands Plan desired conditions, existing conditions, and need for action 13
Table 1.4 – Summary of sensitive species, management indicator species (MIS), and raptor information in project area .33
Table 1.5 – Summary of total DSD area, total acres of DSD, and total percentage of DSD 37

Table 1.6 – Soils stability and hydrologic function of soils, summary for 2008 and 2009 field seasons; percentage of sampled ecological sites by category by allotment 39
Table 2.1 — Grazing Management Toolbox 46
Table 2.2 — Recommendations incorporated into Alternative 3A 48
Table 2.3 — Actions not included in Alternative 3A 48
Table 2.4 — Design criteria 49
Table 2.5 — Effectiveness monitoring schedule 56
Table 2.7 – Woody draw trigger points 60
Table 2.8 — Herbaceous structure trigger points* 61
Table 2.9 — Trigger points for seral stages 62
Table 2.10 — Summary of how the alternatives respond to the purpose and need 62
Table 2.11 — Key issue comparison of the alternatives 64
Table 2.12 — Comparison of summer Authorized Use by alternative 69
Table 2.13 — Summary of initial actions by alternative 71
Table 3.1 — Summary of acres and AUMs associated with active and reclaimed oil and gas pads and roads in the project area 80
Table 3.2 — Summary of past, present, and reasonably foreseeable future actions considered in the cumulative effects analysis 83
Table 3.3 — Sampled plots in MLRA 54 and 58C 91
Table 3.4 — Comparison of alternatives to 3-year average MGA summer permitted use 96
Table 3.5 — Comparison of alternatives to Preference 98
Table 3.6 — Authorized Use under Alternative 2 102
Table 3.7 — Authorized Use under Alternative 4 104
Table 3.8 — PFC functionality ratings and definitions 114
Table 3.9 — Riparian functionality ratings (miles and percent miles of channel) for intermittent streams in the North Billings project area 116
Table 3.10 — Riparian functionality ratings for intermittent streams in the N. Billings project area 118
Table 3.11 — Number of stream reaches that would improve by action alternative 121
Table 3.12 — Comparison of alternatives to MGA 3-year average summer permitted use for allotments with streams reaches rated as FAR-NA, FAR-D, or NF 124
Table 3.13 — Percentage of sampled woody draws rated as Healthy, Unhealthy, or At Risk by allotment 135
Table 3.14 — Characteristics of tree and shrub canopy cover among Healthy, At Risk, and Unhealthy sites 138
Table 3.15 — Tree density per acre by size classes among Healthy, At Risk, and Unhealthy sites 139
Table 3.16 — Summary of effects rationale by allotment for woody draws, Alternative 3 150
Table 3.17 — Summary of effects rationale by allotment for woody draws, Alternative 3A 155
Table 3.18 — Summary of effects rationale by allotment for woody draws, Alternative 4 157
Table 3.19 — Approximate acres of the biologically capable habitat types in the project area 168
Table 3.20 — Distribution of allotments in relation to Grasslands Plan structure objectives 173
Table 3.21 — Comparison of transect and station averages and Grasslands Plan structure objectives for 2004 and 2005 sample years 175
Table 3.22 — Grasslands Plan structure objectives for the Rolling Prairie and Badlands Geographic Areas 176
Table 3.23 — Summary of VOR transects supporting High structure by biologically capable habitat type on the Medora Ranger District 176
Table 3.24 — Summary of VOR transects supporting High structure on biologically capable habitat types in the NE Mckenzie FEIS project area 177
Table 3.25 — Summary of predicted effects on High structure and structure objectives in general, Alternative 3 180
Table 3.26 — Summary of predicted effects on High structure and structure objectives in general, Alternative 4 181
Table 3.27 — Seral stage percentages by methodology 193
Table 3.28 — Effects of proposed actions on current trends of plant composition under Alternative 3 197
Table 3.29 — Effects of proposed initial actions on plant composition under Alternative 3A 201
Table 3.31 — (Left) 2004 and 2005 transect herbaceous structure distribution within the project area 212
Table 3.32 — (Right) 2004 and 2005 station herbaceous structure distribution within the project area 212
Table 3.33 — 2004 and 2005 VOR structure distribution within 1 mile of leks within the project area 213

Table 3.34 — Summary of projected effects, by allotment, for Alternative 3 initial actions on the nesting and brooding habitat of sharp-tailed grouse 216
Table 3.35 — Summary of Alternative 4 effects on sharp-tailed grouse nesting and brooding habitat within 1 mile of known leks 217
Table 3.36 — Demographic overview for North Dakota and Billings County, ND. 234
Table 3.37 — Summary of occupations in North Dakota and Billings County, ND, 2000 235
Table 3.38 — Summary of industries in North Dakota and Billings County, ND, 2000 235
Table 3.39 — Annual part- and full-time employment contribution* from the North Billings project area 237
Table 3.40 — Annual labor income contribution* from the North Billings project area 238
Table 3.41 — Average annual receipts and payments returned to project area county 240
Table 3.42 — Proposed reduction schedule for authorized federal AMs 244
Table 3.43 — Annual part- and full-time employment and labor income contributions from federal forage, Alternative 3* 245
Table 3.44 — The economic impacts of alternative 3, considering the economic contribution of all cows, yearlings, and calves that spend time in the project area at some point in the year* 246
Table 3.45 — Annual part- and full-time employment and labor income contributions from federal forage, Alternative 4* 248
Table 3.46 — Annual part- and full-time employment and labor income contributions from federal forage based on the economic contribution of all cows, yearlings and calves that spend time in the project at some point in the year, Alternative 4* 249
Table 3.47 — Effects of Alternative 4 on grazing fee collections 249

List of Figures

Figure S.1 — Project area. ii
Figure S.2 — Grazing allotment locations. iii
Figure 1.1 — Project area. 3
Figure 1.2 — Grazing allotment locations. 4
Figure 1.3 — Management areas located in the project area. 9
Figure 1.4 — Adaptive management approach for the action alternatives. 18
Figure 3.1 — Fenceline contrast displaying rapid transition in riparian functionality rating. 113
Figure 3.2 — Surveys streams and functionality ratings. 117
Figure 3.3 — Healthy woody draw conditions. 136
Figure 3.4 — At Risk woody draw conditions. 137
Figure 3.5 — Unhealthy woody draw conditions. 137
Figure 3.6 — Decadent box elder tree with more than 100 basal sprouts that have been regularly browsed. 138
Figure 3.7 — (Left) Ephemeral water sources with typical livestock trampling. 139
Figure 3.8 — (Right) Intermittent water sources with typical livestock trampling. 139
Figure 3.9 — Young green ash establishing immediately downstream of a 10- to 15-foot headcut and the terminus of the existing woody draw. 140
Figure 3.10 — Tree density by size class among Healthy, At Risk and Unhealthy woody draws. 142
Figure 3.11 — Average sapling densities between 1993 and 2008. 142
Figure 3.12 — Average percentage canopy cover of chokecherry and western snowberry between 1993 and 2008. 143
Figure 3.14 — 1996 to 2001 VOR transect data from NFS lands, Billings County, ND. 170
Figure 3.15 — 1996 to 1999 VOR transect distribution within project area. The numbers in parentheses are the number of transects sampled in that year. 171
Figure 3.16 — Herbaceous dominated structure transect results expressed as percentages for the project area (2004 and 2005 results) and Grasslands Plan objectives. 172

FIGURE 3.17 — 2004 AND 2005 VOR DISTRIBUTION OF STATIONS WITHIN HERBACEOUS DOMINATED TRANSECTS WITHIN THE PROJECT AREA. 174

Summary of the Final Environmental Impact Statement

INTRODUCTION

The North Billings County Allotment Management Plan Revisions (North Billings) project area is located on the Medora Ranger District, which is part of the Dakota Prairie Grasslands. The Medora Ranger District encompasses National Forest System (NFS) lands located in Billings, Golden Valley, and Slope Counties. The project area is located in northern Billings County, North Dakota, and a small portion of one township in northeastern Golden Valley County, North Dakota. It encompasses all or portions of NFS lands located in T144N, R99W, R100W, R101W, and R102W; T143N, R99W, R100W, R101W, R102W, R103W; and T142N, R100W and, R101W (Figure S.1).

There are 43 livestock grazing allotments within the project area.[1] Table S.1 identifies the grazing allotments associated with the proposed action. Figure S.2 displays the location of the allotments within the project area.

Table S.1 — Livestock grazing allotments included in the proposed action

126	127	128	129	130	131	132A	132H	133	133D5	134
135	136/139	140	141	142	158	220	221	230	237	239
240	241	243	244	248	249	256	258	272	277	278
281	282	283	286	287	288	289	300	301	302	

These allotments cover approximately 87,262 acres of NFS land with approximately 70,871 of those acres being capable of sustaining grazing, as determined by the 2001 Northern Great Plains FEIS. In relation to grazing, the 2001 Dakota Prairie Grasslands Land and Resource Management Plan (Grasslands Plan) characterizes the land base as capable or incapable of supporting grazing activity.

The Forest Service (FS) proposes to continue to permit livestock grazing on these allotments through a program of actions that maintains and/or moves resource conditions towards meeting the Grasslands Plan objectives and desired on-the-ground conditions.

[1] When scoped, this project proposal contained 46 grazing allotments. Since that time, the NFS lands contained within allotments 224, 228, 229, and pasture 4 in allotment 127 have been conveyed from federal ownership to the private sector. The land conveyance was done in compliance with Sec. 424. (a)Land Sale Authorization of the Consolidated Appropriations Act of 2008. Section 424 of the Act directs selling federal lands to offset the private acreage gained by the federal government in the purchase of the Elkhorn Ranch.

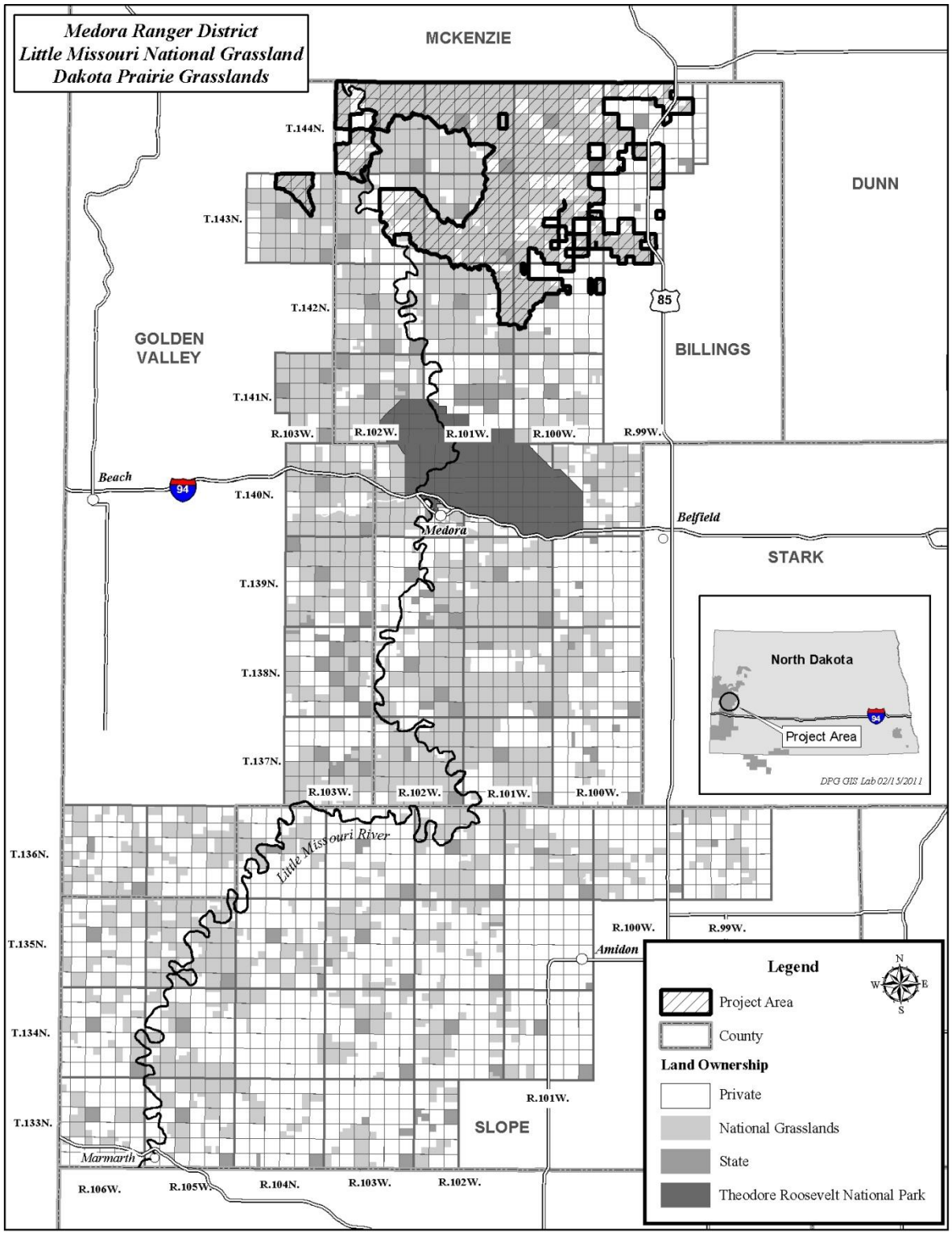

Figure S.1 — Project area.

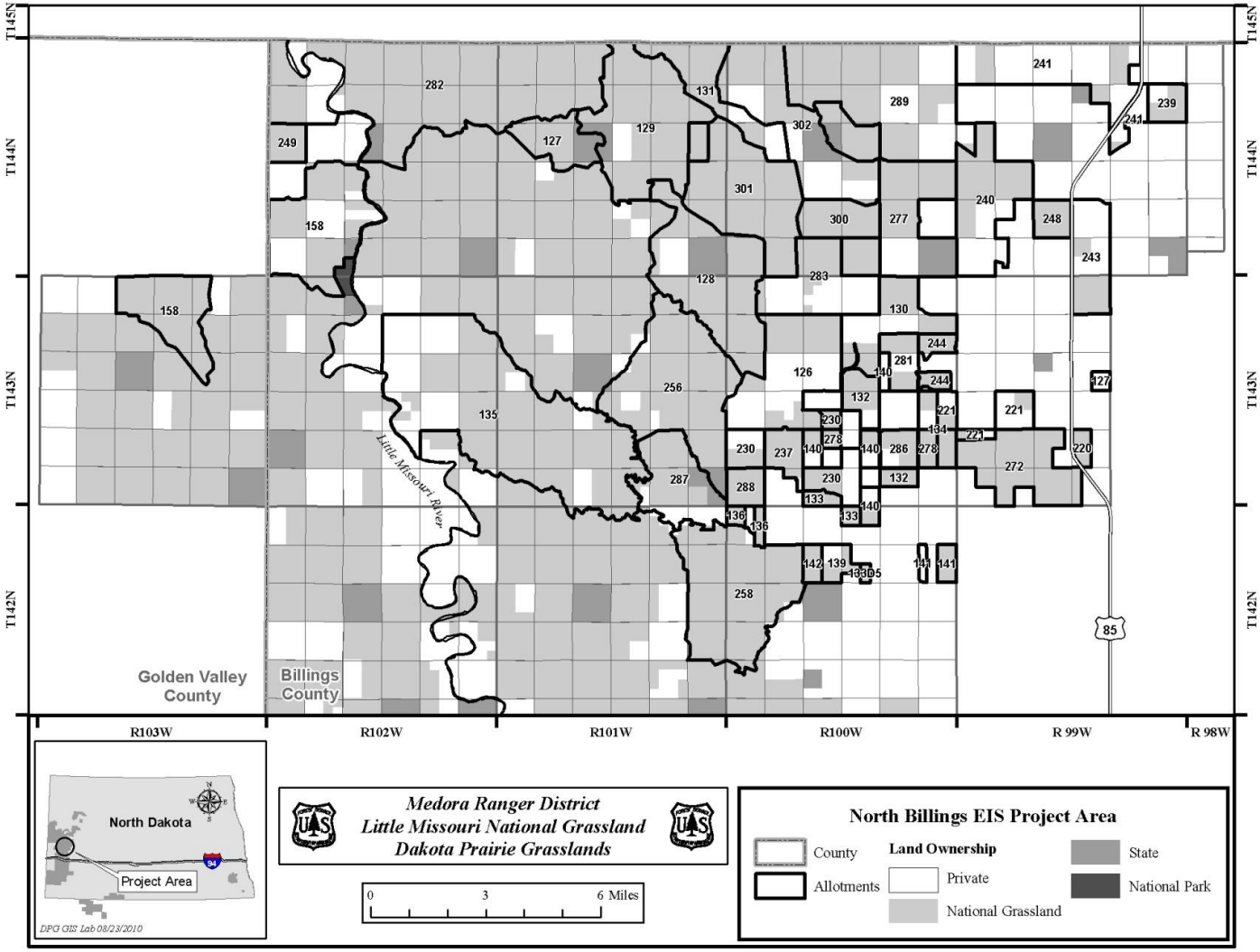

Figure S.2 — Grazing allotment locations.

PURPOSE AND NEED

The Forest Service rangeland allotment management process calls for periodic reviews of allotment conditions and management practices. Regulation 36 CFR 222.2(c) states, "Forage producing National Forest System lands will be managed for livestock grazing and the allotment management plans will be prepared consistent with land management plans." All of the allotments in this analysis are due for environmental review. The Rescission Act of 1995 (P.L. 104-19, Section 504) requires that all grazing allotments on NFS lands undergo NEPA analysis prior to revision of existing allotment management plans. The underlying needs for this proposal include:

- Some resources are not at Desired Conditions as identified by the Grasslands Plan. There is a need to meet or move toward Desired Conditions for those affected resources in accordance with Grasslands Plan direction (pp 1-2, 1-3)[2] while allowing grazing on suitable lands and supporting local families and communities.
- There are overall needs (a) for greater management flexibility to meet Grasslands Plan resource goals and objectives and to cope with fluctuations in environmental and social conditions including, but not limited to, annual changes in weather; (b) to be responsive to permittee requests for reasonable operational adjustments; and (c) to respond to unforeseen or changing issues.

The project specific need for action is created by the disparity between what is present (existing condition) and what is wanted (desired condition) of a resource. The specific action needs for the allotments in this analysis are summarized in Chapter 3 of this FEIS. Table S.2 below identifies which resources are of concern to this analysis.

[2] A requirement of the Demonstration Project is to "determine if Plan Goals and Objectives are achievable or need modification, and monitor progress towards meeting the resource objectives". The analysis completed for North Billings determined that the Plan goals and objectives are achievable; therefore, modification to the Plan is not needed and has not been incorporated. However, monitoring progress towards meeting the resource objectives is an integral component of the proposed action.

Table S.2 — Grasslands Plan desired conditions, existing conditions, and need for action

Grasslands Plan Desired Condition	Existing Condition	Need for Action
----------Riparian/Streams----------		
The Grasslands Plan identifies an objective of meeting or moving towards Proper Functioning Condition on 80 percent of perennial streams. It also directs that corrective action on Functional-At Risk and Nonfunctional streams be initiated. Streams in this case include intermittent streams.	Within the project area approximately 56.4 miles of stream reaches associated with 11 intermittent streams were surveyed in 2004, 2005, 2006, and 2007 to determine their condition. Of the 56.4 miles of stream reaches surveyed, 28.6 miles (51 percent) were at Proper Functioning Condition (PFC); 2.5 miles (4 percent) were Functional-At Risk-Upward Trend (FAR-U); 3.3 miles (6 percent) were Functional-At Risk-Trend Not Apparent (FAR-NA); 2.9 miles (5 percent) were Functional-At Risk-Downward Trend (FAR-D); and 19.1 miles (34 percent) were Nonfunctional (NF). The only perennial stream in the project area is a small portion of the Little Missouri River. A field review of this portion of the river in 2010 indicated that there were no riparian concerns.	There is a need to improve riparian and/or stream conditions for those intermittent stream reaches identified as Functional-At Risk-Downward Trend or Nonfunctional (21.3 miles of stream occurring in 22 of the 43 allotments).
----------Green Ash Hardwood Draws----------		
Trees cover about 10 percent of the landscape on the Medora Ranger District. Of the different types of woodlands in the project area, only the green ash hardwood draws are of concern. The desired condition for green ash draws is that they are self-perpetuating and exhibit a multi-layer and multi-age class of herbaceous plants, shrubs, and trees (Grasslands Plan, pp.1-2, 2-10, 2-17).	Surveys (1998, and 2005-2007) of green ash wooded draws across the project area show that approximately 51 percent are in Healthy condition, 42 percent are At Risk, and 7 percent are Unhealthy. Lack of or low tree regeneration and heavily impacted or absent shrub layers are the primary factors affecting woodland health.	There is a need to improve the health of At Risk and Unhealthy green ash draws in 32 of the 43 allotments by moving them towards healthy self-perpetuating, multi-layered, multi-aged class communities of herbaceous plants, shrubs, and trees.

Grasslands Plan Desired Condition	Existing Condition	Need for Action
----------Vegetative Structure----------		
Grasslands Plan direction is to maintain a shifting mosaic of vegetation structure across the landscape. The desired vegetative mosaic is composed of the Badlands and Rolling Prairie geographic area vegetation structure objectives. These objectives identify a desired array of Low (10-20 percent), Moderate (50-70 percent), and High (20-30 percent) structure across the geographic areas.	Generally, desired high and low structure objectives are not being met in the project area. Survey data from 1996 to 2005 show High structure ranged from 1 to 20 percent, Moderate structure ranged from 56 to 71 percent, and Low structure ranged from 23 to 53 percent.	There is a need to increase the amount of High structure and decrease the amount of Low structure across the project area.
----------Vegetative Seral Stages----------		
Seral stages are the successional stages a plant community progresses through over the course of time. Seral stages range from early pioneer vegetation to climax vegetation. The desired condition for seral stage is composed of the Badlands and Rolling Prairie geographic area seral stages objectives located in Chapter 2 of the Grasslands Plan. Seral objectives are 10-15 percent in early seral stage, 65-75 percent in mid seral stage, and 15-20 percent in late seral stage across the geographic areas.	Surveys completed (1996-2001 and 2004-2010) across the project area indicate that approximately 7 percent of the area is at early seral stage, 72 percent of the area is at mid seral stage, 5 percent of the area is at late seral stage, and 16 percent is at an Invaded Grass State where seral stage was not classified.	There is a need to increase the amount of late and early seral stages and reduce the amount of mid seral plant communities. There is also a need to increase the maintenance of native plant communities, and limit the spread of invasive species and transitions to Invaded Grass States.

DECISION FRAMEWORK

The Grasslands Supervisor is the responsible official who has decided, through alternative selection, to continue livestock grazing on all or portions of the 43 allotments with itemized terms and conditions. The Grasslands Supervisor has selected the final potential alternative in the Draft Record of Decision (ROD) to meet or move towards Grasslands Plan objectives in a timely manner for these 43 allotments. The Grasslands Supervisor is authorized to select any of the alternatives or create a new alternative within the range of the existing alternatives. The Grasslands Supervisor is also responsible for determining whether or not this project requires any site specific amendment(s) to the Grasslands Plan.

Now that the decision process is complete, time will be allowed for the objection process to reach its conclusion. Comments from Objectors to the Draft ROD will be weighed and considered with the FEIS analysis so there is time to make any further adjustments, if the Grasslands Supervisor deems necessary, to publish the Final ROD. Allotment management plans (AMPs) will be written based on the alternative selected. The AMP is the implementation document by which the Forest Service communicates the management objectives and planned actions to accomplish those objectives.

The FEIS is not a decision document. It discloses the environmental consequences of implementing the proposed action and alternatives to that action. Following publication of the FEIS and Draft ROD, the Objection process will ensue. Lastly, the Grasslands Supervisor will select the alternative to be implemented and document his reasoning in a Final ROD.

PUBLIC INVOLVEMENT

A scoping letter was sent to 103 interested parties on May 23, 2008. The letter asked that comments on the proposed action be received by June 23, 2008. A notice of intent (NOI) to prepare an environmental impact statement (EIS), for the North Billings project was published in the *Federal Register* on May 15, 2008.

The Forest Service held public open-house meetings on June 17, 2008, in Dickinson, ND, and on June 18, 2008, in Bismarck, ND. News releases announcing the open houses were sent to the *Bismarck Tribune*, which is the DPG newspaper of record, the *Dickinson Press*, the *Bowman County Pioneer*, *The Herald*, and the *Golden Valley News*. An announcement was also sent to Dickinson and Bismarck, ND, televised Community Calendars. The Forest Service also invited public comment through publication of the proposal in the January 2008 Dakota Prairie Grasslands (DPG) Schedule of Proposed Actions (SOPA).

The DEIS was mailed to a total of 66 individuals, groups, federal, state, and county agencies on June 30, and July 1, 2009. A news release announcing the release of the DEIS was sent to the *Bismarck Tribune*, six other daily newspapers, and numerous radio and television stations on July 1, 2009. The notice of public comment for the DEIS was published in the *Bismarck Tribune* on July 3, 2009. The North Dakota Congressional Delegation was contacted by phone and sent a

briefing paper on July 1, 2009. The briefing paper was also faxed to the Billings and Golden Valley County Commissions and the Medora Grazing Association (MGA). On July 2, 2009, a copy of the news release announcing the release of the DEIS was faxed to the Billings and Golden Valley County Commission and the MGA.

The notice of availability for the DEIS appeared in the *Federal Register* on July 10, 2009. The comment period on the DEIS was to have closed on August 14, 2009. However, on August 13 it was discovered that the e-mail address for comments was incorrect. The district ranger extended the comment period to September 4, 2009, to accept any comments that may not have been received due to the incorrect address. A letter was sent to the project mailing list on August 25, 2009, extending the comment period, and a new notice of public comment was published in the *Bismarck Tribune* on August 28, 2009.

In an effort to further expand the comment base and the opportunity for public participation, the district ranger further extended the public comment period to October 10, 2009; however, comments were accepted until October 13, 2009, because of the Columbus Day holiday. A letter was sent to the project mailing list on September 4, 2009, and a news release announcing the extension was sent to numerous television, radio, and newspapers on the same day. The district ranger, on September 4, 2009, notified the MGA, Billings County, and the congressional delegation of the October extension by phone. An amended notice extending the comment period to October 13, 2009 was published in the *Federal Register* on September 18, 2009. A total of 13 comments were received on the DEIS.

In order to respond to public comments received on the DEIS, and based on the time that had passed (almost 2 years) since the DEIS had been distributed, the DPG decided to take an extra step to ensure the public had seen, and had a chance to comment on, this important document. To that end, the Medora Ranger District of the DPG completed the SDEIS for the North Billings County AMP Revisions (USDA Forest Service 2011). The SDEIS rearranged the analysis to display both a landscape analysis by resource issue (SDEIS, Vol. I, Chapter 3, Part 1) and an allotment-level analysis by resource issue (SDEIS, Vol. II, Chapter 3, Part 2). The SDEIS also responded to comments by including an additional alternative, 3A, which included more information on soil capability, soil productivity, and water quality, and included discussions to address unavailable information and scientific controversy to name a few of the changes. The notification of availability for the document was published in the Federal Register on July 8, 2011. The SDEIS was mailed to a total of 80 individuals, groups, and federal, state, and county agencies on July 1, 2011. Chapter 4 of the SDEIS lists the agencies, organizations, and people who received copies of the SDEIS. A news release announcing the release of the SDEIS was sent to the Bismarck Tribune and numerous other newspapers and radio and television stations on July 1, 2011. The North Dakota congressional delegation was contacted by phone and sent a briefing paper on July 1, 2011. The Billings County Commission and MGA were called as well to inform them of the availability of the SDEIS. Briefings and/or question-and-answer sessions were provided at both the MGA July monthly board of directors meeting and the Billings County Commissioners August meeting. The Notice of Public Comment for the SDEIS was published in the Bismarck Tribune on July 8, 2011.

A news release was sent to the media, reminding the public of the August 22, 2011, deadline for SDEIS comments. However, in an effort to further expand the comment base and the opportunity for public participation, the District Ranger further extended the public comment period to September 21, 2011. On August 15, 2011, a letter was sent to those on the project mailing list, and a news release announcing the extension was sent to numerous television and radio stations and to newspapers on the same day. The Bismarck Tribune published the Notice of Public Comment extension on August 26, 2011. A total of 65 comments were received on the SDEIS.

KEY ISSUES

An issue is an effect on a physical, biological, social, or economic resource. An issue is not an activity in itself; instead, it is the projected effects of the activity that create the issue. For example, livestock grazing is an activity, but its effects on a resource can form an issue. A key issue suggests different courses of action—thus suggesting alternatives and detailed analysis. The Forest Service identifies key issues through contact/discussion (scoping) externally with the public, organizations, and other state and federal agencies and internally.

The interdisciplinary team (IDT) considered external and internal comments and discussions received during scoping, ongoing issues associated with general livestock management on the Medora Ranger District, and landscape information generated from the 2002 Little Missouri National Grassland Rangeland Assessment to identify key issues to be analyzed in this document. The IDT identified six key issues for the project area. The district ranger concurred and directed that these key issues should be carried through the analysis. The key issues, along with the indicator(s) of each issue, are presented below (a brief explanation of the indicator is also provided). Indicators are used to evaluate or measure the effects of an alternative on the different resources.

KEY ISSUE #1. RIPARIAN AREAS: There is a concern that livestock grazing is adversely impacting intermittent streams through excessive use of riparian vegetation, trampling and trailing of stream banks, loafing, etc. Intermittent streams typically flow seasonally when they receive water from surface sources such as snow melt, storm runoff, or from ground water discharge.

Major intermittent streams on NFS lands in the project area were surveyed from 1997 through 1999, and in 2004, 2006, and 2007 using the Proper Functioning Condition protocol (Pritchard et. al., 1998). Approximately 56.4 miles of stream reaches associated with 11 streams were surveyed. Of the surveyed stream reaches, 28.6 miles (51 percent) were at Proper Functioning Condition (PFC); 2.5 miles (4 percent) were Functional-At Risk-Upward Trend (FAR-U); 3.3 miles (6 percent) were Functional-At Risk-Trend Not Apparent (FAR-NA); 2.9 miles (5 percent) were Functional-At Risk-Downward Trend (FAR-D); and 19.1 miles (34 percent) were Nonfunctional (NF).

Proper Functioning Condition (PFC) means that the stream has adequate streambank vegetation, proper stream morphology (structure), or instream structures (i.e. woody debris, rock, etc.) present to dissipate stream energy, during high flows. This results in benefits including, but not limited to, reduced erosion, sediment and bedload capture, floodplain development, improved water quality, ground-water recharge, and development of streambank root masses.

Functional-At Risk means that riparian areas are in a functional condition but one or more properties(such as soil, water, or vegetation) are impaired, which makes the riparian area susceptible to degradation.

Nonfunctional means that the riparian area is not functioning properly. Typically, nonfunctioning riparian areas do not provide adequate vegetation, channel properties, or woody debris to dissipate stream energy associated with high flows and thus do not reduce erosion, improve water quality, capture sediment. etc.

Functional-At Risk and NF streams exhibit an inadequate amount of residual vegetation to trap sediments from fall/spring runoff or to control erosive energy in the channel. They display poor channel morphology (structure) and are affected by excessive bank trampling and lack of desired riparian plant communities. The Grasslands Plan provides guidance for streams identified as non-functioning or functioning at risk with a downward trend that corrective action should be taken within three years of stream inventory (Grasslands Plan Ch. 1, p. 1-11). The Grasslands Plan also identifies to allow only those actions next to perennial and intermittent streams, seeps, springs, lakes, and wetlands that maintain or improve long-term proper functioning of riparian ecosystem conditions (Grasslands Plan Ch. 1, p. 1-9). Some causes of stream degradation include livestock grazing and road impacts.

KEY ISSUE #2. GREEN ASH HARDWOOD DRAWS: There are several different types of woodland communities in the project area including Rocky Mountain juniper, aspen, cottonwood, and green ash hardwood draws. The woody draws are generally in good condition; however, there is a concern that effects from livestock grazing (including browsing, trampling, lounging, etc.) are adversely affecting the distribution of tree and shrub age classes in green ash hardwood draws. From this point forward green ash hardwood draws will be referred to as woody draws.

Healthy woody draws are defined as those woodlands that have self-perpetuating tree and shrub populations with diverse age classes, species composition, and multiple structural layers as habitat conditions permit.

At Risk woody draws tend to exhibit a moderate distribution of tree age classes, but lack consistent regeneration as expressed by sapling and young tree age classes. Desirable tall shrub (e.g., chokecherry, serviceberry) distribution tends to be patchy, and/or low shrubs (such as snowberry) dominate the shrub layer.

Unhealthy woody draws are generally characterized by old or decadent tree layers and a lack of younger age classes ranging from saplings to small diameter trees. The understory is dominated by invasive grasses or short shrubs such as snowberry.

Three different sets of woody draw surveys were collected and used to assess woody draw conditions. The sampled woody draws were rated as Healthy, At Risk, or Unhealthy. Of the green ash woody draws that were surveyed, 51 percent were Healthy, 42 percent were At Risk and about 7 percent were Unhealthy.

The Grasslands Plan provides guidance for woody draws and riparian areas to move at least 80 percent toward self perpetuating plant and water communities that have desired diversity and density of understory and overstory vegetation within site capability (Grasslands Plan Ch. 1, p. 1-2).

KEY ISSUE #3. VEGETATIVE STRUCTURE: There is a concern that livestock grazing has affected the mosaic of vegetative structure in the project area, which has generally resulted in too little High structure and too much Low structure in light of Grasslands Plan structure objectives. Because the geographic area direction within the Grasslands Plan focuses on grass, grass-like, and some shrub life forms, from this point forward vegetative structure will be referred to as herbaceous structure. Structure is an important measure for wildlife habitat, especially ground-nesting birds, but also has implications for other ecosystem attributes and rangeland health. Livestock management influences structure through several factors including intensity, frequency and timing of grazing activity.

The Grasslands Plan identifies a desired range for herbaceous structure as 10 to 20 percent in Low, 50 to 70 percent in Moderate, and 20 to 30 percent in High structure (Grasslands Plan, Ch. 2, pp. 2-13, 2-19).

Low Structure is defined as a Visual Obstruction Reading (VOR) reading between 0 and 1.49 inches.

Moderate Structure is defined as a VOR reading between 1.5 and 3.5 inches.

High Structure is defined as a VOR reading greater than 3.5 inches.

Visual Obstruction Reading (VOR) surveys conducted in the project area for 2004 and 2005 show High structure ranging from 0.6 to 7 percent, Moderate structure ranging from 47 to 64 percent, and Low structure from 30 to 53 percent. These surveys were conducted on biologically capable lands within the project area. VOR surveys conducted from 1996 to 2001 in Billings County show High structure ranging from 3 to 8 percent, Moderate structure ranging from 47 to 83 percent,

and Low structure from 11 to 49 percent. VOR surveys specific to the project area conducted between 1996 to 2001 show High structure ranging from 5 to 20 percent, Moderate structure from 56 to 70 percent, and Low structure ranging from 23 to 36 percent.

KEY ISSUE #4. VEGETATIVE SERAL STAGES: Seral stage refers to the current composition of plant species that occur along a continuum between early plant establishment and a climax plant community. The Grasslands Plan uses vegetative seral stages to identify desired condition for plant species composition. From this point forward vegetative seral stages will be referred to as seral stages. Seral stages are expressed as early, mid, and late stages. Plant communities change as they move from one seral stage to the next. A mosaic of seral stages is normally spread across the landscape.

Early seral stage is the plant community that occurs after a significant disturbance such as heavy continuous seasonlong grazing.

Mid seral stage is the plant community that is transitioning between early and late seral stages and typically develops under more stable environmental conditions, but can occur under a moderate level of disturbance.

Late seral stage is a plant community that develops with extended periods of no or little disturbance, and approaches composition of a climax plant community.

There is a concern that a combination of the expansion of invasive grass species and current grazing strategies is adversely affecting the desired mosaic of seral stages and maintenance of native plant communities. The current distribution of seral stages across the project area is approximately 7 percent in early seral stage, 72 percent in mid seral stage, and 5 percent in late seral stage. Approximately 16 percent of the sample sites are at an Invaded Grass State (NRCS, 2009) and not included in the seral stage analysis. The Grasslands Plan objectives for seral stages are to have 10 to15 percent in early seral stage, 65 to 75 percent in mid seral stage, and 15 to 20 percent in late seral stage.

KEY ISSUE #5. ECONOMICS: Potential reductions to Authorized Use are likely to have an effect on the economics of the individual permittee and adjacent communities. Calculating potential impacts to an individual permittee is very complicated and requires information not readily available. The broader concern, however, is related to how the range of alternatives would affect jobs and income in the agricultural sector, which includes livestock grazing. The economic analysis in this document is focused on the effects of the alternatives on jobs and income within an identified economic impact area of associated counties.

The analysis also considers an economic analysis completed by North Dakota State University (NDSU) for Billings County, ND. The NDSU analysis looks at the effects of two of the four alternatives in terms of changes in gross sales and net revenues from cow-calf operations and debt repayment capabilities.

KEY ISSUE #6. DROUGHT: A major factor affecting herbaceous structure, forage availability, and other resources across the landscape is drought. The Grasslands Plan (Appendix G, p. G-15) defines drought as any year or sequence of years when annual precipitation amounts are 75 percent or less of normal. Based on this definition, drought has occurred in 21 percent of the

years in the northern Great Plains, since 1940 (Holechek et.al. 1989). Within the past 10 years drought has occurred on the Little Missouri National Grasslands about 40 percent of the time according to the U.S. Drought Monitor (http://drought.unl.edu.dm).

Lack of precipitation during the growing season (April through July) has a major impact on the production of forage. Less available forage results in utilization levels being reached earlier in the grazing season, which results in fewer days of grazing. The DPG currently does not have a unit-wide drought strategy but is in the process of creating one. During this interim period a modification of the drought strategy identified in the 2005 NE McKenzie Allotment Management Plan Revisions FEIS will be used. Once the DPG drought strategy is completed it will replace the interim strategy. Drought is an important factor affecting livestock management on the DPG. It is included as an issue to highlight its importance and is addressed through inclusion of an interim drought strategy in the Design Criteria identified in Chapter 2.

ALTERNATIVES CONSIDERED IN DETAIL

For this project, the IDT considered the following elements in the development of the action alternatives: key issues; the purpose of and need for this project as identified in Chapter 1; the goals, objectives, and desired conditions for the project area as described in the Grasslands Plan; comments made by the public, the state, and various agencies during the scoping process; the laws, regulations, and policies that govern land management on National Grasslands; and site-specific resource information.

Four alternatives were developed and analyzed in the DEIS. After review of DEIS comments the responsible official decided to create and include an additional alternative in the SDEIS. The alternative descriptions, presented below, explain the activities that would occur if an alternative were selected. A detailed description of the environmental effects resulting from the alternatives is given in Chapter 3.

It is important to note that Authorized Use under all the alternatives, except Alternative 1, can be adjusted annually to account for situations that require additional resource protection. Examples include drought, grasshopper outbreaks, over-utilization of a pasture, etc. These adjustments are temporary in nature and normally encompass a single grazing season. However, if a resource has been severely affected, adjustments may be of longer duration.

Alternative 1

The CEQ regulations for implementing the NEPA require that a no-action alternative be developed as a benchmark from which the agency can evaluate the proposed action. No action in livestock management planning is defined as "…livestock grazing would not be authorized within the project area" (Forest Service Handbook [FSH] 2209.13, 92.31, Grasslands Plan ROD, 2006).

Upon implementation of the decision and resolution of any appeals, the term grazing permit with the Medora Grazing Association (MGA) would be modified to terminate livestock grazing in the

analysis area. Pursuant to FSH 2209.13, Section 16.24, this alternative could not be implemented until 2 years after the notification of each affected permittee (36 CFR§ 222.4(4)(1)). No permits would be issued for any of the 43 affected allotments. Since livestock grazing would no longer be authorized under this alternative, no mitigation measures for riparian habitat, woody draws, herbaceous structure, or seral stages would be completed. However, restoration projects could be planned and implemented, which would require a subsequent plan and NEPA decision.

Most range improvements currently in existence on the allotments would be abandoned. Subsequent decisions would need to be made regarding retention of any improvements, such as water developments, for other resource needs and funding for maintenance would need to be secured. Any water developments not needed for wildlife or other purposes, and all fences, except Grassland boundary fences or allotment boundary fences adjacent to other active grazing allotments, would be removed.

Under this alternative control of noxious weeds would become the sole responsibility of the Forest Service, as the MGA would no longer be authorized to graze livestock in the project area.

Preference is the maximum number of livestock for a given amount of time allocated to an allotment.

Alternative 2

This alternative would maintain the status quo. Authorized Use would remain at Preference; therefore, there would be no change in the number of livestock or season of use in the allotments within the project area. Some minor changes may be made in the Annual Operating Instructions (AOI) if needed. Existing conditions for each allotment are identified in Chapter 3 Part 2.

Alternative 3

As identified in Chapter 1, the proposed action for this project is to continue to permit livestock grazing at Preference, initially, on the 43 allotments in the project area through a program of actions that maintains and/or moves resource conditions towards meeting the Grasslands Plan objectives and desired on-the-ground conditions. This is to be achieved through implementation of initial actions and application of adaptive options, including the tool box if initial actions fail or cannot be implemented.

Tables x.2 and x.3 (identified by allotment number rather than chapter number) contained in each of the individual allotment write-ups in Chapter 3 Part 2, contain information identifying existing and desired conditions, need for action, initial management actions, and a set of adaptive options to address identified resource concerns for each allotment in the project. Taken together, the initial actions and adaptive options create the proposed program of actions for each individual allotment.

A key component of this alternative is monitoring, because it determines whether implemented management actions are accomplishing their intended resource goals. The starting point for each allotment is identified as “Initial Actions” in Table 3 of the allotment write-ups located in

Chapter 3 Part 2. If monitoring indicates that the initial actions are not meeting or moving a resource towards desired condition, then adaptive options can be applied. Monitoring is discussed in detail later in this document. The type, frequency, and duration of monitoring on each allotment is identified in Table 3 of each of the allotment write-ups.

Information contained in Chapter 3 Part 2 will be used in the development of new allotment management plans (AMPs) for the 43 allotments in the project area. The individual AMPs will be the documents that implement the selected alternative which will be identified in the Draft ROD for this proposal.

If initial or adaptive management options identified in the allotment write-ups located in Chapter 3 Part 2 cannot be implemented as planned, then a team composed of Forest Service specialists, in consultation with the affected permittee and MGA director, would make a recommendation to the district ranger. The recommended course of action would be based on the adaptive options identified for each allotment in Chapter 3 Part 2 and/or the Grazing Management Toolbox (Table S.3). For example, Allotment A contains an initial or adaptive option to develop a range water well, pipeline, and a stock tank or two. The purpose is to pull cattle away from a riparian area that needs improvement. However, for economic reasons it becomes unfeasible to develop the well and facilities in the reasonably foreseeable future, but the resource concern still needs to be addressed. At this point the additional management tools identified in the toolbox would be available to help solve the concern.

The toolbox is a collection of different management tools that could be used singularly or in combination to address resource issues if proposed initial management actions and adaptive options are not successfully addressing a resource concern(s). The toolbox is a compilation of all the different management tools identified in the 43 different allotment summary sheets. The different tools are not listed in any order of preference or priority for implementation.

It is possible that new rangeland management techniques may be developed during the life of this project. New techniques would be incorporated into the toolbox if their implementation is consistent with the effects documented in the FEIS and its accompanying ROD.

Between the DEIS and SDEIS, initial actions for Alternative 3 were modified for allotments 126, 128, 132H, and 300 based on discussion with the permittee for those allotments.

Table S.3 — Grazing Management Toolbox

Adjust AUMs (stocking rate) by # of head &/or # of days.
Adjust AUMs based on average cow size.
Adjust season of use.
Allow early turnout on native pastures one out of 3 years on inventory permits.
Construct and/or remove cross fences.
Construct fence to create riparian unit—allow grazing under riparian grazing dates.
Construct fence to exclude livestock from areas of concern (riparian, wooded draws, springs, wetlands, etc.).
Construct livestock water development (well, pipeline, tanks, windmill, reservoir, dugout, or spring).
Construct temporary fence to control livestock distribution patterns.
Construct water gap to limit livestock access on stream.
Construct/harden stream crossings.
Defer native pastures until June 1, or until development of the three-and-a-half leaf stage for key graminoid species.
Fertilize crested wheatgrass areas.
Hay or cut-&-leave crested wheatgrass areas.
Implement BMPs for riparian pastures.
Implement deferred grazing system.
Implement DPG drought management strategy.
Implement prescribed burns.
Implement rest-rotation grazing system.
Implement twice-over grazing system.
Incorporate a range rider to disperse livestock throughout a pasture (herding).
Incorporate private “off permit” land into rotation.
Interseed pasture with native grass species.
Maintain existing developments to reestablish use.
Manage salt and supplement locations.
Manage water availability/access at water developments.
Mechanical brush management.
Move winter feeding areas off of NFS lands.
Reallocation of pastures (change allotment boundary) .
Remove/reclaim water development (well, pipeline, tanks, windmill, reservoir, dugout, or spring).
Rest for one or more seasons.
Restore/enhance riparian vegetation, i.e., willow planting.
Scarify clubmoss areas within a pasture.
Utilize biological controls for noxious weed control in woody draws.
Utilize non-native grass pastures early to defer grazing on native grasses.

Alternative 3A

One of the MGA comments on the DEIS states that the association wanted Alternative 3 revised to reflect all of the MGA recommendations. They provided Exhibit 2, which compared Alternative 3, Appendix A to the notes of each permittee meeting regarding the initial recommendations. In Exhibit 2, they specifically highlighted recommendations that they felt the Forest Service dropped from consideration, and also highlighted Forest Service additions to Alternative 3, which the MGA claimed the MGA members did not agree to.

Tables 3 and 4 located in Appendix A discuss each item as highlighted in the MGA Exhibit 2. Some of the items highlighted by the MGA in Exhibit 2 did not provide recommendations or had already been addressed in Alternative 3. Therefore, Alternative 3A did not incorporate these highlighted items in the MGA recommended proposal.

In response to the MGA comment, the responsible official decided to include a new alternative in the SDEIS. The new alternative is identified as Alternative 3A. It was created by including applicable actions identified in the MGA Exhibit 2 that the MGA recommended be added to Alternative 3, and excluding some actions identified in Alternative 3 that the MGA did not agree with. Tables S.4 and S.5 summarize the changes made.

Table S.4 — Recommendations incorporated into Alternative 3A

Allotment #	MGA Association/Member Recommendations Added to Alternative
127	Construct a water lot around the existing spring development to allow access to both pastures 2 and 3 in the northeast quarter of the southwest quarter of Section 17, T144N, R101W.
129	Extend range water pipeline from well in allotment 131 pasture 3 into allotment 129 pasture 2 in Section 11, T144N, R101W.
135	Construct a range water pipeline from pasture 8 to pasture 10 and add one stock tank in Section 28, T143, R101W.
142	Construct an electric cross fence running east/west in pasture one.
243	Develop a spring in pasture 1 in the southwest quarter of Section 3, T143N, R99W.
258	Allow a permittee to turn livestock onto native pastures the middle to third week of May.
272	Develop a spring in pasture 2 in the northwest quarter of the southwest quarter of Section 30, T143N, R99W.
287	Construct an extension to the existing range water pipeline in pasture 3 into the northwest quarter of Section 26, T143N, R101W.

Table S.5 — Actions not included in Alternative 3A

Allotment #	Forest Service Actions in Alternative 3 but Not Included in Alternative 3A
126	Reclaim existing spring developments in pastures 4 and 6.
240	Reclaim reservoir(s) in pasture 1.
244	Cross fence pasture 2, north to south. Cross fencing would create a crested wheatgrass pasture on the east side of pasture 2, which would be grazed early. The additional pasture, created through the cross fence allows the implementation of a two pasture deferred grazing rotation between the remaining pastures.
272	Fence woody draw located in the southwest quarter of Section 30 with temporary electric fence. After construction of the pipeline is complete reclaim the dugout located in the southeast quarter of Section 29 pasture 1 and the reservoir located in the northwest quarter of the southeast quarter of Section 30 pasture 2.
278	Reclaim reservoir in pasture 2.
300	Once well is developed reclaim spring in the southeast quarter of Section 28.
301	Fence out spring areas, install check valve to dump water back into riparian areas once stock tanks are full.

Alternative 4

Alternative 4 is similar to Alternative 3 in some respects. However, it differs from Alternative 3 by establishing Authorized Use based on estimated livestock carrying capacities, and it accounts for changes in animal unit forage demands with changes in cow size (animal weight). Four of the allotments' Preference was less than initial estimated carrying capacity. Because there were resource concerns in these allotments, Authorized Use was set at Preference adjusted for cow size as a starting point. In addition, the IDT reviewed the initial and adaptive actions identified in Alternative 3. They then estimated the costs of initial action projects under Alternative 3 and prioritized those projects in light of the resource objectives the project was designed to address. Estimated costs were then compared against projected funding over the next 3 years. This resulted in a winnowing of projects and the development of different management approaches for some of the allotments.

The third table in each of the allotment specific write-ups contained in Chapter 3 Part 2 identifies the allotment-specific actions for each allotment for this alternative. This alternative is also adaptive by design, so if monitoring indicates a need to consider and possibly implement different management options, adaptation would be as discussed in Alternative 3.

PREFERRED ALTERNATIVE

Regulation 40 CFR Section 1502.14(e) of the CEQ regulations states "Identify the agency's preferred alternative or alternatives if one or more exist, in the draft [environmental impact]

statement…" At the time of the DEIS, the responsible official for this project did not have a preferred alternative. After review of information provided during the comment period on the DEIS and SDEIS, the Grasslands Supervisor has identified a combination of alternatives for the 43 allotments as the preferred alternative for this project proposal carefully identified in the Draft ROD.

DESIGN CRITERIA COMMON TO ACTION ALTERNATIVES

Design criteria (Table S.6) are actions designed into the action alternatives (Alternatives 3, 3A, and 4) to reduce impacts of proposed activities. They include any requirements that must be complied with by law, regulation, or policy, and include aspects such as best management practices (BMPs), Grasslands Plan standards and guidelines, and standard operating procedures.

Table S.6 — Design criteria

Place salt and supplement to draw livestock away from woodlands and riparian areas.
On native pastures, defer turnout until June 1, or until the three-and-a-half leaf stage is reached for key native graminoid species, e.g., western wheat, green needle, needle and thread. On inventory permits, early turnout on native pastures is allowed one out of 3 years.
Rotate placement of salt and supplement to minimize effects of concentrating livestock, trailing, etc.
Locate any new water source in uplands away from woodlands and riparian areas.
For allotments requiring a AM/AUM reduction: • If monitoring shows that resource objectives are being met before full implementation of the AM/AUM reduction has occurred, then no further reduction in AUMs will be implemented. • If, after the reduction in AM/AUMs is complete, monitoring shows that resource objective(s) have not been met but a significant sustained upward trend is evident, then further AUM adjustments will not occur unless continued monitoring indicates the upward trend is not being sustained. • If, after the reduction in AM/AUMs is complete, monitoring shows that resource objective(s) are not being met and there is a stagnated or downward trend, then, as an adoptive option, further AM/AUM adjustments may be initiated. • Temporary increases in AUMs may be granted if monitoring indicates that resource objectives are being exceeded.
If stocking rate adjustments are needed, annual reductions will generally not exceed 10 percent.
Move oilers, creep, and supplement feeders out of woodland and riparian areas.
When drought conditions occur, the DPG drought strategy will be followed. In the absence of the DPG drought strategy, the strategy identified in the NE McKenzie Allotment Management Plan Revisions FEIS will be followed, with some modification.* Permittees will be notified verbally and in writing that reductions in numbers and/or seasons may be anticipated.
Ground disturbing activities, such as installation of water developments, pipelines, fences, or exclosures, will require both heritage resource and sensitive species surveys approval by a Forest Service archeologist, botanist, and wildlife biologist prior to construction.
All new fencing will be built according to the standards identified in Grasslands Plan Appendix B.
All new or reconstructed water developments will include wildlife access and escape ramps.

Areas disturbed by rangeland improvement will be seeded with native species utilizing certified weed seed free mixtures prescribed by the Forest Service botanist.
Burn plans will be developed and approved for all prescribed fires prior to implementing on-the-ground actions.
Assess prescribed burn areas to determine appropriate stocking levels. Defer prescribed burn areas from livestock grazing for a portion or all of the following growing season to ensure regrowth of forage species unless there is specific reason to graze early.
Range improvements will be maintained to standard by the allotment permittee prior to turning livestock into the affected pasture.
Install floats and/or shut-off values to regulate inflow to livestock watering tanks.

*The drought strategy would be incorporated into Alternatives 3, 3A, and 4, and would:

- Use the publication *Drought Management on Range and Pastureland* (Reece et al. 1991) to determine allowable stocking levels during drought, unless interdisciplinary collaboration between the Forest Service and the Medora Grazing board provided rationale to deviate from those guides. This publication calculates stocking guidelines by considering weather and soil- moisture. The publication is identified in the Literature Cited section in this FEIS and is located in the Project Record.
- Manage grazing during drought, with the objective of maintaining at least 10 percent of herbaceous communities across biologically capable lands in the project area, for high structure and at least 40 percent for moderate structure. This will help ensure that the project area is not grazed evenly and retains plant cover to provide wildlife habitat, conserve soil moisture, and prevent soil erosion.
- Recognize that allowable utilization rates would be lower during drought.
- Recognize that frequent allotment inspections and early and frequent communications with permittees are key to ensuring that this strategy is effective.

MONITORING

Monitoring includes both grasslands-level and project-level analysis and evaluation. Grasslands-level monitoring is discussed at length in Chapter 4 of the Grasslands Plan and is not reiterated here. Project-level monitoring is the focus of this section of the FEIS.

Monitoring and evaluation are key elements of adaptive management. Adaptive management is proposed under Alternatives 3, 3A and 4. Even under Alternatives 1 and 2, monitoring and evaluation would be important. Monitoring helps determine how well Grasslands Plan and NEPA decisions are being implemented, whether AMP implementation is achieving the desired outcome, or whether changes in management are needed. Through monitoring, the Forest Service can measure whether or not management actions are meeting or moving towards desired conditions in an appropriate timeframe. Through adaptive management, AMPs can remain dynamic, relevant, and useful documents over many years. Additional discussion of adaptive management is contained in Chapter 1.

Two types of monitoring are associated with initiating management actions for a grazing allotment—implementation monitoring and effectiveness monitoring. Implementation monitoring generally measures and documents whether or not Grasslands Plan standards and guidelines and project-level design criteria (as selected in the Draft Record of Decision for this

project) are being applied. Effectiveness monitoring evaluates how effective management actions are at moving toward, achieving, or maintaining desired conditions. Under Alternatives 3, 3A, and 4, if a management action is determined not to be effective, the monitoring will trigger implementation of an adaptive management action. Under Alternatives 1 and 2, additional NEPA would be required before any substantive changes could be made.

Monitoring on the allotments can be accomplished by the Forest Service, permittees, or others (such as university partners and North Dakota Game and Fish), implementing approved methods and providing appropriate documentation that meets specified standards. Herbaceous structure, composition, riparian areas, and green ash woody draws will be the focus of effectiveness monitoring. Table 3 under each allotment write-up located in Chapter 3 Part 2 identifies the type and frequency of monitoring that is proposed for each allotment.

Implementation (Short-Term) Monitoring

Implementation monitoring is short-term monitoring that evaluates whether livestock management is being applied as prescribed in the AMP and implemented through the AOI. The Forest Service in conjunction with the MGA, under the direction of the Grazing Agreement, conducts this type of monitoring.

Compliance with Allotment Management Plan (AMP) and Annual Operating Instructions (AOI)

An AMP is the individual plan developed for a specific allotment. It identifies desired conditions, goals, and objectives applicable to the allotment to move it towards, achieving or maintaining desired objectives.

The AOIs implement the AMP and clearly explain how each allotment is to be managed on a year-to-year basis. The 2009 Grazing Agreement defines AOIs as

> detailed, FS and the MGA approved, instructions for livestock grazing administration to be implemented in a given year on a given allotment developed in conjunction with the MGA and the member. AOIs are based on the AMP and show number of livestock to be grazed, season of use, responsibilities for improvement construction or maintenance, and pasture rotation schedules.

On-the-ground implementation of the AOI is the MGA's and the permittees' responsibility. Checks by the Forest Service and/or the MGA conducted throughout and following the grazing season, including discussions with the permittee, will be used to evaluate compliance with the AOI and AMP.

Effectiveness (Long-Term Trend) Monitoring

Effectiveness monitoring is long-term monitoring that focuses on determining whether management is successful at maintaining existing desired conditions or is moving rangeland resources towards desired conditions. Determining trend toward or away from allotment objectives allows rangeland managers to accurately determine the relative success of the management system and to adjust management to achieve the accomplishment of objectives.

Effectiveness monitoring, as applied here, would center on responding to the "need for action" described in Chapter 1. The long-term health of riparian areas, herbaceous composition and structure, and green ash woody draws will be monitored on each allotment using the methods described in Table S.7. It is important to note that resources may be monitored more or less frequently than identified in Table S.8 if the responsible official decides there is a need to do so. Completing needed monitoring will require a coordinated collaborative effort between the Forest Service, its agent the Medora Grazing Association, and others such as the North Dakota State University and Dickinson State University.

Table S.7 — Effectiveness monitoring schedule

Monitoring Item	Method	General Frequency
Riparian areas	PFC	Every 3 years for streams rated as FAR-NA, FAR-D, or NF. Every 5 years for streams rated as PFC or FAR-U.
Woody draws	Sapling Density and Survival	Once within a 3- to 5-year timeframe.
Herbaceous structure	VOR	Approximately 25 percent of the allotments would be monitored annually for 3 years then reevaluated to determine monitoring frequency. A third of the remaining allotments would be monitored every year over the same 3-year period.
Seral stages	NDSU Ecological Sites and/or NRIS TERRA	Once within a 3- to 5-year timeframe.

TRIGGER POINTS

The value of monitoring under an adaptive management approach is that it reveals how management is performing relative to desired conditions. A natural extension of this process is to ask, "At what point do we consider the need to change management if monitoring indicates a lack of acceptable progress towards desired conditions?" The point at which monitoring indicates a possible need for change is called a trigger point.

Once a trigger point is reached, the district ranger will convene a team, composed of Forest Service specialists in consultation with the affected permittee and MGA Director. The team will review the monitoring data and other pertinent information to determine if a management adjustment is needed. If it is determined that any adjustments are needed, the team will review the adaptive management options identified in Table 3 under each allotment write-up located in Chapter 3 Part 2 and/or the Grazing Management Toolbox and recommend a course of action to the district ranger.

A **trigger point** implements a review process; it doesn't mean a management change is automatically needed. Take, for example, a stream that is rated at FAR-NA (Table S.9). To start moving the stream towards FAR-U, a series of initial actions are implemented on the allotment. If monitoring 5 years hence shows the stream has not achieved the next condition class, e.g., FAR-U, the monitoring information would be reviewed. If the review indicates significant progress is being made and that what is needed is an additional 1 to 2 years to achieve the next condition rating, the district ranger may decide to continue the current course of action with continued monitoring to ensure the goal is achieved in that timeframe.

Monitoring triggers for each of the primary resource issues are identified in Chapter 2 of the SDEIS. The triggers are applied at the allotment level.

SUMMARY COMPARISON OF ALTERNATIVES

The following tables briefly display the differences between the considered alternatives. Table S.8 summarizes the ability of the alternatives to meet the Purpose and Need. Table S.9 summarizes the effects of the alternative by Key Issue. Table S.10 summarizes the Authorized Use by alternative. Table S.11 presents a summary of the different initial management actions and other information associated with each of the alternatives.

Table S.8 — Summary of how the alternatives respond to the purpose and need

Purpose and Need	Alternative 1	Alternative 2	Alternative 3*	Alternative 3A*	Alternative 4*
Allow grazing and provide forage	No	Yes	Yes	Yes	Yes
Support ranching community	No	Would continue to support existing ranching community.	Would continue to support existing ranching community under initial actions. If reductions in Authorized Use were to occur as an adaptive action there is potential for a reduction in jobs and reduced income in the agricultural sector.	Same as Alternative 3	Is projected to result in the loss of 1-4 jobs and a reduction in revenue in the agricultural sector.
Meet or move towards Desired Conditions for resources	See Table 2.11 (in Chapter 2) for a discussion specific to each key resource.				
Provide for management flexibility i.e., adaptive management	No	No	Yes	Yes	Yes

*Alternatives 3, 3A, and 4 are adaptive management alternatives. Responses in the table above are to initial actions proposed under each alternative to address resource concerns. The suite of additional management tools, under adaptive management, available to each alternative is the same. The difference among the three alternatives when considering the adaptive management portion of the alternatives is time. Alternative 4 initially takes more aggressive steps to address resource concerns than do Alternatives 3 and 3A. If under Alternatives 3 or 3A monitoring reveals that more aggressive measures are required, being able to implement those measures and see significant results within the 10- to 15-year timeframe associated with this project becomes questionable.

Table S.9 — Key issue comparison of the alternatives

Key Issue	Indicator(s)	Alternatives				
		1	2	3	3A	4
Riparian	Riparian vegetation condition, sediment entrapment, and stabilization of stream banks and beds.	Removal of livestock would afford riparian vegetation recovery which would increase sediment trapping abilities and increase bank stabilization which, in turn, would bring affected streams segments to PFC. Stream segments adversely affected by the effects of road construction may continue to function below PFC.	This alternative would maintain the status quo in terms of the riparian vegetation condition and its ability to trap sediment and stabilized stream banks and beds. Percentages of PFC (51), FAR-U (4), FAR-NA (6), FAR-D (5), and NF (34) stream segments would remain the same.	Initial actions would provide for riparian vegetation recovery, reduced bank disturbance, and improved sediment capture. This would result in 23 of the 28 stream reaches identified as FAR or NF improving towards PFC. Eighteen of the 23 reaches that would improve are rated as FAR-D or NF. Seven of these 18 reaches could improve but could take several decades to reach PFC. *Adaptive Management*: Implementation of different adaptive management tools would see the additional improvement of four stream segments not improved with initial actions. There will be no improvement in allotment 277 (Scairt Woman Draw). This is because the underlying cause of the functionality problem was not clearly due to the effects of livestock grazing; therefore it was not clear that changes in grazing	Same as Alternative 3.	Initial actions would provide for riparian vegetation recovery, reduced bank disturbance, and improved sediment capture. This would result in 27 of the 28 stream reaches identified as FAR or NF improving towards PFC. Twenty seven of the FAR and NF reaches would improve although two of the 27 reaches are expected to take several decades to reach PFC due to the existing condition. *Adaptive Management*: Implementation of different adaptive management tools could decrease the recovery time of the two reaches that are expected to take several decades to reach PFC. There will be no improvement in allotment 277 (Scairt Woman Draw) for the same reason as identified under Alternative 3.

Key Issue	Indicator(s)	Alternatives				
		1	2	3	3A	4
				practices would result in recovery during the time frame of this project.		
Woody draws	Intensity, frequency, and season of disturbance relative to current levels of disturbance.	Removal of livestock would allow most At Risk and Unhealthy woody draws to recover to a Healthy condition rating. Some woody draws rated as Unhealthy are too heavily impacted and would eventually disappear from the landscape without an investment in additional resources, such as planting of trees and shrubs.	This alternative would maintain current Authorized Use numbers and grazing systems, range facilities, etc. Therefore the intensity and frequency of disturbance associated with livestock use would remain unchanged. Due to low sapling recruitment there is potential for some At Risk woody draws to shift to Unhealthy and for further reduction or loss of Unhealthy woody draws. The percentage of Healthy woody draws would persist. Currently 51 percent of the	This alternative maintains Authorized Use at Preference and would implement other initial actions to address woody draw concerns. The initial actions would affect both the intensity and frequency of use providing an opportunity for some improvement in woody draw health. Of the 43 allotments in the project 5 have no woody draws and 6 are meeting objectives. Of the remaining allotments 11 are predicted to improve, 15 would experience no change and 6 would decrease in condition. The total proportion of Healthy woody draws would not be expected to increase above 55 percent. *Adaptive Management*: Adaptive management tools would improve impacted woody draws.	Under this alternative, woody draw conditions would improve in 8 allotments, 15 allotments would experience no change, and in 9 allotments conditions would decrease. The total proportion of Healthy woody draws would not be expected to increase compared to existing conditions. *Adaptive Management*: Same as Alternative 3.	This alternative would set Authorized Use at initial estimated carrying capacity. Except in three allotments this action would result in a decrease in both the intensity and frequency of disturbance associated with livestock use of woody draws. Of the 32 allotments not meeting woody draw objectives, 21 are predicted to improve, 7 would experience no change, and 4 would decrease in condition. The total proportion of Healthy woody draws would have the potential to increase to 59 percent. *Adaptive Management:* Adaptive management tools, if needed, are the same as Alternative 3 and 3A. The difference between Alternatives 3,3A, and 4, is the rate of expected change. Because more aggressive initial actions are implemented under Alternative 4 the expected rate of change would be higher under Alternative 4.

Key Issue	Indicator(s)	Alternatives				
		1	2	3	3A	4
			woody draws are rated as Healthy, 42 percent At Risk and 7 percent as rated Unhealthy.			
Herbaceous structure	Levels of Authorized Use relative to initial estimated carrying capacity.	Removal of livestock would see an increase in High structure and decrease in Low structure.	Authorized Use would remain at current levels which in most of the allotments are above initial estimated carrying capacity. The 8 allotments meeting structure objectives would continue. The existing mosaic of structure on the remaining allotments would be maintained.	This alternative would maintain Authorized Use at Preference and would implement a series of different management actions. These actions would modify the existing structure mosaic but no increase in the amount of High structure is projected because the levels of Authorized Use, under initial actions remain at Preference. *Adaptive Management*: Adaptive management tools would move the existing structure mosaic towards structure objectives.	Same as Alternative 3.	Establishing Authorized Use at initial estimated carrying capacity would change the structure proportions of the current structure mosaic. The amount of Low structure would decrease. Moderate and High structure would increase, but to what degree is unknown. Monitoring would document the amount of shift. *Adaptive Management*: Adaptive management tools, if needed, are the same as Alternative 3 and 3A. The difference between Alternatives 3,3A, and 4, is the rate of expected change. Because more aggressive initial actions are implemented under Alternative 4 the excepted rate of change would be higher under Alternative 4.
Seral stages	Intensity, frequency, and timing of disturbance on	Removal of livestock grazing would allow for a shift towards	Current management activities are not meeting early	Initial management actions would see a shift towards achieving the seral stage objective in 23 percent of	Initial management actions would see a shift towards achieving seral stage objectives	Initial management actions would see a shift towards achieving seral stage objectives in 33 percent of

Key Issue	Indicator(s)	Alternatives				
		1	2	3	3A	4
	native species communities and communities dominated by invasive grasses.	late seral stages and a decrease in early seral stages. However, increasing invasive grasses would have a high potential to impede development or maintenance of late seral native plant communities.	and late seral stage objectives. The current level of grazing intensity and frequency of disturbance on native species would maintain the current seral stage mosaic. However, current trends in invasive grasses have the potential to increase the proportion of invaded grass states.	the allotments. Of the remaining allotments, 63 percent would maintain their current seral stages, and 14 percent would see shifts away from the seral stage objective. Invasive grass management issues would persist to varying degrees in about 70 percent of the allotments, including half of the allotments experiencing a shift towards seral stage objectives. *Adaptive Management*: Adaptive management tools would move towards desired seral objectives, however, invasive grasses may gain a greater foothold before adaptive tools are implemented under this alternative.	in 16 percent of the allotments, 68 percent of the allotments would maintain their current seral stages, and 16 percent would see shifts away from the seral stage objective. Invasive grass management issues would persist to varying degrees in about 70 percent of the allotments with the potential for transitions to Invaded Grass States. *Adaptive Management*: Same as Alternative 3.	the allotments, 53 percent of the allotments would maintain their current seral stages, and 14 percent would see shifts away from the seral stage objective. Reducing Authorized Use to initial estimated carrying capacity in native dominated communities would facilitate a shift towards late seral stage at a faster rate than Alternatives 3 and 3A. However, invasive grass management issues would persist to varying degrees in about 70 percent of the allotments with the potential for transitions to Invaded Grass States. *Adaptive Management*: Adaptive management actions would achieve seral objectives faster because there would be fewer allotments compared to Alternatives 3 and 3A to move towards seral objectives.
Economics	Combination of full and part time jobs and income for the 12 county	Loss of 20 to 39 jobs and $359,497 to $708,453 in annual income.	Maintains 20 to 39 jobs. Annual income to the economic	Maintains 20 to 39 jobs with potential for two additional jobs. Annual income to the	Same as Alternative 3. Billings County economic analysis identified that 3A	Potential loss of 1 to 4 jobs. Annual income to the economic analysis area in year one would range from

Key Issue	Indicator(s)	Alternatives				
		1	2	3	3A	4
	economic area. Billings County economic analysis – net margins and ability to repay debt.	The Billings County economic analysis did not address this alternative.	analysis area would range from $414,902 to $763,858. The baseline assessment in the Billings County economic analysis showed that smaller operations (≤150 head) have small net margins and little capacity to service debt. Larger operations (250-350head) have larger margins and greater ability to service debt.	economic analysis area would range from $414,902 to $763,858 The Billings County economic analysis did not specifically address this alternative. As Authorized Use is initially the same as Alternative 2 the economic effects are expected to be similar to Alternative 2.	would not change their assessment as there is no initial change in Authorized Use. Therefore, economic effects are thought to be similar to Alternative 2.	$382,404 to$699,814. At year five, income would be $359,576 to $654,829. Billings County economic analysis - Reductions in Authorized Use would reduce net revenues / net margins and ability to service debt. Smaller operations (≤150 head) have less capacity to service debt and would be more quickly affected than larger 250- 350 head operations.
Drought	Precipitation	No drought strategy needed.	No drought strategy in place. Would adapt DPG strategy when complete.	Would use a modification of the McKenzie Ranger District strategy until the DPG drought strategy is completed.	Same as Alternative 3.	Same as Alternative 3.

For comparison purposes in the table below the AMs authorized under Alternatives 2, 3, and 3A were converted to AUMs by multiplying the Authorized Use AM number (Preference) by 1.15 (see Grasslands Plan, Appendix I). This assumes that all of the animal units are larger cows within the range of 1,100 to1,300 pounds with an average of 1,200 pounds to get a conversion factor of 1.15 (the conversion factor is explained in detail in the Range section of Chapter 3). In some cases this will likely result in an over or under estimation, but, again, this is done for comparison purposes.

Table S.10 — Comparison of summer Authorized Use by alternative

NOTE DISCLAIMERS ABOVE

Allot #	Alternative 1 AUMs	Alternatives 2, 3, and 3A AUMs	Alternative 4 AUMs
126/128	0	2708	2178
127	0	474	345
129	0	1150	1000
130	0	729	678
131	0	55	48
132A	0	202	202
132H	0	370	353
133	0	313	198
133D5	0	56	35
134	0	292	220
135	0	1793	1559
136/139	0	416	285
140	0	323	237
141	0	204	113
142	0	192	128
158	0	1801	1527
220	0	184	112
221	0	283	174
230	0	419	358
237	0	331	250
239	0	288	176
240	0	930	876
241	0	413	357
243	0	431	347

Allot #	Alternative 1 AUMs	Alternatives 2, 3, and 3A AUMs	Alternative 4 AUMs
244	0	271	241
248	0	359	359
249	0	235	194
256	0	1830	1678
258	0	2382	1694
272	0	1694	1472
277	0	1298	1243
278	0	313	230
281	0	339	270
282	0	2441	2123
283	0	345	340
286	0	320	236
287	0	666	577
288	0	308	216
289	0	2057	1862
300	0	559	524
301	0	1916	1734
302	0	1201	1051
Total	0	32891	27801

The Table S.11 presents a summary of the different initial management actions and other information associated with each of the alternatives.

Table S.11 — Summary of initial actions by alternative

Proposed Action	Alt 1	Alt 2	Alt 3	Alt 3A	Alt 4
# of allotments with adjusted Authorized Use	0	0	0	0	41
# and (miles)of new fence	0	0	5 (6.2)	7 (6.4)	5 (6.4)
Total forage production	0	102,522,760	102,522,760	102,522,760	102,522,760
Total Authorized Use	0	29,125 AMs	29,125 AMs	29,125 AMs	28,340 AUMs
# and (acreage) of new riparian exclosures	0	0	1(3)	1(3)	7 (479)
# of new rangeland water wells	0	0	9	9	6
# of sites and (acreage) proposed for native tree & shrub planting	0	0	0	0	2 (129)
# of new water tanks and (approximate miles of new pipeline)	0	0	22 (17.9)	27 (23.2)	13 (11.6)
# of allotments with burning, mechanical, or chemical treatment of juniper or sage encroachment	0	0	2	2	2
# of dugouts, reservoirs, or springs reclaimed	0	0	12	2	6
# of springs or reservoirs fenced	0	0	8	9	9
# of new spring developments	0	0	0	2	0
# of woody draws fenced	0	0	2	0	4
# of allotments with stream crossing hardening and stream control structures	0	0	1	1	1
# of waterlots constructed	0	0	1	2	1
Projected cost of proposed rangeland facilities	0	0	$597,750	$646,826	$486,375

CHAPTER 1
Purpose of and Need for Action

INTRODUCTION

The USDA Forest Service (FS) has prepared this Final Environmental Impact Statement (FEIS) in compliance with the National Environmental Policy Act (NEPA) and other relevant federal laws and regulations. This FEIS discloses the direct, indirect, and cumulative environmental impacts that would result from the alternatives. The document is organized into four chapters:

Chapter 1. Purpose Of and Need for Action: This chapter briefly describes the proposed action, the need for that action, and other purposes to be achieved by the proposal. It also describes the public involvement process used and identifies key issues resulting from that process and issues eliminated from detailed study. Chapter 1 has been reorganized in the FEIS to more clearly provide the historical and legal context of the proposed action.

Chapter 2. Alternatives, Including the Proposed Action: This chapter describes the five alternatives considered in this analysis. It explains how the alternatives were developed, identifies alternatives considered in detail, alternatives dropped from further analysis, and design criteria associated with all the action alternatives. The chapter ends with a summary of the effects of implementing each alternative in relation to the purpose and need and the key issues.

Chapter 3. Affected Environment and Environmental Consequences: This chapter has been reformatted since the DEIS was published. There are now two parts to this chapter. Part 1 provides an overview and summarizes the affected environment and environmental consequences for each resource. It also describes the methodology used in analyzing each resource. Part 2 provides specific information and effects analysis by allotment for each alternative and resource.

Chapter 4. Consultation and Coordination: This chapter provides a list of preparers and agencies consulted during the development of the FEIS.

Index: The index provides document topic by page number.

Appendices: The appendices provide more detailed information to support the analyses presented in the FEIS.

Additional documentation, including more detailed analyses of project-area resources, may be found in the Project Record, located at the Medora Ranger District.

Note: References to the 2001 Dakota Prairie Grasslands Land and Resource Management Plan (Grasslands Plan) page numbers pertain to the printed copies of the document. Equivalent page numbers on the CD copies of the Grasslands Plan may be slightly different.

OVERVIEW

The North Billings County Allotment Management Plan Revisions (North Billings) project area is located on the Medora Ranger District, which is part of the Dakota Prairie Grasslands. The Medora Ranger District encompasses National Forest System (NFS) lands located in Billings, Golden Valley, and Slope Counties. The project area is located in northern Billings County, North Dakota, and a small portion of one township in northeastern Golden Valley County, North Dakota. It encompasses all or portions of NFS lands located in T144N, R99W, R100W, R101W, and R102W; T143N, R99W, R100W, R101W, R102W, R103W; and T142N, R100W and, R101W (Figure 1.1).

There are 43 livestock grazing allotments within the project area.[3] Table 1.1 identifies the grazing allotments associated with the proposed action. Figure 1.2 displays the location of the allotments within the project area.

Table 1.1 — Livestock grazing allotments included in the proposed action

126	127	128	129	130	131	132A	132H	133	133D5	134
135	136/139	140	141	142	158	220	221	230	237	239
240	241	243	244	248	249	256	258	272	277	278
281	282	283	286	287	288	289	300	301	302	

These allotments cover approximately 87,262 acres of NFS land, with approximately 70,871 of those acres being capable of sustaining grazing, as determined by the 2001 Northern Great Plains FEIS. In relation to grazing, the Grasslands Plan characterizes the land base as capable or incapable of supporting grazing activity.

The Forest Service proposes to continue to permit livestock grazing on these allotments through a program of actions that maintains, and/or moves resource conditions towards meeting the Grasslands Plan objectives and desired on-the-ground conditions.

[3] When scoped, this project proposal contained 46 grazing allotments. Since that time, the NFS lands contained within allotments 224, 228, 229, and pasture 4 in allotment 127 have been conveyed from federal ownership to the private sector. The land conveyance was done in compliance with Sec. 424. (a)Land Sale Authorization of the Consolidated Appropriations Act of 2008. Section 424 of the Act directs selling federal lands to offset the private acreage gained by the federal government in the purchase of the Elkhorn Ranch.

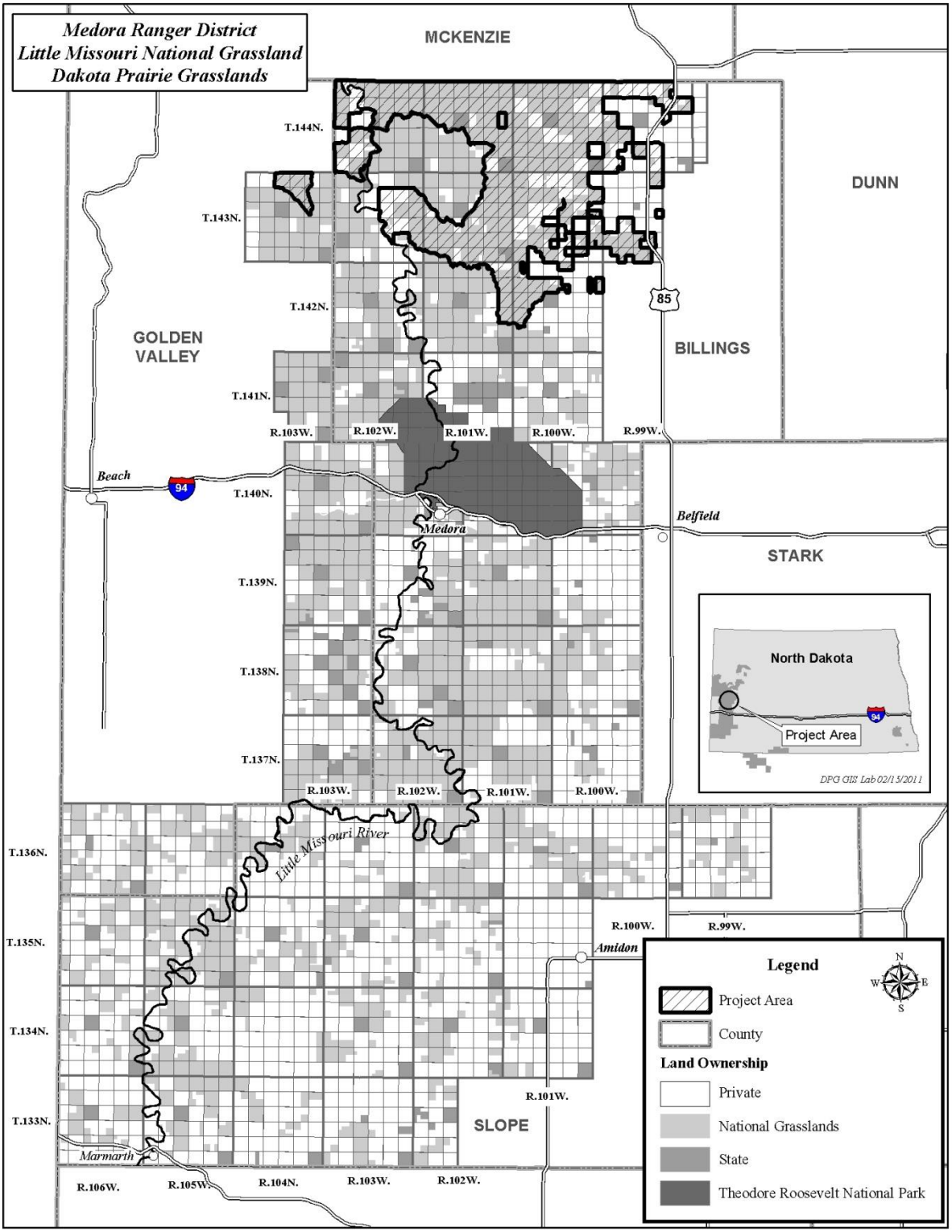

Figure 1.1 — Project area.

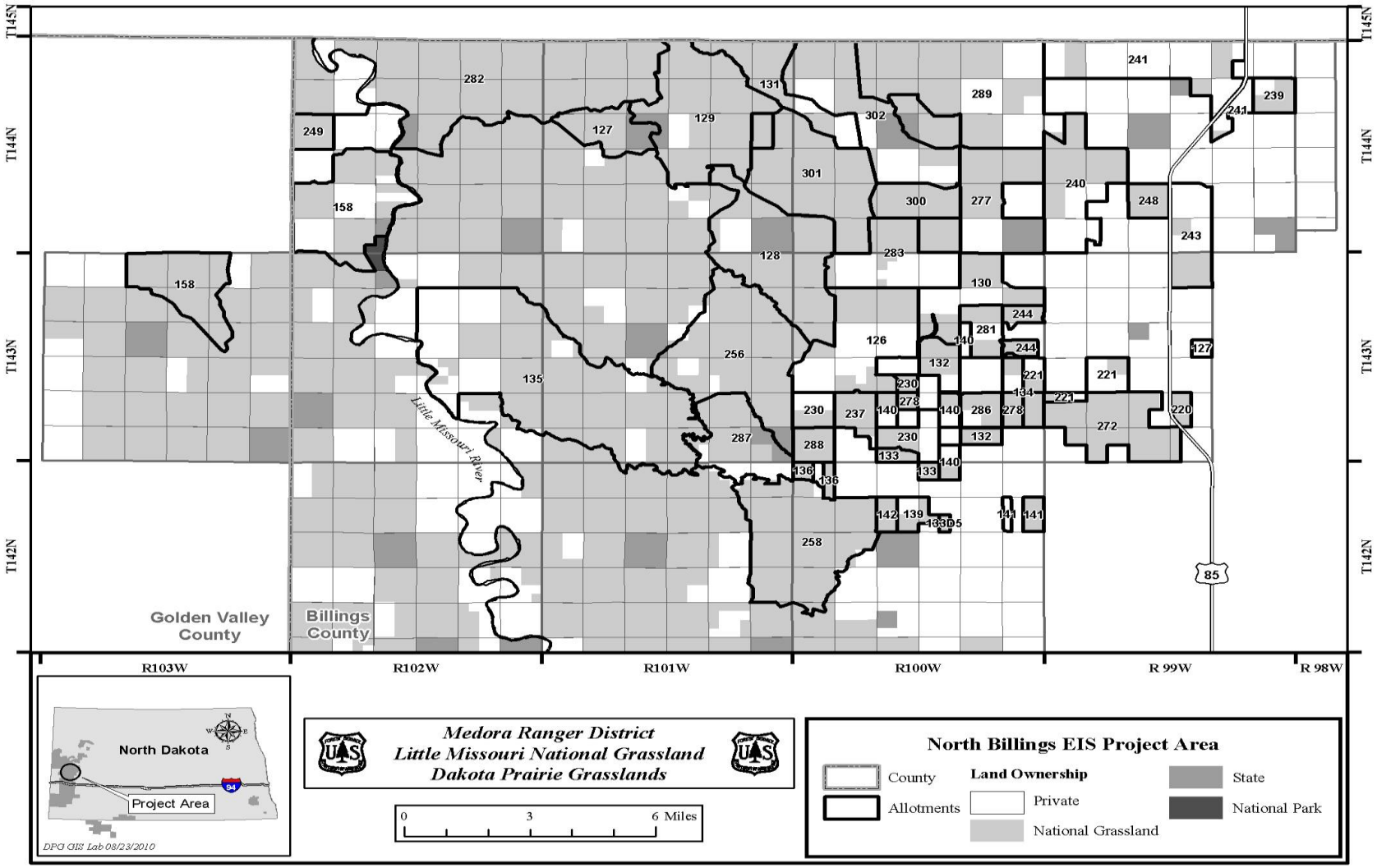

Figure 1.2 — Grazing allotment locations.

HISTORIC AND LEGAL FRAMEWORK

The lands that constitute the Little Missouri National Grassland (LMNG), which contains the Medora Ranger District, were formerly held mostly in the private sector. Livestock grazing has occurred on what is now the Little Missouri National Grassland since the last half of the 19th century, when livestock were brought to the plains by ranchers and homesteaders in response to government programs, such as the 1862 Homestead Act. A combination of the 1929 stock market crash, national economic depression, and drought of the 1930s led to hard times for many Great Plains settlers. Hundreds of thousands of people left the region when faced with low land values, delinquent taxes, and foreclosures on their mortgages. As a result, banks, states, and the federal government acquired the title to millions of acres of land (Robinson 1966).

During the 1930s, the federal government initiated a large-scale Land Utilization Program (LUP). Initially the program was designed to repurchase submarginal lands. However, it was expanded to include the transfer of land to its most suitable use (Olson 1997). In 1934, the Agricultural Adjustment Administration started purchasing submarginal lands across the nation. In areas of grasslands, grazing associations and districts were formed to integrate management of these lands with private ranch and farm operations. The LUP culminated with the passage of the Bankhead-Jones Farm Tenant Act of July 22, 1937. The Act states:

> The Secretary [of Agriculture] is authorized and directed to develop a program of land conservation and land utilization, in order thereby to correct maladjustments in land use and thus assist in controlling soil erosion, reforestation, preserving natural resources, protecting fish and wildlife, developing and protecting recreation facilities, mitigating floods, preventing impairment of dams and reservoirs, developing energy resources, conserving surface and subsurface moisture, protecting the watershed of navigable streams, and protecting the public lands, health, safety, and welfare, but not to build industrial parks or establish private industrial or commercial enterprises‖ (Section 31, Title III, Bankhead-Jones Farm Tenant Act of 1937, as amended in 1962, 1966, and 1981).

From 1938 to 1954, the Soil Conservation Service (SCS) administered the LUP. In 1954, the LUP was transferred to the Forest Service. On June 23, 1960, the USDA created 20 national grasslands from the LUP lands; the LMNG is one of the created grasslands.

Management of the Grasslands is governed under the provisions of the Bankhead-Jones Farm Tenant Act, the Forest and Range Renewable Resources Planning Act, the National Forest Management Act, Forest Service regulations 36 CFR 213 (Administration of Lands under Title III of the Bankhead-Jones Farm Tenant Act by the Forest Service) and 36 CFR 222 (Range Management), and other laws relating to national grasslands as NFS lands.

The regulations at 36 CFR 213.1(b) state that “The National Grasslands shall be a part of the National Forest system and permanently held by the Department of Agriculture for administration under the provisions and purposes of title III of the Bankhead-Jones Farm Tenant Act.” Section 213.1(d) states “the resources shall be managed so as to maintain and improve soil

and vegetative cover, and to demonstrate sound and practical principles of land use for the areas in which they are located". Section 213.4 states that any prior rules and regulations issued for land use utilization projects are superseded to all projects administered by the Forest Service.

The Forest and Rangeland Renewable Resources Planning Act of 1974 required the Forest Service to develop land and resource management plans for all units of the National Forest System. The national grasslands were explicitly incorporated as part of the National Forest System. The National Forest Management Act of 1976 further directed how such land and resource management plans were to be developed. Specifically, such plans were to:

> ….provide for multiple use and sustained yield of the products and services obtained there from in accordance with the Multiple-Use Sustained-Yield Act of 1960, and in particular include coordination of outdoor recreation, range, timber, watershed, wildlife and fish, and wilderness.‖ (Section 6(e), National Forest Management Act, P.L. 94-588).

In response to the National Forest Management Act, the Forest Service developed a land and resource management plan for the Dakota Prairie Grasslands. The livestock-grazing part of the revised plan was adopted by two records of decision: Powell 2002 and Kimbell 2006. Those records of decision established livestock grazing as an allowable use, and provided guidance on how, when, and where such grazing could occur. Powell (2002) also established the Scientific Review Team (SRT), a panel of independent scientists that conducted 14 public meetings, starting in February 2003. The SRT reviewed the scientific basis for, and the practical application of, the new Grasslands Plan. The SRT's final report, presented in May 2005, concluded that the Grasslands Plan could be implemented, but that it was impossible to determine whether projected stocking rates would attain the plan's goals and objectives. The report also contained recommendations for improving the plan's implementation and monitoring. Copies of the SRT report, and the Dakota Prairie Grasslands' response, can be viewed online at the Dakota Prairie Grasslands' website (http://www.fs.fed.us/r1/dakotaprairie). A discussion of how the SRT Report and Grasslands response was considered in this analysis may be found in Appendix C.

The 2006 Record of Decision (ROD) established the Demonstration Project:

> The purpose of the demonstration project is to: 1) develop and implement integrated AMPs [Allotment Management Plan] collaboratively with the respective grazing associations that share in the management of grazing on the National Grasslands; 2) to determine if Grasslands Plan Goals and Objectives are achievable or need modification; and 3) monitor progress towards meeting resource objectives. One key goal of the Demonstration Project is to maintain or improve current on-the ground conditions while maintaining, to the maximum extent possible, a grazing program at current AUM levels and providing sufficient habitat for grassland species (Kimbell 2006, pp 8, 9).

The Rescissions Act of 1995 requires each National Forest System unit to establish and adhere to a schedule for completion of review under the NEPA, for all grazing allotments for which

analysis was needed. The NEPA-phase of this project was initiated in May 2008, in part to comply with the Rescissions Act of 1995.

The Dakota Prairie Grasslands, including the project area, is also managed in accordance with 36 CFR 222 (Range Management). Section 222.3(a) states that unless otherwise specified by the Chief of the Forest Service, all grazing and livestock use on National Forest System lands must be authorized by a grazing or livestock use permit. The Forest Service issues a grazing agreement (permit) to the Medora Grazing Association (MGA) for the NFS lands contained within the boundary of the MGA. Among other things, the grazing agreement authorizes livestock use on NFS lands, identifies the Preference for each allotment, and includes provision for the association to issue and administer grazing permits. As outlined in the grazing agreement, the MGA administration shall be in accordance with state and federal law and regulation, Forest Service policies and procedures pertaining to the National Grasslands, and LRMP and AMP direction. The MGA is the Forest Service's permittee; however, in this document the term permittee is generally used in reference to the person(s) associated with the 43 allotments in this project. Each of these allotments has a site-specific management plan called an allotment management plan (AMP).

An AMP documents the actions and management strategies necessary to reach a given set of objectives. This includes such things as a description of necessary fences and water developments, a list of the permissible type and number of livestock, and details on the allowable season and regime of grazing. The AMPs are developed based on the details of the selected alternative. The selected alternative is identified in the ROD, which will accompany the Final EIS for this project.

AMPs are implemented through Annual Operating Instructions (AOIs). Annual Operating Instructions are developed each year by the individual permittees and the grazing association. The AOIs are then reviewed, modified if necessary, and approved by the Forest Service. These provisions are intended to react to resource issues identified during field monitoring, as well as to respond to yearly and seasonal fluctuations in weather or range conditions.

GRASSLANDS PLAN DIRECTION SPECIFIC TO PROJECT AREA

The Grasslands Plan provides several levels of direction including grasslands-wide direction (Chapter 1), geographic area direction (Chapter 2), and management area direction (Chapter 3), applicable to the North Billings County Allotment Management Plan Revisions.

The project area is located in both the Badlands and Rolling Prairie geographic areas. These areas include management direction that is too specific to apply across the entire Dakota Prairie Grasslands. The geographic area direction is applied to the different areas in addition to the grasslands-wide direction in Chapter 1 and management area direction in Chapter 3. Approximately 60,872 acres (70 percent) of the project area is in Badlands and 26,390 acres (30 percent) in Rolling Prairie geographic areas.

The project area contains eight management areas (MAs). Figure 1.3 shows the management areas locations within the project area. The MA provides management direction in addition to the Grassland-wide direction identified in Chapter 1 of the Grasslands Plan. The MA direction applies only to those specific areas of the Grasslands assigned to a particular MA. Each MA identifies certain values and uses that are to be emphasized over others. The acreages represented by each MA are displayed in Table 1.2, followed by descriptions that include the management emphasis and total acres within the project area.

Table 1.2 — Management area acreage in the project area

Management Prescription Area	Management Area Title	Total Acres
1.31	Nonmotorized Backcountry Recreation	7,155
2.1	Special Interest Areas	240
2.2	Research Natural Areas	1,771
3.51a	Bighorn Sheep Habitat With Non-Federal Mineral Ownership	2,929
3.51b	Bighorn Sheep Habitat With Non-Federal Mineral Ownership	1,727
3.65	Rangelands with Diverse Natural Appearing Landscapes	47,392
4.22	River and Travel Corridors	1,027
6.1	Rangeland with Broad Resource Emphasis	24,215
(Elkhorn Ranch– No MA currently assigned)	Not Assigned	806
Total Acres		**87,262**

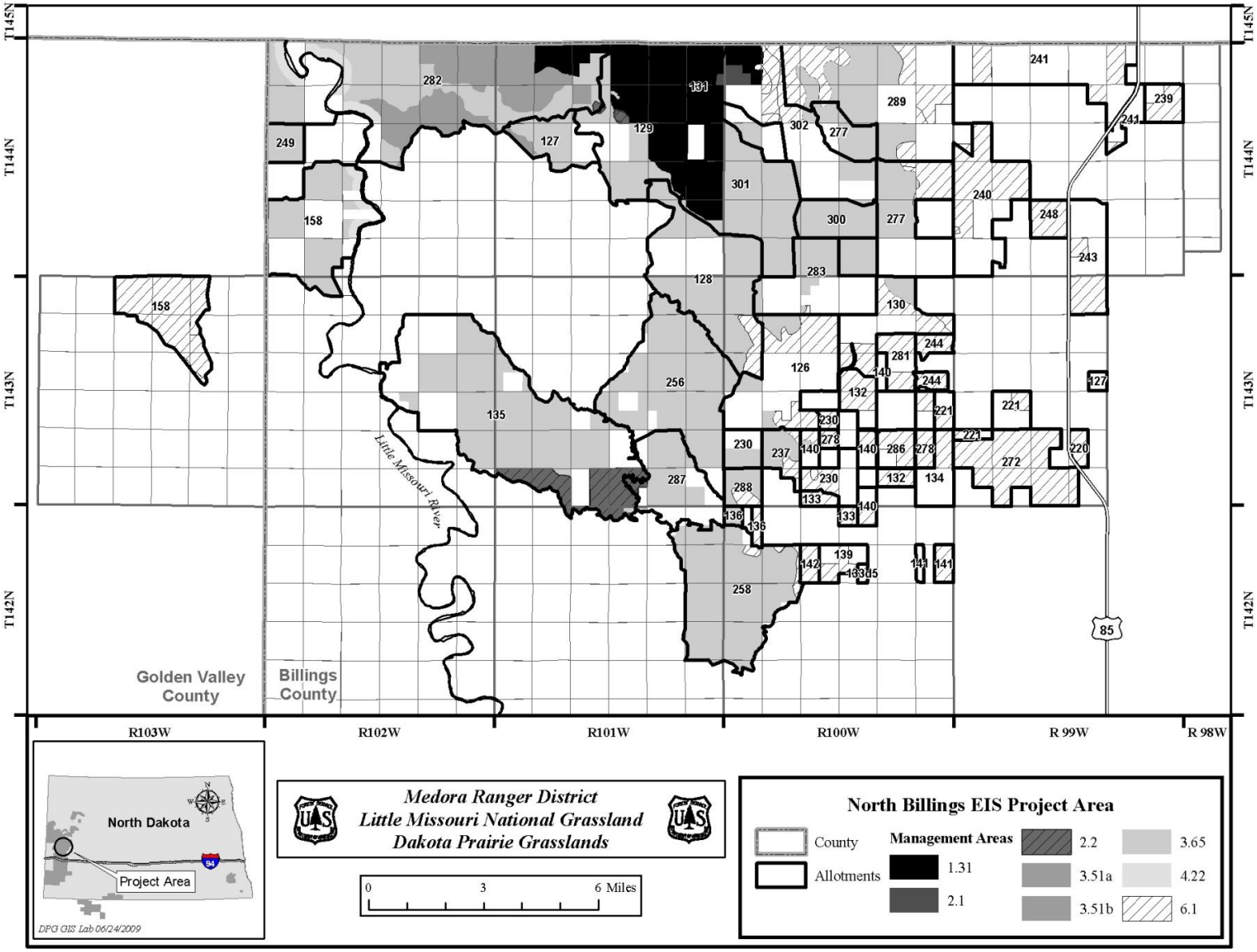

Figure 1.3 — Management areas located in the project area.

Management Area 1.31: Nonmotorized Backcountry Recreation

These areas are managed to provide nonmotorized, semi-primitive recreation opportunities in a natural-appearing landscape. Where they occur, valid existing rights will be honored when development is proposed.

Management Area 2.1: Special Interest Areas

For the purpose of public use and enjoyment, special interest areas (SIA) are managed to protect sites with important physical, biological, and/or cultural characteristics. Where applicable, areas are managed to maintain or enhance plant and wildlife population viability.

Management Area 2.2: Research Natural Areas

Research natural areas (RNA) form a network of ecological reserves designated for non-manipulative research, education, and maintenance of plant biodiversity. Proposed RNAs are managed as if they were officially designated RNAs until the regional forester makes a final decision.

Within RNAs, human influences on ecological processes are limited as much as possible, but are sometimes evident. Types of human use vary, but generally are not intensive. RNAs play an important role in an adaptive-management philosophy by serving as a "natural" reference for areas that are intensively managed for a particular objective.

Management Areas 3.51A: Bighorn Sheep, and 3.51B: Bighorn Sheep Habitat With Non-Federal Mineral Ownership

These areas are managed to provide quality forage, cover, escape terrain, and solitude for bighorn sheep while accounting for the possible development of non-federal mineral ownership. These areas might also allow petroleum resource development on federal minerals once non-federal production has been established.

Management Area 3.65: Rangelands with Diverse Natural Appearing Landscapes

This management area emphasizes maintaining or restoring a diversity of desired plants, animals, and ecological processes and functions. It also provides a mix of other rangeland values and uses with limits on facilities to maintain a natural appearing landscape.

Management Area 4.22: River and Travel Corridors

This area is managed to protect or preserve the scenic values and recreation uses of the Little Missouri River Corridor.

Management Area 6.1: Rangeland with Broad Resource Emphasis

This area is primarily a rangeland ecosystem that is managed to meet a variety of ecological conditions and human needs. Ecological conditions will be maintained while emphasizing selected biological (grasses and other vegetation) structure and composition that considers the range of natural variability. These lands often display density of facilities; evidence of vegetative manipulation, and high levels of development, commodity uses, and activity. Users expect to see other people and evidence of human activities. Facilities supporting the various resource uses are common. Motorized transportation is common on designated roads and two-tracks.

Additional direction, policy, and guidance are provided by the following sources:

♦ Forest Service Manual (FSM) 2200, Range Management.

♦ Forest Service Handbook (FSH) 2209.13 Grazing Permit Administration Handbook; and FSH 2109.13 Pesticide-use Management and Coordination Handbook.

PURPOSE AND NEED

The Forest Service rangeland allotment management process calls for periodic reviews of allotment conditions and management practices. Regulation 36 CFR 222.2(c) states "Forage producing National Forest System lands will be managed for livestock grazing and the allotment management plans will be prepared consistent with land management plans." All of the allotments in this analysis are due for environmental review. The Rescission Act of 1995 (P.L. 104-19, Section 504) requires that all grazing allotments on NFS lands undergo NEPA analysis prior to revision of existing allotment management plans. The underlying needs for this proposal include:

- Some resources are not at Desired Conditions as identified by the Grasslands Plan. There is a need to meet or move toward Desired Conditions for those affected resources in accordance with Grasslands Plan direction (pp 1-2, 1-3)[4] while allowing grazing on suitable lands and supporting local families and communities.

[4] A requirement of the Demonstration Project is to "determine if Plan Goals and Objectives are achievable or need modification, and monitor progress towards meeting the resource objectives". The analysis completed for North Billings determined that the Plan goals and objectives are achievable; therefore, modification to the Plan is not needed and has not been incorporated. However, monitoring progress towards meeting the resource objectives is an integral component of the proposed action.

- There are overall needs (a) for greater management flexibility to meet Grasslands Plan resource goals and objectives and to cope with fluctuations in environmental and social conditions including, but not limited to, annual changes in weather; (b) to be responsive to permittee requests for reasonable operational adjustments; and (c) to respond to unforeseen or changing issues.

The project-specific need for action is created by the disparity between what is present (existing condition) and what is wanted (desired condition) of a resource. The specific action needs for the allotments in this analysis are summarized in Chapter 3 of this FEIS. Table 1.3 identifies which resources are of concern to this analysis.

Table 1.3 — Grasslands Plan desired conditions, existing conditions, and need for action

Grasslands Plan Desired Condition	Existing Condition	Need for Action
----------Riparian/Streams----------		
The Grasslands Plan identifies an objective of meeting or moving towards Proper Functioning Condition on 80 percent of perennial streams. It also directs that corrective action on Functional-At Risk and Nonfunctional streams be initiated. Streams in this case include intermittent streams.	Within the project area approximately 56.4 miles of stream reaches associated with eleven intermittent streams were surveyed in 2004, 2005, 2006, and 2007 to determine their condition. Of the 56.4 miles of stream reaches surveyed, 28.6 miles (51 percent) were at Proper Functioning Condition (PFC); 2.5 miles (4 percent) were Functional-At Risk-Upward Trend (FAR-U); 3.3 miles (6 percent) were Functional-At Risk-Trend Not Apparent (FAR-NA); 2.9 miles (5 percent) were Functional-At Risk-Downward Trend (FAR-D); and 19.1 miles (34 percent) were Nonfunctional (NF). The only perennial stream in the project area is a small portion of the Little Missouri River. A field review of this portion of the river in 2010 indicated that there were no riparian concerns.	There is a need to improve riparian and/or stream conditions for those intermittent stream reaches identified as Functional-At Risk-Downward Trend or Nonfunctional (21.3 miles of stream occurring in 22 of the 43 allotments).
----------Green Ash Hardwood Draws----------		
Trees cover about 10 percent of the landscape on the Medora Ranger District. Of the different types of woodlands in the project area, only the green ash hardwood draws are of concern. The desired condition for green ash draws is that they are self-perpetuating and exhibit a multi-layer and multi-age class of herbaceous plants, shrubs, and trees (Grasslands Plan, pp.1-2, 2-10, 2-17).	Surveys (1998, and 2005-2007) of green ash wooded draws across the project area show that approximately 51 percent are in Healthy condition, 42 percent are At Risk, and 7 percent are Unhealthy. Lack of or low tree regeneration and heavily impacted or absent shrub layers are the primary factors affecting woodland health.	There is a need to improve the health of At Risk and Unhealthy green ash draws in 32 of the 43 allotments by moving them towards healthy self-perpetuating, multi-layered, multi-aged class communities of herbaceous plants, shrubs, and trees.

Grasslands Plan Desired Condition	Existing Condition	Need for Action
----------Vegetative Structure----------		
Grasslands Plan direction is to maintain a shifting mosaic of vegetation structure across the landscape. The desired vegetative mosaic is composed of the Badlands and Rolling Prairie geographic area vegetation structure objectives. These objectives identify a desired array of Low (10-20 percent), Moderate (50-70 percent), and High (20-30 percent) structure across the geographic areas.	Generally, desired high and low structure objectives are not being met in the project area. Survey data from 1996 to 2005 show High structure ranged from 1 to 20 percent, Moderate structure ranged from 56 to 71 percent, and Low structure ranged from 23 to 53 percent.	There is a need to increase the amount of High structure and decrease the amount of Low structure across the project area.
----------Vegetative Seral Stages----------		
Seral stages are the successional stages a plant community progresses through over the course of time. Seral stages range from early pioneer vegetation to climax vegetation. The desired condition for seral stage is composed of the Badlands and Rolling Prairie geographic area seral stages objectives located in Chapter 2 of the Grasslands Plan. Seral objectives are 10-15 percent in early seral stage, 65-75 percent in mid seral stage, and 15-20 percent in late seral stage across the geographic areas.	Surveys completed (1996-2001 and 2004-2010) across the project area indicate that approximately 7 percent of the area is at early seral stage; 72 percent of the area is at mid seral stage; 5 percent of the area is at late seral stage; and 16 percent is at an Invaded Grass State where seral stage was not classified.	There is a need to increase the amount of late and early seral stages and reduce the amount of mid seral plant communities. There is also a need to increase the maintenance of native plant communities, and limit the spread of invasive species and transitions to Invaded Grass States.

PROPOSED ACTION

The Forest Service proposes to continue to permit livestock grazing on these allotments through a program of actions that maintains and/or moves resource conditions towards meeting the Grasslands Plan objectives and desired on-the-ground conditions. Grazing management (program of actions) would be carried out so that it meets or moves impacted resources towards Grasslands Plan desired conditions. This would be achieved by implementing initial actions and through the application of adaptive management strategies if initial actions fail or can't be implemented. The proposed action also includes a monitoring plan and interim drought strategy which are described in detail in Chapter 2. It is designed to:

- Provide adaptive management flexibility to meet changing conditions.
- Contribute to the general economic and social vitality of the local area.
- Meet direction contained in the demonstration project, including recommendations from the FS Final Response to the SRT Report.
- Move impacted resources towards Grasslands Plan desired conditions.

Collectively the 43 allotments in this analysis contain approximately 87,262 acres of NFS lands. There are also private and state lands associated with many of the allotments. However, the proposed action, Alternative 3, proposes activities only on NFS lands and discloses effects associated with the proposed action and other alternatives.

ADAPTIVE MANAGEMENT

Three of the action alternatives contained in the analysis—Alternatives 3, 3A and 4—are built on the principle of adaptive management. The following discussion is presented to help the reader better understand this concept as applied to range analysis and range management decision making.

Adaptive management is defined as, "A system of management practices based on clearly identified intended outcomes and monitoring to determine if management actions are meeting those outcomes; and, if not, to facilitate management changes that will best ensure that those outcomes are met or re-evaluated. Adaptive management stems from the recognition that knowledge about natural resource systems is sometimes uncertain" (36 CFR 220.3). It is a process that allows the responsible official to deal with uncertainty and changing conditions over time and it provides for constrained flexibility to adapt to changing conditions or unanticipated resource response. Adaptive management is based on the assumption that current resources and scientific knowledge are limited and a certain level of uncertainty exists. To a degree it also acknowledges the "art" of natural resource management. Nevertheless, an adaptive management approach attempts to apply available resources and knowledge and adjusts management techniques as new information is revealed.

In terms of natural resource management, adaptive management focuses on meeting or moving toward the desired condition objectives on the ground. This is a significant shift in how we think about range planning in that the proposed action focuses on what we want the ground to look like and what constraints are necessary to get there, rather than focusing on how many cattle to permit or which fence to build.

Under the traditional approach to completing the NEPA process, issues are identified, management actions are proposed to address those issues, an environmental impact analysis is completed, and mitigation measures are created. Unfortunately, this process does not account for unanticipated changes in environmental conditions, inaccurate predictions, or subsequent information that might affect the original decision. The Council on Environmental Quality (CEQ) recognized that by adding "monitoring and adaptation" to the traditional "predict, mitigate, and implement" NEPA model, the concept of adaptive management could be incorporated into the NEPA process. The Forest Service added direction regarding adaptive management in its Federal Regulations in 2008 (36 CFR 220) and its associated NEPA Handbook (FSH 1909.15, 14.1).

As previously identified, the traditional approach to the NEPA process does not provide the decision maker with much latitude to adjust actions once a decision has been made. For example, say that on allotment X the decision is to permit 203 cow/calf pairs for a season of June 3 to September 14 under a three-pasture deferred rotation grazing system. However, after the decision is made an opportunity or need is presented to use some electric fencing to create a riparian pasture in a problem area. Essentially, there is a need to apply different techniques to better achieve the objectives specified in the NEPA decision. This leaves the responsible official with the situation of either continuing existing management, knowing that it is not meeting the current needs, or re-entering the NEPA process to re-evaluate new management practices and then to revise the existing NEPA-based decision.

Under an adaptive approach, the NEPA process considers an initial set of actions to address a set of issues and identifies a series of additional adaptive options that can be implemented if monitoring indicates there is a need to change management actions. Because these additional options are analyzed in the NEPA document, it provides the responsible official with "constrained flexibility" to adapt to changing conditions within the realm of the identified adaptive options. While it is impossible to predict all potential changes, or to plan for dealing with all uncertainty, implementing an adaptive management approach provides more flexibility in the management of the range and associated resources.

The key feature of adaptive management is its use of monitoring. Monitoring is the basis on which management changes are proposed. In other words, if some aspect of the planned management is shown by monitoring to be ineffective or cannot be implemented as planned, then a team composed of Forest Service specialists in consultation with the affected permittee and the Medora Grazing Association (MGA) director would make a recommendation to the district ranger. The recommended course of action would be based on the adaptive options identified in Chapter 3 Part 2 under the third table for each allotment and/or the Grazing Management

Toolbox (Table 2.4). The adaptive actions are evaluated in Chapter 3 of this analysis. Figure 1.4 is a flowchart showing how adaptive management works.

SCOPE OF THE PROPOSAL

Geographic Scope

The Medora Ranger District has prepared this Final Environmental Impact Statement (FEIS) to document additional information and analysis resulting from comment and review on the Draft Environment Impact Statement (DEIS), and subsequently the Supplemental Environmental Impact Statement (SEIS).

The project area encompasses 43 livestock grazing allotments. The allotments are made up of NFS, state, and private lands.

The project area (Figure 1.1) encompasses approximately 118,354 acres of intermingled private, state, and NFS lands. There are approximately 87,262 acres of NFS lands associated with the allotments included in this analysis. The majority of the allotments in this analysis are located in the Badlands geographic area with the remainder located in the Rolling Prairie geographic area. Some of the allotments contain portions of both geographic areas.

Temporal Scope

This proposal would be implemented the grazing season following the signing of a Final ROD for this project. Information contained in the FEIS would be used to create new AMPs for the allotments. The issuance of AMPs to reflect the selected alternative would not be subject to further NEPA documentation as long as the FEIS analysis and decision remain valid.

Administrative Scope

AMPs will be developed from information contained in the FEIS and will be based on the decision associated with the FEIS. The AMPs guide livestock management within the allotments, with adaptive adjustments being implemented based on monitoring.

Five alternatives were developed and analyzed in detail for this project. The alternatives are described in detail in Chapter 2 of this document.

The proposed action is limited to the continuation of grazing activities on NFS lands. It includes initial management actions to address resource concerns, adaptive management actions, monitoring, and feedback.

This FEIS was developed under the implementing regulations of NEPA; the CEQ, Title 40, Code of Federal Regulations, Parts 1500-1508 (40 CFR 1500-1508); and the National Forest Management Act (NFMA). The proposal is not a general management plan for the area. The FEIS is the site-specific NEPA documentation for the proposal, and is not a programmatic analysis. General management direction is found in the Grasslands Plan.

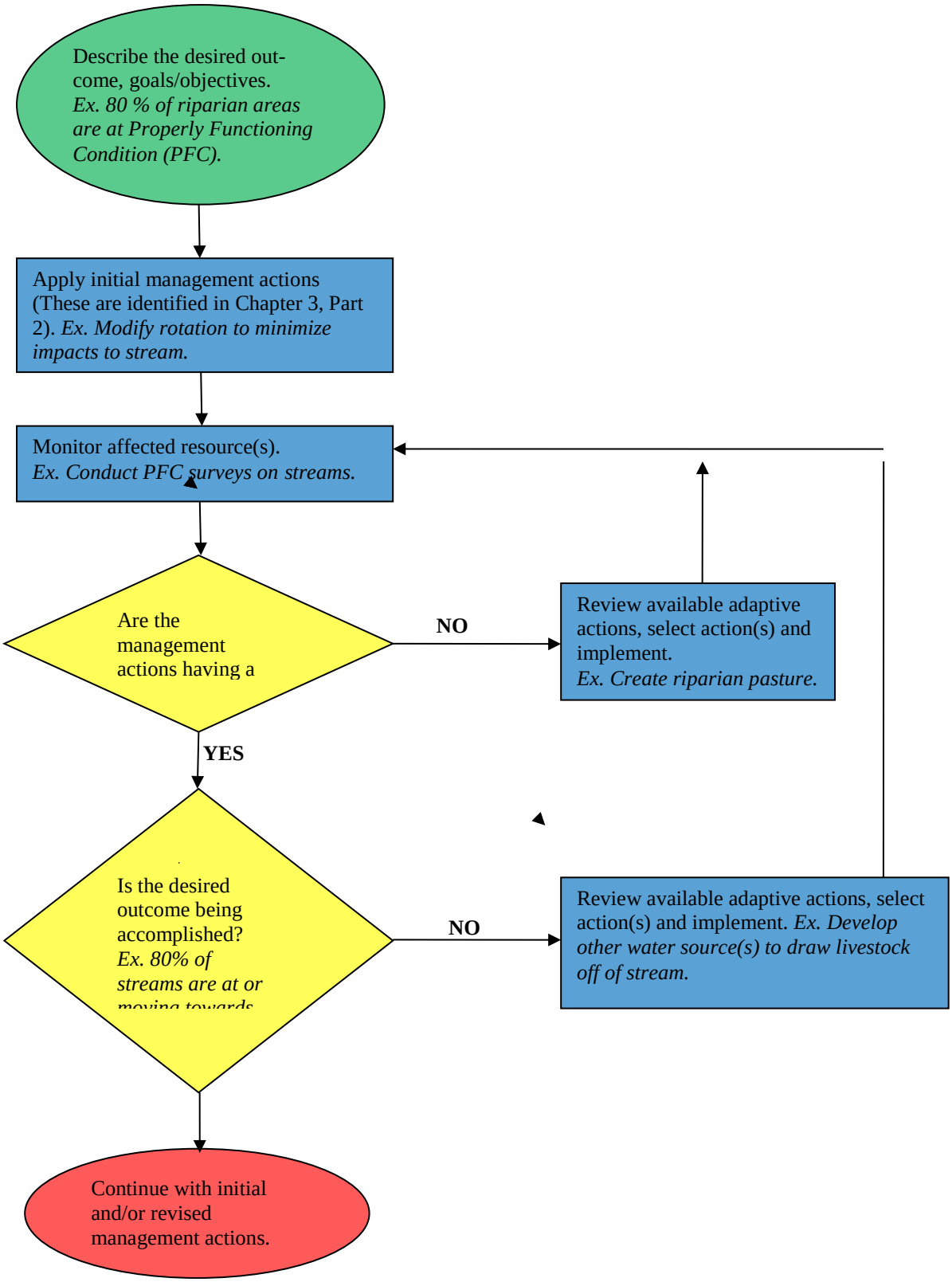

Figure 1.4 — Adaptive management approach for the action alternatives.

DECISION FRAMEWORK

The Grasslands Supervisor is the responsible official who will decide, through alternative selection, whether or not to continue livestock grazing on all or portions of the 43 allotments and, if so, under what terms and conditions so as to meet or move toward meeting Grasslands Plan objectives in a timely manner. He or she may select any of the alternatives or create a new alternative within the range of the existing alternatives. He or she is also responsible for determining whether or not this project requires any site-specific amendment(s) to the Grasslands Plan.

Once the decision process is complete AMPs will be written based on the alternative selected. The AMP is the implementation document by which the Forest Service communicates the management objectives and planned actions to accomplish those objectives.

The FEIS is not a decision document. Rather it discloses the environmental consequences of implementing the proposed action and alternatives to that action. The Grasslands Supervisor has reviewed the FEIS in its entirety and has selected the alternative that is to be implemented and has documented his reasoning in a Draft ROD.

TIERED AND REFERENCE DOCUMENTS

Agencies are encouraged to tier their analysis documents to other analyses as a means to eliminate repetitive discussions of the same issues (40 CFR 1502.20). Agencies are also directed to incorporate, by reference, material that will help cut down the bulk of a document (40 CFR 1502.21). All of the following documents supporting this analysis are located in the Project Record.

The environmental analysis documented in this assessment is tiered to the 2001 FEIS for the Grasslands Plan. The 2001 FEIS describes the existing condition of the DPG and evaluates the environmental consequences of different management alternatives. It is the analysis from which the Grasslands Plan was derived.

The analysis also tiers to the 2007 Noxious Weed Management Project FEIS. This FEIS evaluates the environmental consequences related to the use of an integrated adaptive approach to treating existing and future infestations of noxious weeds.

Incorporated by reference is the 2001 Dakota Prairie Grasslands Revised Land and Resource Management Plan (Grasslands Plan), and its 2002 and 2006 RODs. The 2002 Grasslands Plan establishes the management direction for the DPG in compliance with the 1976 NFMA, the 1969 NEPA, and other laws and regulations. Detailed information concerning applicable goals, objectives, standards, guidelines, and other management direction from the Grasslands Plan and its RODs is incorporated by reference into the FEIS.

The 2002 Little Missouri National Grassland Rangeland Assessment—specifically, information related to woody draws, herbaceous structure and composition, wildlife, and riparian areas—is incorporated by reference into this analysis.

The Watershed Conservation Practices Handbook (FSH 2509.22) is also incorporated by reference.

PUBLIC INVOLVEMENT

A scoping letter was sent to 103 interested parties on May 23, 2008. The letter asked that comments on the proposed action be received by June 23, 2008. A notice of intent (NOI) to prepare an environmental impact statement (EIS) for the North Billings project was published in the *Federal Register* on May 15, 2008.

The Forest Service held public open-house meetings on June 17, 2008, in Dickinson, ND, and on June 18, 2008, in Bismarck, ND. News releases announcing the open houses were sent to the *Bismarck Tribune*, which is the DPG newspaper of record, the *Dickinson Press*, the *Bowman County Pioneer*, *The Herald*, and the *Golden Valley News*. An announcement was also sent to Dickinson and Bismarck, ND, televised Community Calendars. The Forest Service also invited public comment through publication of the proposal in the January 2008 DPG Schedule of Proposed Actions (SOPA).

The DEIS was mailed to a total of 66 individuals; groups; and federal, state, and county agencies on June 30, and July 1, 2009. A news release announcing the release of the DEIS was sent to the *Bismarck Tribune*, six other daily newspapers, and numerous radio and television stations on July 1, 2009. The Notice of Public Comment for the DEIS was published in the Bismarck Tribune on July 3, 2009. The North Dakota Congressional Delegation was contacted by phone and sent a briefing paper on July 1, 2009. The briefing paper was also faxed to the Billings and Golden Valley County Commissions and the Medora Grazing Association (MGA). On July 2, 2009 a copy of the news release announcing the release of the DEIS was faxed to the Billings and Golden Valley County Commission and the MGA.

The notice of availability for the DEIS appeared in the *Federal Register* on July 10, 2009. The comment period on the DEIS was to have closed on August 14, 2009. However, on August 13 it was discovered that the e-mail address for comments was incorrect. The district ranger extended the comment period to September 4, 2009, to accept any comments that may not have been received due to the incorrect address. A letter was sent to the project mailing list on August 25, 2009, extending the comment period, and a new Notice of Comment was published in the *Bismarck Tribune* on August 28, 2009.

In an effort to further expand the comment base and the opportunity for public participation, the district ranger further extended the public comment period to October 10, 2009; however, comments were accepted until October 13, 2009, because of the Columbus Day holiday. A letter was sent to the project mailing list on September 4, 2009, and a news release announcing the extension was sent to numerous television, radio, and newspapers on the same day. The district ranger, on September 4, 2009, notified the MGA, Billings County, and the congressional delegation of the October extension by phone. An amended notice extending the comment period to October 13, 2009 was published in the *Federal Register* on September 18, 2009. A total of 13 comments were received on the DEIS.

In order to respond to public comments received on the DEIS, and based on the time that had passed (almost 2 years) since the DEIS had been distributed, the DPG decided to take an extra step to ensure the public had seen, and had a chance to comment on, this important document. To that end, the Medora Ranger District of the DPG completed the SDEIS for the North Billings County AMP Revisions (USDA Forest Service 2011). The SDEIS rearranged the analysis to display both a landscape analysis by resource issue (SDEIS, Vol. I, Chapter 3, Part 1) and an allotment-level analysis by resource issue (SDEIS, Vol. II, Chapter 3, Part 2). The SDEIS also responded to comments by including an additional alternative, 3A; included more information on soil capability, soil productivity, and water quality; and included discussions to address unavailable information and scientific controversy to name a few of the changes. The notification of availability for the document was published in the Federal Register on July 8, 2011. The SDEIS was mailed to a total of 80 individuals, groups, and federal, state, and county agencies on July 1, 2011. Chapter 4 of the SDEIS lists the agencies, organizations, and people who received copies of the SDEIS. A news release announcing the release of the SDEIS was sent to the Bismarck Tribune and numerous other newspapers and radio and television stations on July 1, 2011. The North Dakota congressional delegation was contacted by phone and sent a briefing paper on July 1, 2011. The Billings County Commission and MGA were called as well to inform them of the availability of the SDEIS. Briefings and/or question-and-answer sessions were provided at both the MGA July monthly board of directors meeting and the Billings County Commissioners August meeting. The Notice of Public Comment for the SDEIS was published in the Bismarck Tribune on July 8, 2011.

A news release was sent to the media, reminding the public of the August 22, 2011, deadline for SDEIS comments. However, in an effort to further expand the comment base and the opportunity for public participation, the District Ranger further extended the public comment period to September 21, 2011. On August 15, 2011, a letter was sent to those on the project mailing list, and a news release announcing the extension was sent to numerous television and radio stations and to newspapers on the same day. The Bismarck Tribune published the Notice of Public Comment extension on August 26, 2011. A total of 65 comments were received on the SDEIS.

KEY ISSUES

An issue is an effect on a physical, biological, social, or economic resource. An issue is not an activity in itself; instead, it is the projected effects of the activity that create the issue. For example, livestock grazing is an activity, but its effects on a resource can form an issue. A key issue suggests different courses of action thus suggesting alternatives and detailed analysis. The Forest Service identifies key issues through contact/discussion (scoping) externally with the public, organizations, and other state and federal agencies and internally.

The interdisciplinary team (IDT) considered external and internal comments and discussions received during scoping, ongoing issues associated with general livestock management on the Medora Ranger District, and landscape information generated from the 2002 Little Missouri National Grassland Rangeland Assessment to identify key issues to be analyzed in this document. The IDT identified six key issues for the project area. The district ranger concurred and directed that these key issues should be carried through the analysis. The key issues, along with the indicator(s) of each issue, are presented below (a brief explanation of the indicator is also provided). Indicators are used to evaluate or measure the effects of an alternative on the different resources.

KEY ISSUE #1. RIPARIAN AREAS: There is a concern that livestock grazing is adversely impacting intermittent streams through excessive use of riparian vegetation, trampling and trailing of stream banks, loafing, etc. Intermittent streams typically flow seasonally when they receive water from surface sources such as snow melt, storm runoff, or from ground water discharge.

Major intermittent streams on NFS lands in the project area were surveyed from 1997 through 1999, and in 2004, 2006, and 2007 using the Proper Functioning Condition protocol (Pritchard et. al., 1998). Approximately 56.4 miles of stream reaches associated with 11 streams were surveyed. Of the surveyed stream reaches, 28.6 miles (51 percent) were at Proper Functioning Condition (PFC); 2.5 miles (4 percent) were Functional-At Risk-Upward Trend (FAR-U); 3.3 miles (6 percent) were Functional-At Risk-Trend Not Apparent (FAR-NA); 2.9 miles (5 percent) were Functional-At Risk-Downward Trend (FAR-D); and 19.1 miles (34 percent) were Nonfunctional (NF).

Functional-At Risk and NF streams exhibit an inadequate amount of residual vegetation to trap sediments from fall/spring runoff or to control erosive energy in the channel. They display poor channel morphology (structure) and are affected by excessive bank trampling and lack of desired riparian plant communities. The Grasslands Plan provides guidance for streams identified as non-functioning or functioning at risk with a downward trend that corrective action should be taken within three years of stream inventory (Grasslands Plan Ch. 1, p. 1-11). The Grasslands Plan also allows only those actions next to perennial and intermittent streams, seeps, springs, lakes, and wetlands that maintain or improve long-term proper functioning of riparian ecosystem conditions (Grasslands Plan Ch.

Proper Functioning Condition (PFC) means that the stream has adequate streambank vegetation, proper stream morphology (structure), or instream structures (i.e. woody debris, rock, etc.) present to dissipate stream energy, during high flows. This results in benefits including, but not limited to, reduced erosion, sediment and bedload capture, floodplain development, improved water quality, ground-water recharge, and development of streambank root masses.

Functional-At Risk means that riparian areas are in a functional condition but one or more properties(such as soil, water, or vegetation) are impaired, which makes the riparian area susceptible to degradation.

Nonfunctional means that the riparian area is not functioning properly. Typically, nonfunctioning riparian areas do not provide adequate vegetation, channel properties, or woody debris to dissipate stream energy associated with high flows and thus do not reduce erosion, improve water quality, capture sediment. etc.

1, p. 1-9). Some causes of stream degradation include livestock grazing and road impacts.

Indicators: Existing stream condition and movement towards PFC based on riparian vegetation condition, sediment entrapment, and stabilization of stream banks and beds.

These indicators provide a qualitative estimate of how well an alternative would move FAR and NF intermittent stream segments towards PFC.

KEY ISSUE #2. GREEN ASH HARDWOOD DRAWS: There are several different types of woodland communities in the project area including Rocky Mountain juniper, aspen, cottonwood, and green ash hardwood draws. The woody draws are generally in good condition; however, there is a concern that effects from livestock grazing including browsing, trampling, lounging, etc are adversely affecting the distribution of tree and shrub age classes in green ash hardwood draws. From this point forward green ash hardwood draws will be referred to as woody draws.

Three different sets of woody draw surveys were collected and used to assess woody draw conditions. The sampled woody draws were rated as Healthy, At Risk, or Unhealthy. Of the green ash woody draws that were surveyed, 51 percent were Healthy, 42 percent were At Risk, and about 7 percent were Unhealthy.

Healthy woody draws are defined as those woodlands that have self-perpetuating tree and shrub populations with diverse age classes, species composition, and multiple structural layers as habitat conditions permit.

At Risk woody draws tend to exhibit a moderate distribution of tree age classes, but lack consistent regeneration as expressed by sapling and young tree age classes. Desirable tall shrub (e.g., chokecherry, serviceberry) distribution tends to be patchy, and/or low shrubs (such as snowberry) dominate the shrub layer.

Unhealthy woody draws are generally characterized by old or decadent tree layers and a lack of younger age classes ranging from saplings to small diameter trees. The understory is dominated by invasive grasses or short shrubs such as snowberry.

The Grasslands Plan provides guidance for woody draws and riparian areas to move at least 80 percent toward self-perpetuating plant and water communities that have desired diversity and density of understory and overstory vegetation within site capability (Grasslands Plan Ch. 1, p. 1-2).

Indicator: Existing woody draw condition and degree of movement towards desired conditions based on the effects of intensity, frequency, and season of disturbance on tree and shrub regeneration. The indicator is expressed in terms of Healthy, At Risk, or Unhealthy condition.

These indicators are intended to provide a qualitative measure of how well an alternative will improve the health of At Risk and Unhealthy woody draws. Intensity, frequency, and season of disturbance are directly related to the health of a woody draw. Different combinations of these factors can improve or adversely affect woody draw health.

KEY ISSUE #3. HERBACEOUS STRUCTURE: There is a concern that livestock grazing has affected the mosaic of herbaceous structure in the project area, which has generally resulted in too little High structure and too much Low structure in light of Grasslands Plan structure objectives. Structure is an important measure for wildlife habitat, especially ground-nesting birds, but also has implications for other ecosystem attributes and rangeland health. Livestock management influences structure through several factors including intensity, frequency, and timing of grazing activity.

Low Structure is defined as a Visual Obstruction Reading (VOR) reading between 0 and 1.49 inches.

Moderate Structure is defined as a VOR reading between 1.5 and 3.5 inches.

High Structure is defined as a VOR reading greater than 3.5 inches.

The Grasslands Plan identifies a desired range for herbaceous structure as 10 to 20 percent in Low, 50 to 70 percent in Moderate, and 20 to 30 percent in High structure (Grasslands Plan, Ch. 2, pp. 2-13, 2-19).

Visual Obstruction Reading (VOR) surveys conducted in the project area for 2004 and 2005 show High structure ranging from 0.6 to 7 percent, Moderate structure ranging from 47 to 64 percent, and Low structure from 30 to 53 percent. These surveys were conducted on biologically capable lands within the project area. VOR surveys conducted from 1996 to 2001 in Billings County show High structure ranging from 3 to 8 percent, Moderate structure ranging from 47 to 83 percent, and Low structure from 11 to 49 percent. VOR surveys specific to the project area conducted between 1996 to 2001 show High structure ranging from 5 to 20 percent, Moderate structure from 56 to 70 percent, and Low structure ranging from 23 to 36 percent.

Indicator: Trend of High structure.

This indicator is intended to provide a quantitative estimate of how well an alternative would move herbaceous vegetation towards desired structure objectives. The potential trend of High structure was evaluated by comparing the level of Authorized Use relative to the initial estimated carrying capacity, as well as how livestock management could affect High structure. When Authorized Use exceeds carrying capacity there is greater utilization of the existing forage, which results in a greater amount of Low to Moderate structure. If Authorized Use is at or below the carrying capacity, then High structure may increase to some degree; however, the level of increase would depend upon a variety of factors such as the time, intensity and duration of livestock grazing and would be monitored to see if additional adjustments in Authorized Use or timing of grazing are warranted.

KEY ISSUE #4. VEGETATIVE SERAL STAGES: Seral stage refers to the current composition of plant species that occur along a continuum between early plant establishment and a climax plant community. The Grasslands Plan uses vegetative seral stages to identify desired condition for plant species composition. From this point forward vegetative seral stages will be referred to as seral stages. Seral stages are expressed as early, mid, and late stages. Plant communities change

as they move from one seral stage to the next. A mosaic of seral stages is normally spread across the landscape.

There is a concern that a combination of the expansion of invasive grass species and current grazing strategies is adversely affecting the desired mosaic of seral stages and maintenance of native plant communities. The current distribution of seral stages across the project area is approximately 7 percent in early seral stage, 72 percent in mid seral stage, and 5 percent in late seral stage. Approximately 16 percent of the sample sites are at an Invaded Grass State (NRCS, 2009) and not included in the seral stage analysis. The Grasslands Plan objectives for seral stages are to have 10 to15 percent in early seral stage, 65 to 75 percent in mid seral stage, and 15 to 20 percent in late seral stage.

Early seral stage is the plant community that occurs after a significant disturbance such as heavy continuous seasonlong grazing.

Mid seral stage is the plant community that is transitioning between early and late seral stages and typically develops under more stable environmental conditions, but can occur under a moderate level of disturbance.

Late seral stage is a plant community that develops with extended periods of no or little disturbance, and approaches composition of a climax plant community.

Indicator: Trend of seral stages.

This indicator provides a quantitative estimate of how well an alternative is moving the project area towards desired seral stage (plant composition) objectives. Intensity, frequency, and timing of grazing disturbance can have differing effects on plant composition and trends towards late or early seral stages, as well as trends of invasive grasses.

As intensity and frequency of grazing increase in a native grass community there is generally a shift towards an earlier seral stage. A reduction in intensity and frequency of grazing tends to facilitate the development of late seral stages, but can be complicated by trends of invasive species. The timing of grazing disturbances also influences trends in plant composition as a result of differences in species palatability that change during the year, thus affecting their degree of desirability and selective use by grazing livestock. Species that are actively selected are likely to decrease in occurrence, while species that are avoided or undesired are likely to increase. The timing of grazing also influences the ability of plants to complete critical growth stages, thereby influencing plant vigor, production, and the maintenance of desired plant composition.

KEY ISSUE #5. ECONOMICS: Potential reductions to Authorized Use are likely to have an effect on the economics of the individual permittee and adjacent communities. Calculating potential impacts to an individual permittee is very complicated and requires information not readily available. The broader concern, however, is related to how the range of alternatives would affect jobs and income in the agricultural sector which includes livestock grazing. The economic analysis in this document is focused on the effects of the alternatives on jobs and income within an identified economic impact area of associated counties.

The analysis also considers an economic analysis completed by North Dakota State University (NDSU) for Billings County, ND. The NDSU analysis looks at the effects of two of the four alternatives in terms of changes in gross sales and net revenues from cow-calf operations and debt repayment capabilities.

Indicator: The Forest Service indicator is jobs and income generated in the agricultural community. The indicators associated with the NDSU study are cumulative net margins and debt repayment capability.

This indicator is intended to give a quantitative measure of how an alternative will affect jobs and income in the agricultural sector within the identified economic impact area for this project.

KEY ISSUE #6. DROUGHT: A major factor affecting herbaceous structure, forage availability, and other resources across the landscape is drought. The Grasslands Plan (Appendix G, p. G-15) defines drought as any year or sequence of years when annual precipitation amounts are 75 percent or less of normal. Based on this definition, drought has occurred in 21 percent of the years in the northern Great Plains, since 1940 (Holechek et.al. 1989). Within the past 10 years drought has occurred on the Little Missouri National Grasslands about 40 percent of the time according to the U.S. Drought Monitor (http://drought.unl.edu.dm).

When there is a lack of precipitation during the growing season (April thru July) it has a major impact on the production of forage. Less available forage results in utilization levels being reached earlier in the grazing season which results in fewer days of grazing. The DPG currently doesn’t have a unit-wide drought strategy but is in the process of creating one. During this interim period a modification of the drought strategy identified in the 2005 NE McKenzie Allotment Management Plan Revisions FEIS will be used. Once the DPG drought strategy is completed it will replace the interim strategy. Drought is an important factor affecting livestock management on the DPG. It is included as an issue to highlight its importance and is addressed through inclusion of an interim drought strategy in the Design Criteria identified in Chapter 2.

ISSUES ELIMINATED FROM DETAILED STUDY

This section identifies issues that were dropped from detailed study and why they were not carried forward through the rest of the FEIS. This is consistent with Council on Environmental Quality (CEQ) direction concerning non-significant issues and narrowing discussion to keep an EIS as concise as possible. Issues eliminated from detailed study include: archeology, noxious weeds, threatened and endangered (TE) plants, sensitive plants, recreation, TE wildlife species, sensitive species, management indicator species (MIS), raptors, soils, and soil capability.

The CEQ directs that environmental impact statements shall be kept concise and shall not be longer than absolutely necessary to comply with NEPA and CEQ regulations (40 Code of Federal Regulations (CFR) 1502.2 (c)). The CEQ continues at 40 CFR 1501.7(a) (3) with direction to "Identify and eliminate from detailed study the issues which are not significant . . . narrowing the discussion of the issues in the statement to a brief presentation of why they will not have a significant effect on the human environment or providing a reference to their coverage elsewhere." Again, at 40 CFR 1502.2(b), the CEQ identifies that "Impacts shall be discussed in proportion to their significance. There shall be only brief discussion of other than significant issues. As in a finding of no significant impact, there should only be enough discussion to show why more study is not warranted."

Archeology

The following discussion summarizes information contained in the Archeology Report (Project Record, Specialist Reports and Notes) prepared by the Forest Service zone archeologist for the Little Missouri National Grasslands (LMNG). The archeology analysis covers the original project area which contained approximately 149,140 acres. Since then the project area was reduced to about 87,262 acres. The conclusions determined by the archeology report are, however, still valid for the smaller project area (Project Record, Specialist Reports and Notes, Archeology Report).

The North Billings project area is located in the Little Missouri River Study Unit according to the North Dakota Comprehensive Plan of Historic Preservation: Archeological Component (SHSND 1990). This area has witnessed the entire span of human prehistoric and historical occupation in North Dakota over approximately the past 12,000 years.

CULTURAL SITES

To date, 840 resource projects have been conducted in the North Billings project area. A complete bibliography of those projects is included in the Archeology Report. Inventories of ground-disturbing projects constitute the majority of the projects. A total of 55,147 acres of federal land have been surveyed. This represents approximately 37 percent of the total federal acres under study (149,140 acres). The inventories have resulted in the location and recording of 304 cultural sites within the North Billings project area. The sites are listed in Appendix I, of the Archeology Report, by site number, site type, and eligibility. The site density is calculated at one

site per 181 acres of inventory. At this density, an additional 519 sites can be estimated to be present but not yet located and recorded.

Of the 304 sites, 37 (about 12 percent) are considered to be eligible for the National Register of Historic Places (NRHP), although none are currently listed on the National Register. An additional 80 sites (about 26 percent) have been formally determined ineligible for the National Register. The remaining 187 sites, nearly 62 percent, are of undetermined eligibility and require further work prior to evaluations of eligibility. Sites that are of undetermined eligibility are treated as if they were eligible sites until they have been proven to be not eligible.

Traditional Cultural Property

A Traditional Cultural Property (TCP) is defined as one that is eligible for inclusion on the NRHP because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community (USDI Bulletin 38). No TCPs are known to be present within the North Billings planning area.

Grazing and Rangeland Management Effects

A sampling of sites was monitored during the 1997 and 1998 field seasons in an attempt to assess effects on cultural resource sites from grazing and rangeland management projects. The results from this monitoring were summarized in Floodman (2000). Three broad categories of effect were utilized: livestock, range improvements, and vehicular trails. These are discussed briefly below.

- Livestock effects are those directly related to the presence of cattle on the site or movement of cattle across the site. These effects were divided into two types of effect: trailing and loafing/trampling.
- Range improvements are projects constructed on the ground for the improvement of pastures and the grazing of cattle. Range improvements defined for the study include spring developments, water wells, water pipelines, watering tanks, stock dams/reservoirs, and fences.
- Vehicular trails cross the grasslands and are used by many visitors other than for the permitted grazing actions. Most of the developed pipeline watering systems either parallel trails, or else trails have developed adjacent to the lines.

Of the 304 sites within the project study area, 141 (approximately 46 percent) were within the 1998 monitor results. Of these, 109 (approximately 77 percent of the monitored sites) are within the allotment areas being studied and formed the basis of the effects analysis. The sites are listed in Appendix I of the Archeology Report, which is located in the Specialist Reports and Notes section of the Project Record.

Of the 109 sites being used for the effects analysis, 33 (approximately 30 percent) were noted to have some type of effects from cattle, range improvements, or vehicular use across the site

boundaries. Of these, severe and adverse effects were noted on 14 of the sites. Those sites with light to moderate impacts from cattle trailing and trampling are not considered adverse. No effects were noted at 76 sites, (approximately 70 percent) of the sites monitored. Of the 14 sites with severe and adverse effects, closer examination reveals that four sites have suffered adverse effects due to pipeline construction, road construction, or cattle trampling or trailing. These sites have all been mitigated.

CONCLUSION

Adoption of management practices to address other resource issues will help to alleviate adverse effects on cultural resource sites due to overgrazing in some areas and from the concentration of cattle within site areas. All water sources are away from the cultural sites recorded in all instances of effect and are not a source of damage in this project area. New plans will result in more stable soils, increased sod cover, and will help reduce the potential for erosion of cultural sites and loss of integrity in the pasture areas.

Under the action alternatives, new fences, water developments, or other improvements may be required. A cultural resource inventory is mandated prior to any ground-disturbing action. The projects will be surveyed and cultural sites will be recorded and evaluated in accordance with the established criteria for nomination to the NRHP for all areas of potential effect for the projects. All significant cultural resources will be avoided and preserved in place. No improvements will be placed within the boundaries of known or newly discovered sites.

The Forest Service zone archeologist concludes in the Archeology Report that the implementation of new management plans for the allotments in the North Billings area will have no adverse effect on cultural resources. The State Historical Society of North Dakota, after review of the Archeology Report, stated that “We concur with a 'No Adverse Effect' determination, and we concur with the proposed management recommendations as outlined in the conclusion”(SHPO 2006). Therefore, this issue was dropped from further consideration in this analysis.

Noxious Weeds

Noxious weeds are a scourge to the prairie ecosystem. They displace and crowd out native plants, modify wildlife habitat, reduce livestock forage, adversely impact watersheds and riparian areas, and are costly to control. Over the years in the Dakotas, federal agencies, state and local governments, county weed boards, and local grazing associations have expended millions of dollars and countless hours to eradicate or control noxious weed populations.

Forest Service Manual (FSM) 2080.5 defines noxious weeds as: “… plants designated as noxious weeds by the Secretary of Agriculture or by the responsible State official. Noxious weeds generally possess one or more of the following characteristics: aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host of serious insects or disease, and being native or new to or not common to the United States or parts thereof.”

Noxious weeds are listed by the State of North Dakota and individual counties. There are currently 23 noxious weeds species associated with the state and county noxious weed lists. Of this number, 17 are known to occur on the DPG. Within the project area, 6 species—leafy spurge, Canada thistle, burdock, black henbane, field bindweed (in 2010 this plant was dropped from the North Dakota noxious weed list), and absinth wormwood—have been identified. The amount of known infestations in the individual allotments ranges from zero to approximately 263 acres. The most prevalent noxious weeds in the project area are leafy spurge, Canada thistle, and burdock. Total estimated acreage in the project area is approximately 790 acres.

Noxious weeds are of concern; however, they were not carried forward in this analysis as a key issue because they have been previously analyzed in the 2007 Noxious Weed Management Project Final Environmental Impact Statement (FEIS) and its accompanying Record of Decision (ROD) which are located in the Supporting Documentation–Range section of the Project Record. The ROD approves the use of the integrated adaptive approach to continue to treat existing and future infestations of noxious weeds. None of the proposed actions associated with this project would alter any of the provisions of the Noxious Weed FEIS. Therefore, this issue was dropped from further consideration in this analysis.

Threatened and Endangered Plant Species

The Forest Service botanist has concluded that there are no federally listed threatened or endangered (T&E) plant species, and there is no designated critical habitat for T&E plant species, on the Little Missouri National Grassland (Project Record, Specialist Reports and Notes, Botany Report). There is no plant species proposed for federal listing and there is no proposed critical habitat associated with the proposed project. Therefore, this issue was dropped from further consideration in this analysis.

Sensitive Plant Species

There are six known populations of three sensitive plant species in the project area—Hooker's townsendia (*Townsendia hookeri*), blue-eyed Mary (*Collinsia parviflora*), and Dakota buckwheat (*Eriogonum visheri*).

Hooker's townsendia typically occurs in sparsely vegetated habitat associated with exposed parent material, poorly developed soil, or recent sedimentation; however, two of the three population sites in the project area occurred in more heavily vegetated settings than is typical of most population sites. Livestock may incidentally graze or trail through Hooker's townsendia population sites, but the very low stature and minimal leaf production of the plant confer an escape from livestock herbivory. Additionally, the primary growth and flowering period occurs during early spring, prior to typical livestock turn-in dates. Although some mechanical damage may occur from livestock trailing through a population site, a certain level of trailing and grazing disturbances may provide benefits of decreased competition with other plant species, maintenance of low structure, and creation of favorable microsites for seed germination.

Two population sites of blue-eyed Mary (*Collinsia parviflora*) are documented in the project area and have remained persistent since their discovery in the early 1990s. Primary habitat for this early-season and short-lived annual species involves the understory of various tree and shrub communities that include woody draws and stands of Rocky Mountain juniper. The growth cycle of blue-eyed Mary is generally nearing completion by late May or early June when livestock grazing generally commences. Concurrent years of observation within the two known population sites suggest that livestock grazing and trailing are not having an adverse effect on the populations.

A new population of Dakota buckwheat (*Eriogonum visheri*) was discovered along a ridge saddle in the Blacktail Creek watershed during project fieldwork. This population is significant in that it is about 20 miles distant from other known populations and therefore contributes to the spatial distribution of the species across the LMNG. The discovered population is the only known site for Dakota buckwheat in the project area.

To an even greater extent than Hooker's townsendia, Dakota buckwheat typically occurs in poor soil conditions that most plant species cannot tolerate. Thus, competition from other species is usually low or non-existent, and the population sites exhibit minimal forage value. The discovered population site is atypical in that it occurs on a broad ridge saddle with moderate amounts of inland saltgrass (*Distichlis spicata*). Abundant hoof prints attest to livestock trailing through the site, but the tallest and most vigorous Dakota buckwheat plants occurred within the hoof prints that collect and increase available moisture. Annual growth and flowering of Dakota buckwheat occurs in mid to late summer, and although some incidental grazing of plants may occur, minimal leaf or forage production confers a low potential for any significant degree of selective grazing.

The six sensitive plant populations in the project area were not affected by livestock grazing and in one case benefited as the largest plants were found in cattle hoof prints. The Forest Service botanist (Project Record, Specialist Reports and Notes, Botany Report) has determined the proposed project would not affect the viability of existing sensitive plant populations. For these reasons, sensitive plants were dropped from further consideration in this analysis.

Recreation

Dispersed recreation opportunities exist throughout the project area. Developed recreation opportunities; such as Magpie and Elkhorn campgrounds and the Whitetail picnic area, are located in or adjacent to the project area. A portion of the nationally recognized non-motorized Maah Daah Hey Trail passes through part of the project area. The area also contains the Ice Caves Special Interest Area, a favorite dispersed recreation site, and other areas of recreation interest including the Two Top/ BigTop and Mikes Creek Research Natural Areas, and the Magpie and Blacktail Inventoried Roadless Areas.

Regardless of the amount of grazing activities in any of the action alternatives, effects on the recreation resource are about the same.

Two of the developed facilities, Elkhorn and Magpie campgrounds, have been fenced to keep livestock out of the facilities. Whitetail picnic area is unfenced and subject to potential impacts including damage to structures such as tables, bulletin boards, livestock rubbing, etc. However, current allotment boundary fences surrounding the picnic area mitigate potential livestock effects. No adverse impacts to developed recreation sites located in the project area are expected under any alternative.

Dispersed recreation includes the Maah Daah Hey Trail, outfitters, individual hunting, and bird watching to mention a few. All the allotments contain a variety of dispersed recreation activities. The Maah Daah Hey Trail would likely have the greatest impacts from continuation of grazing, or new range developments, such as new fencing. Livestock utilize the trail as a walking path, and walking on the trail during wet conditions roughens up the trail surface creating potential safety problems for hikers and mountain bikers. The trampling of the trail surface by livestock could affect the drainage along the trail and create increased maintenance concerns and costs for the Forest Service. Some users complain about cow manure on trails.

Range permittees have experienced problems from recreating publics who leave gates open. This has allowed cattle to enter other pastures or allotments or private properties. They have also reported having water tanks turned on and floats tampered with.

The proposed grazing seasons range from seasonlong to year-around and overlap with a variety of hunting seasons, including upland bird and big game seasons. Although hunting seasons and grazing seasons overlap, no adverse effects on hunting opportunities for either individual hunters or outfitters are expected.

Winter activities in the project area are of a minimal nature and consist primarily of cross country snowmobiling when there is enough snow present to allow that activity. There may be some incidental cross country skiing use. Most cattle are off the range during the deep winter months and would not be affected.

Motorized travel in the project area is limited to existing roads and trails. Off-road motorized travel is allowed for permit holders such as grazing permittees and oil and gas companies. Travel is restricted to administration of their permits. The use of motorized equipment to administer permits can create problems for recreation users. Over time, continued off-road use can leave identifying marks on the ground that appear to the general public as acceptable activities. The average off-road motorized recreationist tends to follow tracks already defined in the grassland, regardless of where they go and who put them there. The development of a Travel Management Plan will analyze these issues.

Alternative 1 – No Grazing (No Action) would eliminate grazing. This alternative would eliminate all concerns or problems that develop between visiting publics and grazing livestock. Alternatives 2, 3, and 3A would maintain current numbers and seasons of use. Effects of grazing activities on recreational use would likely remain status quo. Alternative 4 would see a reduction, in most cases, of authorized AUMs, which would result in reduced numbers of grazing livestock in the project area. Opportunities for conflicts between livestock and other public land users, already very low, may decrease further under this alternative.

The array of alternatives would maintain or reduce livestock use in the project area, so no cumulative effects on recreation are expected. Therefore, this issue was dropped from further consideration in this analysis.

Threatened and Endangered Wildlife Species

The Forest Service wildlife biologist has concluded that there are no federally listed TE wildlife species on the LMNG (Project Record, Specialist Reports and Notes, Wildlife Report). There is no designated critical wildlife habitat and there are no wildlife species proposed for federal listing; further, there is no proposed critical habitat associated with the proposed project. Therefore, this issue was dropped from further consideration in this analysis.

Sensitive Species, Management Indicator Species (MIS), Raptors

A detailed description and analysis of sensitive species, management indicator species (MIS), and raptors is contained in the BA, which is located in Appendix D of the Wildlife Report (Project Record, Specialist Reports and Notes). Table 1.4 summarizes information for each species.

Table 1.4 – Summary of sensitive species, management indicator species (MIS), and raptor information in project area

Species	Designation	Habitat on or Near LMNG	Occurrence within Project Area	Potential for Project Area Impacts on Habitat or Population	Effects Call
Bald eagle (Haliaeetus leucocephalus)	S[1]	Large trees for perching and roosting, areas with carrion, small mammals or fish. Use at this time is restricted to spring and fall migration.	UQ[2]	None	All Alts: No Impact
American peregrine falcon (Falco peregrinus)	S	Peregrine falcons will use almost any habitat type that provides hunting opportunities. Potential use is strictly migratory. (This species was removed from the FS Region 1 Sensitive Species List in May of 2011.)	UQ	None	All Alts: No Impact
Baird's sparrow (Ammodramus bairdii)	S	Idle native or tame grasslands or lightly to moderately grazed pastures.	K[3]	High	Alts 1, 2: May impact* Alts 3, 3A, 4: Beneficial

Species	Designation	Habitat on or Near LMNG	Occurrence within Project Area	Potential for Project Area Impacts on Habitat or Population	Effects Call
Burrowing owl (Athene cunicularia)	S	Well drained, gentle grassland with sparse vegetation; usually rely on burrowing mammals for nest sites; One small prairie dog colony (<1 acre in size) in project area.	UQ	None	All Alts: No Impact
Loggerhead shrike (Lanius ludovicianus)	S	Open habitat with low stature grasses and forbs and shrubs or low trees.	Likely	Moderate	Alts 1, 2: May impact* Alts 3, 3A, 4: Beneficial
Long-billed curlew (Numenius americanus)	S	Expansive, open, gentle grassland with short vegetation.	PSH[4]	Low	All Alts: May impact*
Sprague's pipit (Anthus spragueii)	S	Grasslands of intermediate height and sparse to intermediate vegetation.	K	High	Alts 1, 2: May impact* Alts 3, 3A, 4: Beneficial
Rocky Mountain bighorn sheep (Ovis canadensis canadensis)	S	Badlands and other steep grassland for escape cover, with shrubs, grasses, sedges and forbs for food.	K	Low	All Alts: May impact*
Dakota skipper (Hesperia dacotae)	S	Undisturbed tallgrass to mixed grass prairies; East: low (wet) bluestem prairie; West: upland (dry) prairie dominated by bluestems and needlegrasses.	UQ	None	All Alts: No Impact
Ottoe skipper (Hesperia ottoe)	S	Undisturbed mid-grass to tall grass prairie, drier sites/hilltops.	PSH	Moderate	Alts 1, 2: May impact* Alts 3, 3A, 4: Beneficial
Regal fritillary (Speyeria idalia)	S	Tallgrass to mixed grass bluestem prairies.	UQ	None	All Alts: No Impact
Tawny crescent (Phyciodes batessi)	S	North-facing or other mesic sites – green ash forest margins that border bluestem prairie.	K	Moderate	Alts 1, 2: May impact* Alts 3, 3A, 4: Beneficial
Sturgeon chub (Hybopsis gilida)	S	Primarily inhabits large turbid rivers with rock or gravel bottoms; present in the Missouri River and historically the Little Missouri River.	UQ	None	All Alts: No Impact

Species	Designation	Habitat on or Near LMNG	Occurrence within Project Area	Potential for Project Area Impacts on Habitat or Population	Effects Call
Northern redbelly dace (Phoxinus eos)	S	Slower and clearer waters with some vegetation. Impoundments like beaver ponds and pools in headwaters. Has been found in the Cannonball and the Little Missouri River on the LMNG.	UQ	None	All Alts: No Impact
Golden eagle (Aquila chrysaetos)	R[5]	Nests: Trees, Cliffs; Prey: opportunistic	K	Low	No Measurable Impacts
Prairie falcon (Falco mexicanus)	R	Cliffs	K	Low	No Measurable Impacts
Merlin (Falco columbarius)	R	Forested draws	PSH	Low	No Measurable Impacts
Ferruginous hawk (Buteo regalis)	R	Nests: Isolated buttes, trees, etc	UQ	None	All Alts: No Impact
Greater sage grouse (Centrocercus urophasianus)	S & MIS[6]	Sagebrush shrubland.	UQ	None	All Alts: No Impact
Black-tailed prairie dog (Cynomys ludovicianus)	S & MIS	Gentle grassland terrain; short grass communities; not forested or wet. One small prairie dog colony (<1 acre in size) in project area.	K	Low	All Alts: May impact habitat

[1]S=Sensitive [2]UQ=Unlikely or Questionable [3]K=Known [4]PSH=Potential Suitable Habitat
[5]R=Raptor [6]MIS=Management Indicator Species
*May Impact =May impact individuals but will not lead to federal listing or a loss of viability in the LMNG.

SENSITIVE SPECIES

Effects on the sensitive species listed in Table 1.4 indicate that the alternatives will have no impact, will be beneficial, or may affect individuals of a population. Reasons vary for the determinations including but not limited to the following. Several of the species such as the greater sage grouse, burrowing owl, and Dakota skipper are not known to occur in the project area. For two species, bald eagle and peregrine falcon, the project area may be used only during spring or fall migration periods. Alternatives 3, 3A, and 4 move the project area toward the Grasslands Plan objectives thus would benefit some species, e.g. Baird's sparrow and Sprague's pipit. Alternatives 1 and 2, which are not projected to move conditions towards Grasslands Plan

objectives, would result in a "may impact" determination but will not lead to federal listing or lost viability for these same species. However, none of the alternatives would threaten the viability of any sensitive species in the project area. See the Wildlife Report (Project Record, Specialist Reports and Notes) for further discussion. For the above reasons, the sensitive species identified were dropped from further consideration in this analysis.

Management Indicator Species (MIS)

There are three MIS species for the LMNG: greater sage grouse, black-tailed prairie dogs (prairie dogs), and sharp-tailed grouse. Sharp-tailed grouse will be addressed in Chapter 3. The closest known greater sage grouse occur approximately 35 to 40 air miles southwest of the project area. There are approximately 2,600 acres of big sagebrush habitat located in the project area. However, it is scattered across approximately 52,400 acres of Badlands and does not occur in large enough blocks to support a sage grouse population. Additionally, there are no greater sage grouse leks or sightings in the project area. There is one small prairie dog colony, less than 1 acre in size, in the project area; however, none of the alternatives would have an effect on this town. For the above reasons, greater sage grouse and prairie dogs were dropped from further consideration in this analysis.

Raptors

The golden eagle and the prairie falcon are both known to occur in the project area. In general, nest site availability and non-forested habitat are critical components for these two species. These species are adapted to the presence of herbivore activity, which has no effect on nesting sites. None of the alternatives propose any activity that would affect nesting sites for these species. The array of alternatives, to varying degrees, may affect the prey base for these species; however, it is not possible to determine if this would have any significant effect on them.

The merlin is not known to occur in the project area; however, the project does support potential foraging and nesting habitat for the species. As with the species above, herbivores have no effect on potential nesting sites. The array of alternatives may affect the availability of prey species; however, it is not possible to determine the magnitude of those effects at this time.

The Forest Service wildlife biologist concluded that the project area provides marginal habitat, at best, for ferruginous hawks. This is due to their need for large expanses of open rolling prairie and high densities of prey such as prairie dogs, which are scarce in the project area (Project Record, Specialist Reports and Notes, Wildlife Report).

For the above reasons, this issue was dropped from further consideration in this analysis.

Soils

Soils and soil condition are of primary importance because they are the foundation upon which a healthy ecosystem is built. Soil condition is determined through an evaluation of soil quality based on an interpretation of factors that affect three primary soil functions. The primary soil functions evaluated are: soil hydrology, soil stability, and nutrient cycling (USDA 1999). Soil

condition objectives apply to lands where long-term soil productivity and satisfactory watershed condition are principle objectives, such as on the LMNG.

Direction from the Forest Service Northern Region (Region 1) is to manage NFS lands under ecosystem management principles without permanent impairment of land productivity and to maintain or improve soil quality (USDA 1999). Soil quality standards are met when detrimental soil disturbance (DSD) from management activities occur on no more than 15 percent of an activity area or allotment. Detrimental soil disturbance is defined as activities that result in compaction, displacement, rutting, severe burning, surface erosion, loss of surface organic matter, and soil mass movement.

Livestock management activities associated with DSD includes watering locations, mineral sites, corrals, livestock trails, and use of two-track trails. These activities result in various levels of soil compaction, rutting, displacement, and surface erosion.

A soil compaction study was completed on the Little Missouri National Grassland by Gonzalez et al. (2005). The results indicated there was no long-term soil compaction on upland soils as a result of livestock activities except at the specific site types noted in the above paragraph.

Table 1.5 lists a summary of total DSD area, acreage, and percentage within the project area. The total project area DSD is 0.45 percent, which is negligible and well below the 15 percent regional direction.

Table 1.5 – Summary of total DSD area, total acres of DSD, and total percentage of DSD

Allotment #	Alt. 1	Alt. 2	Alt. 3	Alt. 3A	Alt. 4
Total acres of NFS lands in project area	87,265	87,265	87,265	87,265	87,265
Total DSD acres	30	392	376	395	386
DSD percent	0.0003	0.45	0.43	0.45	0.44

Alternative 1 would see the removal of stock tanks, mineral sites, corrals, etc. Over time, these sites as well as cattle trails would heal. Assuming the two-track trails continue to be used for other purposes, existing DSD acres would be reduced to 30 acres and the total DSD reduced from 0.45 to 0.0003 percent. Alternative 2 would maintain the status quo, and the total DSD (392 acres) would be expected to remain at about 0.45 percent.

Alternative 3 proposes to construct 22 livestock water tanks, 9 rangeland water wells, and 1 waterlot that would result in new DSD. The alternative also proposes to reclaim 12 dugouts, reservoirs, or springs, which would result in a reduction in DSD after successful reclamation is complete. The net change in DSD as result of this alternative is a reduction of 15.8 acres and 0.02 percent DSD, equating to a total DSD of 0.43 percent.

In comparison to Alternative 3, Alternative 3A proposes to construct five additional livestock water tanks and one additional waterlot which would result in new DSD. The net change in DSD as result of this alternative is an addition of 3 acres and 0.003 percent DSD, equating to a total DSD of 0.453 percent.

Alternative 4 proposes to construct 13 livestock water tanks, 6 rangeland water wells, and 1 waterlot that would result in new DSD. The alternative also proposes to reclaim 6 dugouts, reservoirs, or springs, which would result in a reduction in DSD after successful reclamation is complete. The net change in DSD as result of this alternative is a reduction of 6.2 acres and 0.01 percent DSD, equating to a total DSD of 0.44 percent.

The total DSD in the project area is 0.45 percent, which is well below the regional standard of 15 percent. All of the alternatives, except Alternative 2, would lower the DSD. Because this project would maintain (Alt. 2) or reduce (Alts. 1, 3, 3A, and 4) the already low percentage of soil compaction or disturbance, and because it is well below the 15 percent DSD regional soil standard, no additional analysis is needed.

Soil Capability

The Forest Service, in cooperation with North Dakota State University (NDSU) and the MGA, has formed a cooperative effort to collect monitoring data on the LMNG. NDSU started the data collection on the Medora Ranger District in 2008 in North Billings County. By the end of 2009 they had collected information on 34 of the 43 allotments in the project area. A more detailed description of this cooperative effort is located in Chapter 3.

The 17 Indicators of Rangeland Health (Pellantet al. 2006) assessment was conducted on 30 of the allotments. This produced 115 samples, of which 98 were used and 17 were discarded because the surveys had not been fully completed. The 17 Indicators of Rangeland Health is a rapid assessment method that looks at 17 different indicators to gauge the health of the range. The assessment compares the observed indicator to a reference or desired condition for that indicator to determine the level of departure if any. Each indicator then receives a rating from 1 to 5:

1 indicates an extreme departure from the reference condition,
2 is an extreme to moderate departure,
3 is a moderate departure,
4 is a moderate to slight departure, and
5 indicates a slight to no departure from reference conditions.

Of the indicators, 9 apply to soil stability and 11 apply to hydrologic function of the soils; 8 of these indicators overlap. These indicators provide an indication of soil health and functionality. Table 1.6 shows the percentage of sampled ecological sites and their ratings within each allotment. As the table shows, almost all of the ecological sites in the project area are in categories 4 and 5. This means that the soils are functioning properly in regards to nutrient cycling and hydrologic function and they are not eroding off the landscape, i.e., they're stable. In

other words, the soils are capable of maintaining the diverse native plant communities associated with the different soil types.

Table 1.6 – Soils stability and hydrologic function of soils, summary for 2008 and 2009 field seasons; percentage of sampled ecological sites by category by allotment

Allotment #	1 % [1] Extreme		2 % Extreme to Moderate		3 % Moderate		4 % Moderate to Slight		5 % None to Slight	
	SS[2]	HF[3]	SS	HF	SS	HF	SS	HF	SS	HF
126	0	0	0	0	0	5	5	10	95	85
128	0	0	0	0	0	0	10	17	90	83
129	0	0	0	0	4	8	10	12	86	80
131	0	0	0	0	7.5	15	10	10	82.5	75
132	0	0	0	0	0	0	0	7	100	93
135	0	0	0	0	0	0	30	40	70	60
136	0	0	0	0	0	0	0	0	100	100
140	0	0	0	5	0	10	0	0	100	85
158	0	0	0	0	0	0	10	10	90	90
220	0	0	0	0	0	0	0	10	100	90
230	0	0	0	0	0	0	0	0	100	100
239	0	0	0	0	0	0	3	17	97	83
240	0	0	0	0	0	8	20	28	80	64
241	0	0	0	0	0	5	5	15	95	80
243	0	0	0	0	0	10	10	10	90	80
244	0	0	0	0	0	10	0	0	100	90
248	0	0	0	0	0	10	7	7	93	83
256	0	0	0	0	0	0	30	40	70	60
258	0	0	0	0	0	5	5	10	95	85
272	0	0	0	0	0	10	0	0	100	90
277	0	0	2.5	5	10	12.5	15	20	72.5	62.5
278	0	0	0	0	0	10	0	10	100	80
279	0	0	0	0	0	0	20	10	80	90
280	0	0	0	0	0	0	17	23	83	77
282	0	0	0	0.5	2	3.5	17	21	81	75
288	0	0	0	0	0	10	0	0	100	90
289	0	0	0	0	0	1	20	20	80	79

Allotment #	1 % [1] Extreme		2 % Extreme to Moderate		3 % Moderate		4 % Moderate to Slight		5 % None to Slight	
	SS[2]	HF[3]	SS	HF	SS	HF	SS	HF	SS	HF
300	0	0	0	0	0	0	0	10	100	90
301	0	0	0	0	4	5	17.5	19	78.5	76
302	0	0	6	10	26	28	8	10	60	52

[1] This is the percentage of sampled ecological sites within each allotment, in each category.
[2] SS=Soil Stability.
[3] HF=Hydrologic Function

Soil Productivity

Annual forage production, Indicator #15 of the 17 Indicators of Rangeland Health, can serve as a surrogate for soil productivity. Of the 115 sites surveyed 90.5 percent were at or near reference condition for forage production. Approximately 9.5 percent (11 sample sites) had a moderate or greater departure from reference conditions. Closer review of the 11 sites found that four were located on the wrong ecological site, two had incomplete data, and three didn't follow the protocol correctly, which resulted in incorrect category determinations. The remaining two sites had been sampled correctly but an incorrect category determination was made.

It is important to understand that the 115 samples reviewed for this indicator represent about half of the samples that are to be collected by NDSU for the various ecological sites in the project area. It will take several more years to complete the sampling. What can be said at this point is that based on the existing survey information, there is no indication the productivity of the soils in the project area has been compromised.

Because the soils in the project area are stable, functioning properly in regards to nutrient cycling and hydrologic function, and their productivity is intact this issue is dropped from further consideration in this analysis. Additional information is available in the Supporting Documentation–Watershed section of the Project Record.

CLIMATE CHANGE

Livestock affect climate change through the production of methane gas (CH_4), which is produced as part of normal digestive processes in ruminant animals. During digestion, microbes present in an animal's digestive system ferment food consumed by the animal. This microbial fermentation process, referred to as enteric fermentation, produces CH_4 as a by-product, which can be exhaled or eructated by the animal. Methane is a potent greenhouse gas that is 21 times more effective at trapping heat in the atmosphere than carbon dioxide on a kilogram per kilogram basis (Wood et al. 1998).

Livestock can also play a beneficial role in relation to climate change. The LMNG evolved under the herbivory of ungulates such as bison, deer, elk, and antelope. As such, the native plant

communities associated with the LMNG are adapted to herbivory. Livestock have, for the most part, replaced the large herds of wild ungulates on the grasslands, and they have a role in maintaining healthy grasslands. Information from the EPA website (http://www.epa.gov/methane/rlep/index.html) states that properly managed grazing "can reduce atmospheric concentrations of carbon dioxide through the mechanism of soil carbon sequestration on grazing lands."

The agricultural sector in 2006 was responsible for 6 percent of the total U.S. greenhouse gas emissions (EPA, 2008). Beef cattle are responsible for the production of 20 percent of the 6 percent of greenhouse gases generated from agriculture sources. Stated another way, beef cattle produce approximately 1.2 percent of U.S. greenhouse gases. On a percentage basis, the estimated 5,200 head of cattle that currently graze within the project area would account for 0.0000006 percent of the methane produced by beef cattle produced in the United States.

Alternative 1, which removes livestock from NFS lands in the project area, may or may not lead to a reduction in methane production. The permittees might maintain their existing herd numbers on their own or rented properties. They might reduce a certain portion of their herds or get out of livestock production entirely. It is impossible to predict what each permittee would do. In general terms it is possible to say that, under this alternative, methane production produced by cattle in this project area could range from zero to what is currently produced.

A possible indirect effect of removing livestock from lands in the project area relates to potential effects on the plant communities and their abilities to serve as carbon sinks. It is generally, though not universally, accepted that in grassland ecosystems grazing is needed to maintain the health of associated plant communities. The cessation of grazing in the project area may result in increases in plant community health in the short term, but eventually these communities would likely decline due to litter build up and the presence of invasive grasses. As the vigor of any herbaceous plant community decreases, so does its ability to effectively sequester carbon.

Alternative 2 would maintain current Authorized Use, and Alternatives 3 and 3A would initially as well. Therefore, the amount of methane would stay more or less the same as what is currently produced. The ability of the NFS lands in the project area to sequester carbon would likely remain the same as current conditions.

Alternative 4 would reduce Authorized Use, which may result in decreased methane production. However, as explained under Alternative 1, it would depend on what the permittee decides to do with the cattle removed from the NFS lands in the project area. Reduced Authorized Use under this alternative is projected to improve the mosaic of herbaceous structure and seral stages, which should also improve carbon sequestration but to what degree is unknown.

The livestock that graze in the project area produce a minute amount of the total methane produced by the beef cattle industry of the United States. Maintaining the current numbers of cattle in the project area would continue to affect climate as it currently does; however, it is difficult to identify what the effect would be in terms of global climate change. Reducing the number of cattle may or may not result in less methane production for reasons previously stated. Even if all the livestock were removed and not replaced, it would be difficult at best to determine

what the effect of such a minute reduction in methane would have on climate change. For these reasons this issue was dropped from further consideration in this analysis.

A more detailed discussion of climate change can be found in the Climate Change report located in the Specialist Reports and Notes section of the Project Record.

WATER QUALITY

The following information has been added to the SDEIS in response to comments presented by the EPA.

The North Dakota State Department of Health (NDDoH) has jurisdiction over the quality of waters of the state. The ND Century Code 33-16 authorizes the state to establish a system for classifying waters of the state; provide standards of water quality for waters of the state; and protect existing and potential beneficial uses of waters of the state (NDDoH 2001).

The Little Missouri River (LMR), which generally flows northward, is the only perennial stream in the project area. A perennial stream flows continuously throughout most years. It is classified as a Class II stream, which means that the waters of the stream are suitable for fish, aquatic biota, recreation, agricultural uses, and with treatment for municipal or domestic use (NDDoH 2001). Approximately 27 miles of the river are located within the project area. Roughly 6 of the 27 miles of the river actually abut NFS lands within the project area, equating to about 1 percent of the total length of the LMR. The remaining 21 miles of the river bank in the project area are either privately owned or owned by the state. The other streams within the project area are intermittent and are classified as Class III streams for water quality standards. The waters of Class III streams are suitable for agricultural and industrial uses but must be maintained to protect secondary contact recreation use (e.g., wading), fish, aquatic biota, and wildlife (NDDoH 2001).

The reach of the LMR flowing through the project area has not been assessed for water quality by the state. Two reaches of the LMR above and two below the project area have been rated for water quality by the state. Three of these reaches are rated as “Fully Supporting but Threatened” for recreation and one as “Not Supporting” based on levels of fecal coliform contamination (NDDoH 2008). The probable sources, as identified by the state, are livestock grazing or feeding operations and onsite sewage treatment systems. Contributions of fecal coliform are thought to originate on private, state, and federal lands bordering the river. The intermittent streams in the project area may contribute some quantity of fecal coliform to the LMR through sources previously mentioned and wildlife. Livestock managed on private and state lands within the project area are also potential contributors of fecal coliform to the LMR and intermittent streams in the project area. There are no water bodies within the project area listed on the Clean Water Act Section 303(d) list for water quality impairment.

All of the alternatives except Alternative 2 would improve riparian vegetation conditions and contaminant filtering capability. Recent studies (Shirmohammadi and Montas 2003, Pachepsky et al. 2006, Sullivan et al. 2007) indicate that vegetation filter strips are highly effective in

removing nutrients and fecal coliform from overland flow and preventing these contaminants from entering the stream flow. Therefore, actions that increase riparian vegetation will directly decrease sediment transport as well as transport of sediment laden contaminants such as fecal coliform.

Currently there is no readily available information establishing the water quality for the LMR or intermittent streams in the project area. To better address this in the future this project proposes to establish water quality monitoring for the LMR, within the project area, and at the confluences of the LRM and two major intermittent streams, which drain much of the project area. The Monitoring section in Chapter 2 of this document provides more detailed information regarding the proposed monitoring.

Water quality was not carried through detailed analysis because there is no known impairment to water quality of the LMR as a result of proposed actions within the project area. A more detailed discussion of water quality can be found in the Water Quality Report (Project Record, Specialist Reports and Notes).

CHAPTER 2
Alternatives, Including the Proposed Action

INTRODUCTION

This chapter describes the five alternatives considered in this analysis. It explains how the alternatives were developed and identifies alternatives considered in detail, alternatives dropped from further analysis, and design criteria associated with all the action alternatives (Alternatives 3, 3A, and 4). The chapter ends with a summary of the effects of implementing each alternative in relation to the purpose and need and the key issues.

ALTERNATIVES CONSIDERED IN DETAIL

For this project, the IDT considered the following elements in the development of the action alternatives: key issues; the purpose of and need for this project as identified in Chapter 1; the goals, objectives, and desired conditions for the project area as described in the Grasslands Plan; comments made by the public, the state, and various agencies during the scoping process; the laws, regulations, and policies that govern land management on National Grasslands; and site-specific resource information.

Four alternatives were developed and analyzed in the DEIS. After review of DEIS comments the responsible official decided to create and include an additional alternative in the SDEIS. The alternative descriptions, presented below, explain the activities that would occur if an alternative were selected. A detailed description of the environmental effects resulting from the alternatives is given in Chapter 3.

It is important to note that Authorized Use under all the alternatives, except Alternative 1, can be adjusted annually to account for situations that require additional resource protection. Examples include drought, grasshopper outbreaks, over-utilization of a pasture, etc. These adjustments are temporary in nature and normally encompass a single grazing season. However, if a resource has been severely affected, adjustments may be of longer duration.

Alternative 1

The CEQ regulations for implementing NEPA require that a no-action alternative be developed as a benchmark from which the agency can evaluate the proposed action. No action in livestock management planning is defined as "…livestock grazing would not be authorized within the project area" (Forest Service Handbook [FSH] 2209.13, 92.31, Grasslands Plan ROD, 2006).

Upon implementation of the decision and resolution of any appeals, the term grazing permit with the MGA would be modified to terminate livestock grazing in the analysis area. Pursuant to FSH 2209.13, Section 16.24, this alternative could not be implemented until 2 years after the notification of each affected permittee (36 CFR§ 222.4(4)(1)). No permits would be issued for

any of the 43 affected allotments. Since livestock grazing would no longer be authorized under this alternative, no mitigation measures for riparian habitat, green ash woody draws (woody draws), herbaceous structure, or seral stages would be completed. However, restoration projects could be planned and implemented, which would require a subsequent plan and NEPA decision.

Most range improvements currently in existence on the allotments would be abandoned. Subsequent decisions would need to be made regarding retention of any improvements, such as water developments, for other resource needs and funding for maintenance would need to be secured. Any water developments not needed for wildlife or other purposes, and all fences, except Grassland boundary fences or allotment boundary fences adjacent to other active grazing allotments, would be removed.

Under this alternative control of noxious weeds would become the sole responsibility of the Forest Service because the Medora Grazing Association (MGA) would no longer be authorized to graze livestock in the project area.

Alternative 2

This alternative would maintain the status quo. Authorized Use would remain at Preference; therefore, there would be no change in the number of livestock or season of use in the allotments in the project area. Some minor changes may be made in the Annual Operating Instructions (AOI) if needed. Existing conditions for each allotment are identified in Chapter 3 Part 2.

Alternative 3

Preference is the maximum number of livestock for a given amount of time allocated to an allotment.

As identified in Chapter 1, the proposed action for this project is to continue to permit livestock grazing at Preference, initially, on the 43 allotments in the project area through a program of actions that maintains and/or moves resource conditions towards meeting the Grasslands Plan objectives and desired on-the-ground conditions. This is to be achieved through implementation of initial actions and application of adaptive options, including the tool box if initial actions fail or can't be implemented.

The second and third tables contained in each of the individual allotment write-ups, located in Chapter 3 Part 2, contain information identifying existing and desired conditions, need for action, initial management actions, and a set of adaptive options to address identified resource concerns for each allotment in the project. Taken together, the initial actions and adaptive options create the proposed program of actions for each individual allotment.

A key component of this alternative is monitoring, as it determines if implemented management actions are accomplishing their intended resource goals. The starting point for each allotment is identified as "Initial Actions" in Table 3 of the allotment write-ups located in Chapter 3 Part 2. If monitoring indicates that the initial actions are not meeting or moving a resource towards desired condition, then adaptive options can be applied. Monitoring is discussed in detail later in this

chapter. The type, frequency, and duration of monitoring on each allotment is identified in Table 3 of each of the allotment write-ups in Chapter 3 Part 2.

Information contained in Chapter 3 Part 2 will be used in the development of new Allotment Management Plans (AMPs) for the 43 allotments in the project area. The individual AMPs will be the documents that implement the selected alternative which will be identified in the Final ROD for this proposal.

If monitoring indicates that Grasslands Plan objectives are not being met or progress towards those objectives is not occurring through the implementation of initial or adaptive management options identified in the allotment write-ups located in Chapter 3 Part 2, then a team, composed of Forest Service specialists in consultation with the affected permittee and MGA Director, would make a recommendation to the district ranger. The recommended course of action would be based on the adaptive options identified for each allotment in Chapter 3 Part 2 and/or the Grazing Management Toolbox (Table 2.1). For example, Allotment A contains an initial action to develop a range water well, pipeline, and a stock tank or two. The purpose is to pull cattle away from a riparian area that needs improvement. However, after implementation of these actions, monitoring shows that an upward trend in PFC is not occurring. At this point the additional management tools identified in the adaptive options or the Grazing Management Toolbox would be available to help solve the concern.

The toolbox is a collection of different management tools that could be used singularly or in combination to address resource issues if proposed initial management actions and adaptive options are not successfully addressing a resource concern(s). The toolbox is a compilation of all the different management tools identified in the 43 different allotment summary sheets. The different tools are not listed in any order of preference or priority for implementation.

It is possible that new rangeland management techniques may be developed during the life of this project. New techniques would be incorporated into the toolbox if their implementation is consistent with the effects documented in the FEIS and its accompanying Final ROD.

Between the DEIS and SDEIS, initial actions for Alternative 3 were modified for allotments 126, 128, 132H, and 300 based on discussion with the permittee for those allotments.

Table 2.1 — Grazing Management Toolbox

Adjust AUMs (stocking rate) by # of head &/or # of days.
Adjust AUMs based on average cow size.
Adjust season of use.
Allow early turnout on native pastures one out of three years on inventory permits.
Construct and/or remove cross fences.
Construct fence to create riparian unit — allow grazing under riparian grazing dates.
Construct fence to exclude livestock from areas of concern (riparian, wooded draws, springs, wetlands, etc.).
Construct livestock water development (well, pipeline, tanks, windmill, reservoir, dugout, or spring).
Construct temporary fence to control livestock distribution patterns.

Construct water gap to limit livestock access on stream.
Construct/harden stream crossings.
Defer native pastures until June 1, or until development of the three-and-a-half leaf stage for key graminoid species.
Fertilize crested wheatgrass areas.
Hay or cut-&-leave crested wheatgrass areas.
Implement BMPs for riparian pastures.
Implement deferred grazing system.
Implement DPG drought management strategy.
Implement prescribed burns.
Implement rest-rotation grazing system.
Implement twice-over grazing system.
Incorporate a range rider to disperse livestock throughout a pasture (herding).
Incorporate private “off permit” land into rotation.
Interseed pasture with native grass species.
Maintain existing developments to reestablish use.
Manage salt and supplement locations.
Manage water availability/access at water developments.
Mechanical brush management.
Move winter feeding areas off of NFS lands.
Reallocation of pastures (change allotment boundary)
Remove/reclaim water development (well, pipeline, tanks, windmill, reservoir, dugout, or spring).
Rest for one or more seasons.
Restore/enhance riparian vegetation, i.e., willow planting.
Scarify clubmoss areas within a pasture.
Utilize biological controls for noxious weed control in woody draws.
Utilize non-native grass pastures early to defer grazing on native grasses.

Alternative 3A

One of the MGA comments on the DEIS states that the association wanted Alternative 3 revised to reflect all of the MGA recommendations. They provided Exhibit 2, which compared Alternative 3, Appendix A to the notes of each permittee meeting regarding the initial recommendations. In Exhibit 2, they specifically highlighted recommendations that they felt the ForestService dropped from consideration and also highlighted Forest Service additions to Alternative 3, which the MGA claimed the MGA members did not agree to.

Tables 3 and 4 located in Appendix A discuss each item as highlighted in the MGA Exhibit 2. Some of the items highlighted by the MGA in their Exhibit 2 did not provide recommendations or had already been addressed in Alternative 3. Therefore, Alternative 3A did not incorporate these highlighted items in the MGA recommended proposal.

In response to the MGA comment, the responsible official decided to include a new alternative in the SDEIS. The new alternative is identified as Alternative 3A. Alternative 3A was created by including applicable actions identified in the MGA Exhibit 2 that the MGA recommended be added to Alternative 3, and excluding some actions identified in Alternative 3 that the MGA did not agree with. Tables 2.2 and 2.3 summarize the changes made.

Table 2.2 — Recommendations incorporated into Alternative 3A

Allotment #	MGA Association/Member Recommendations Added to Alternative
127	Construct a water lot around the existing spring development to allow access to both pastures 2 and 3 in the northeast quarter of the southwest quarter of Section 17, T144N, R101W.
129	Extend range water pipeline from well in allotment 131 pasture 3 into allotment 129 pasture 2 in Section 11, T144N, R101W.
135	Construct a range water pipeline from pasture 8 to pasture 10 and add one stock tank in Section 28, T143, R101W.
142	Construct an electric cross fence running east/west in pasture 1.
243	Develop a spring in pasture 1 in the southwest quarter of Section 3, T143N, R99W.
258	Allow a permittee to turn livestock onto native pastures the middle to third week of May.
272	Develop a spring in pasture 2 in the northwest quarter of the southwest quarter of Section 30, T143N, R99W.
287	Construct an extension to the existing range water pipeline in pasture 3 into the northwest quarter of Section 26, T143N, R101W.

Table 2.3 — Actions not included in Alternative 3A

Allotment #	Forest Service Actions in Alternative 3 but not included in Alternative 3A
126	Reclaim existing spring developments in pastures 4 and 6.
240	Reclaim reservoir(s) in pasture 1.
244	Cross fence pasture 2, north to south. Cross fencing would create a crested wheatgrass pasture on the east side of pasture 2, which would be grazed early. The additional pasture, created through the cross fence, allows the implementation of a two-pasture deferred grazing rotation between the remaining pastures.
272	Fence woody draw located in the southwest quarter of Section 30 with temporary electric fence. After construction of the pipeline is complete, reclaim the dugout located in the southeast quarter of Section 29 pasture 1 and the reservoir located in the northwest quarter of the southeast quarter of Section 30 pasture 2.
278	Reclaim reservoir in pasture 2.

Allotment #	Forest Service Actions in Alternative 3 but not included in Alternative 3A
300	Once well is developed reclaim spring in the southeast quarter of Section 28.
301	Fence out spring areas, install check valve to dump water back into riparian areas once stock tanks are full.

Alternative 4

Alternative 4 is similar to Alternative 3 in some respects. However, it differs from Alternative 3 by establishing Authorized Use based on estimated livestock carrying capacities and accounts for changes in animal unit forage demands with changes in cow size (animal weight). Four of the allotments' Preference was less than initial estimated carrying capacity. Because there are resource concerns in these allotments, Authorized Use was set at Preference adjusted for cow size as a starting point. In addition, the IDT reviewed the initial and adaptive actions identified in Alternative 3. They then estimated the costs of initial action projects under Alternative 3 and prioritized those projects in light of the resource objectives the project was designed to address. Estimated costs were then compared against projected funding over the next three years. This resulted in a winnowing of projects and the development of different management approaches for some of the allotments.

The third table in each of the allotment specific write-ups contained in Chapter 3 Part 2 identifies the allotment specific actions for each allotment for this alternative. This alternative is also adaptive by design, so if monitoring indicates a need to consider and possibly implement different management options, it would be as discussed in Alternative 3.

Preferred Alternative

40 CFR Section 1502.14(e) of the CEQ regulations states, "Identify the agency's preferred alternative or alternatives if one or more exist, in the draft [environmental impact] statement…." At the time of the DEIS, the responsible official for this project did not have a preferred alternative. After review of information provided during the comment period on the DEIS and SDEIS, the Grasslands Supervisor has identified a combination of alternatives for the 43 allotments as the preferred alternative for this project proposal carefully identified in the Draft ROD.

Design Criteria Common to Action Alternatives

Design criteria (Table 2.4) are actions designed into the action alternatives (Alternatives 3, 3A, and 4) to reduce impacts of proposed activities. They include any requirements that must be complied with by law, regulation, or policy, and include things such things as best management practices (BMPs), Grasslands Plan standards and guidelines, and standard operating procedures.

Table 2.4 — Design criteria

Place salt and supplement to draw livestock away from woodlands and riparian areas.

On native pastures, defer turnout until June 1, or until the three-and-a-half leaf stage is reached for key native graminoid species, e.g., western wheat, green needle, needle and thread. On inventory permits, early turnout on native pastures is allowed one out of 3 years.
Rotate placement of salt and supplement to minimize effects of concentrating livestock, trailing, etc.
Locate any new water source in uplands away from woodlands and riparian areas.
For allotments requiring a AM/AUM reduction: • If monitoring shows that resource objectives are being met before full implementation of the AM/AUM reduction has occurred, then no further reduction in AUMs will be implemented. • If, after the reduction in AM/AUMs is complete, monitoring shows that resource objective(s) have not been met but a significant sustained upward trend is evident, then further AUM adjustments will not occur unless continued monitoring indicates the upward trend is not being sustained. • If, after the reduction in AM/AUMs is complete, monitoring shows that resource objective(s) are not being met and there is a stagnated or downward trend, then, as an adaptive option, further AM/AUM adjustments may be initiated. • Temporary increases in AUMs may be granted if monitoring indicates that resource objectives are being exceeded.
If stocking rate adjustments are needed, annual reductions will generally not exceed 10 percent.
Move oilers, creep, and supplement feeders out of woodland and riparian areas.
When drought conditions occur, the DPG drought strategy will be followed. In the absence of the DPG drought strategy, the strategy identified in the NE McKenzie Allotment Management Plan Revisions FEIS will be followed, with some modification.* Permittees will be notified verbally and in writing that reductions in numbers and/or seasons may be anticipated.
Ground-disturbing activities—such as installation of water developments, pipelines, fences, or exclosures—will require both heritage resource and sensitive species surveys approval by a Forest Service archeologist, botanist, and wildlife biologist prior to construction.
All new fencing will be built according to the standards identified in Grasslands Plan Appendix B.
All new or reconstructed water developments will include wildlife access and escape ramps.
Areas disturbed by rangeland improvement will be seeded with native species utilizing certified weed seed free mixtures prescribed by the Forest Service botanist.
Burn plans will be developed and approved for all prescribed fires prior to implementing on-the-ground actions.
Assess prescribed burn areas to determine appropriate stocking levels. Defer prescribed burn areas from livestock grazing for a portion or all of the following growing season to ensure regrowth of forage species unless there is specific reason to graze early.
Range improvements will be maintained to standard by the allotment permittee prior to turning livestock into the affected pasture.
Install floats and/or shut-off values to regulate inflow to livestock watering tanks.

*The drought strategy would be incorporated into Alternatives 3, 3A, and 4, and would:

- Use the publication *Drought Management on Range and Pastureland* (Reece et al. 1991) to determine allowable stocking levels during drought, unless interdisciplinary collaboration between the Forest Service and the Medora Grazing board provided rationale to deviate from those guides. This publication calculates stocking guidelines by considering weather and soil moisture. The publication is located in the Literature Cited section of the Project Record.
- Manage grazing during drought, with the objective of maintaining at least 10 percent of herbaceous communities across biologically capable lands in the project area, for High structure and at least 40 percent for Moderate structure. This will help ensure that the project area is not grazed evenly and retains plant cover to provide wildlife habitat, conserve soil moisture, and prevent soil erosion.
- Recognize that allowable utilization rates would be lower during drought.

- Recognize that frequent allotment inspections and early and frequent communications with permittees are key to ensuring that this strategy is effective.

ALTERNATIVES CONSIDERED BUT DROPPED FROM DETAILED ANALYSIS

1) *When originally scoped, this project had five alternatives. Alternative 5 was an alternative similar to Alternative 4 in that it contained the same initial and adaptive management actions as Alternative 4. It differed in that it utilized livestock carrying capacity to set Authorized Use for each allotment.*

   After a closer review of the alternatives it became apparent that the differences between Alternatives 4 and 5 were relatively small and that an opportunity existed to combine the two alternatives. Combining alternatives created a more robust alternative for public review. This action would also reduce the complexity of the document making it easier for the public to track. The district ranger decided to accept the IDT's recommendation to consolidate Alternatives 4 and 5; thus, Alternative 5 as a separate alternative was dropped from consideration in this analysis.

2) *Another alternative considered was a native ecosystem (or "ecosystem management") alternative that would allow the public to see how differently the project and planning area would function and appear if it were managed for native species instead of private livestock.*

   This was an alternative brought forward during the DEIS comment period. An "Ecosystem Management" alternative as described would have many legal, cultural, economic, and other hurdles involved. A replication of historical conditions would be difficult given the existing parameters and the multiple unknowns of historical conditions. In addition, taking this alternative to its logical conclusion, reintroducing the native carnivorous assemblage (such as the plains grizzly, gray wolf, etc.) on such a small scale would be difficult or impossible as some of these species are now extinct.

   To entertain this alternative, even on a limited scale, would require that all interior fences would need to be removed from the project area to allow for free-roaming animals. However, this is not practical because of the extensive intermingling of private, state, and federal lands in the project area. Also, the Forest Service has no authority to remove existing private fences in the project area. Currently, grazing permittees have the option to graze bison under the 2006 Grazing ROD for the DPG (page 9) and the Medora Grazing Agreement 2009, (Management of Livestock, Number 8, page 36. MGA Bison Policy, revised, June 3, 2005). However, bison grazing would not necessarily result in improved conditions relative to cattle grazing because it is the manner in which grazing animals are managed that will affect the condition and composition of plant resources. For instance, confining a given number of cattle or bison within a fenced pasture until a certain percentage of utilization has occurred would provide similar results. Although bison may exhibit different landscape-level grazing patterns than cattle, including less time spent within woody draws or riparian systems and decreased selection for forb

species (Steuter and Hidinger, 1999), these differences would be diminished within pastures of a limited size.

Additionally, an alternative for free-roaming bison was considered but eliminated from detailed analysis in the Northern Great Plains FEIS (see 2003 WO appeal decision, starting at page 19). It was eliminated for several reasons: first, the state would need to fully support and participate in such an alternative; and second, a similar response from the mixed-grass prairie can be gained by domestic livestock. Conditions today are the same as they were during the Grasslands Plan revision.

For the above reasons this alternative was dropped from detailed analysis.

3) *"The AMP DEIS needs to include LRMP amendments that will include deletion of the 'no net' increase in range structures, revision of high structure and VOR standards to reflect site capability and maintaining grazing levels, revision of PFC criteria designed for western North Dakota, and revision of woody draw standards to reflect historical distribution and trend data, will recalculate AUMs and evaluate whether larger livestock affect forage health and vigor adversely, and will include all lands in calculation of carrying capacity."*

This was an alternative brought forward during the DEIS comment period. This alternative would revise or remove a number of Grasslands Plan goals, objectives, and standards and guidelines in order to keep on-the-ground conditions "as is" and maintain grazing levels.

'No net' increase in range structures.

The Grasslands Plan allows for an increase in range structures. The no net increase limit on range structures was in the Draft Grasslands Plan but was changed between the draft and the Final Northern Great Plains EIS. The Grasslands Plan guideline for range infrastructure is to "Use nonstructural range management techniques such as water management, herding, riding, and mineral management to achieve desired conditions. If nonstructural management methods are not successful, then new structural development may be used to achieve desired conditions" (Grasslands Plan, pp. 2-15, 2-22). In addition, Alternatives 3, 3A, and 4 all include an increase in range structures; therefore this component has already been considered.

All of the action alternatives in the analysis contain provisions for additional range infrastructure. These are summarized in Table 2.15.

Revise high structure and VOR standards to reflect site capability and maintaining grazing levels.

As identified in the Herbaceous section of Chapter 3 of this FEIS, the habitat types used to define biologically capable areas are fully capable of producing High herbaceous structure as defined by the current VOR value for High structure. Therefore, a Grasslands Plan amendment is not needed.

The Grasslands Plan is an outcome-based document; it defines desired resource conditions, goals, and objectives. It does not specify maintaining set levels of grazing, recreation, oil and gas production, or any other resource. Maintaining set grazing levels does not provide needed management flexibility to attain the Grassland goals and objectives. Grazing is a tool used to help achieve desired conditions; saying the tool must always be used the same way, maintaining current grazing levels, is inconsistent with the basic tenet of the Grasslands Plan.

Revision of PFC criteria designed for western North Dakota.

This request was not carried forward because it addresses how to analyze impacts, not how to manage impacts.

Revision of woody draw standards to reflect historical distribution and trend data.

There are no standards in the Grasslands Plan associated with woody draws. The Grasslands Plan goals, objectives, and guidelines (Grasslands Plan, pp. 1-2, 1-3, 1-13, 2-10, 2-17) identify the desired conditions for existing woody draws. Distribution and trends for woody draws are addressed in Chapter 3 of this FEIS

Recalculate AUMs and evaluate whether larger livestock affect forage health and vigor adversely.

Some commenters felt the Forest Service approach to calculating AUMs was not correct. The method used by the Forest Service was peer reviewed by the Agricultural Research Station (ARS) and utilized production information provided by the NRCS. The methodology is explained in detail in the Range section of Chapter 3 of this FEIS. Differing methods of calculating carrying capacity does not dictate the need to amend the Grasslands Plan.

The Grasslands Plan doesn't evaluate actions; rather it provides guidance on how to manage the DPG to obtain desired goals and objectives. The question of forage health is not tied to animal size alone. Rather it is associated with the timing, duration, season, and number of livestock grazed in a particular setting such as an allotment. If a permittee is grazing at the wrong time (i.e. season), for too long a period, and with too high a stocking level, damage to resources will occur regardless of livestock size.

Include all lands in calculation of carrying capacity.

The DPG has addressed this request in its response to SRT Recommendation I-2. However, this analysis did consider production on all areas capable of producing forage. See the Range section in Chapter 3 of this FEIS for more detailed information.

Maintaining the existing condition in this project area would not be consistent with the rest of the Grasslands Plan, the SRT report and the Forest Service response. Throughout the Northern Great Plains planning process, the SRT reports and the Demonstration project itself, the need for a different weighting of multiple uses on the ground is a key theme. The SRT itself, in response to one of the comments raised by the Heritage

Alliance of North Dakota (HAND), states "[i]t is the opinion of the SRT that the perceived problems associated with the current FEIS and LRMP stem largely from differences among affected parties in value systems rather than scientific shortcomings" (2006 ROD, p. 4).

The SRT further states in another response:

> [i]t is also critical that all affected parties understand that proposed changes in resource use cannot be solely driven by available ecological monitoring data. Rather, public land management goals and objectives must include, by law, public driven, multiple use goals and objectives, many of which are driven by factors other than ecological condition. Livestock production is still the dominant feature of the new Plan, but the Plan must and does include other goals and objectives that reflect public land use desires (2006 ROD, p. 5).

It is not at all certain that, over the long term, managing to maintain grazing levels as requested in this alternative would leave the ground capable of supporting even a single use management of livestock production. Excessive use over time may result in on-the-ground conditions that would produce fewer pounds of forage per acre and result in the need to reduce time on the ground, livestock numbers, or a combination of both.

For the above reasons, this alternative was not considered in further in this analysis.

4) *An alternative that would require that grazing levels (Authorized Use) be maintained*.

This alternative is addressed in the analysis under Alternative 2.

MONITORING

Monitoring includes both grasslands-level and project-level analysis and evaluation. Grasslands-level monitoring is discussed at length in Chapter 4 of the Grasslands Plan and is not reiterated here. Project-level monitoring is the focus of this section of the FEIS.

Monitoring and evaluation are key elements of adaptive management. Adaptive management is proposed under Alternatives 3, 3A, and 4. Even under Alternatives 1 and 2, monitoring and evaluation would be important. Monitoring helps determine how well Grasslands Plan and NEPA decisions are being implemented, whether AMP implementation is achieving the desired outcome, or whether changes in management are needed. Through monitoring, the Forest Service can measure whether or not management actions are meeting or moving towards desired conditions in an appropriate timeframe. Through adaptive management, AMPs can remain dynamic, relevant, and useful documents over many years. Additional discussion of adaptive management is contained in Chapter 1.

Two types of monitoring are associated with initiating management actions for a grazing allotment—implementation monitoring and effectiveness monitoring. Implementation monitoring generally measures and documents whether or not Grasslands Plan standards and

guidelines and project-level design criteria (as selected in the record of decision for this project) are being applied. Effectiveness monitoring evaluates how effective management actions are at moving toward, achieving, or maintaining desired conditions. Under Alternatives 3, 3A, and 4, if a management action is determined not to be effective, the monitoring will trigger implementation of an adaptive management action. Under Alternatives 1 and 2, additional NEPA would be required before any substantive changes could be made.

Monitoring on the allotments can be accomplished by the Forest Service, permittees, or others (such as university partners and North Dakota Game and Fish), implementing approved methods and appropriate documentation that meets specified standards. Herbaceous structure, composition, riparian areas, and green ash woody draws will be the focus of effectiveness monitoring. Table 3 under each allotment write-up located in Chapter 3 Part 2 identifies the type and frequency of monitoring that is proposed for each allotment.

Implementation (Short-Term) Monitoring

Implementation monitoring is short-term monitoring that evaluates whether livestock management is being applied as prescribed in the AMP and implemented through the AOI. The Forest Service in conjunction with the MGA, under the direction of the Grazing Agreement, conducts this type of monitoring.

Compliance with Allotment Management Plan (AMP) and Annual Operating Instructions (AOI)

An AMP is the individual plan developed for a specific allotment. It identifies desired conditions, goals, and objectives applicable to the allotment to move it towards, achieving or maintaining desired objectives.

The AOIs implement the AMP and clearly explain how each allotment is to be managed on a year-to-year basis. The 2009 Grazing Agreement defines AOIs as “detailed, FS and the MGA approved, instructions for livestock grazing administration to be implemented in a given year on a given allotment developed in conjunction with the MGA and the member. AOIs are based on the AMP and show number of livestock to be grazed, season of use, responsibilities for improvement construction or maintenance, and pasture rotation schedules.” On-the-ground implementation of the AOI is the MGA’s and the permittees’ responsibility. Checks by the Forest Service and/or the MGA conducted throughout and following the grazing season, including discussions with the permittee, will be used to evaluate compliance with the AOI and AMP.

Effectiveness (Long-Term Trend) Monitoring

Effectiveness monitoring is long-term monitoring that focuses on determining whether management is successful at maintaining existing desired conditions or is moving rangeland resources towards desired conditions. Determining trend toward or away from allotment

objectives allows rangeland managers to accurately determine the relative success of the management system and to adjust management to achieve the accomplishment of objectives.

Effectiveness monitoring, as applied here, would center on responding to the "need for action" described in Chapter 1. The long-term health of riparian areas, herbaceous composition and structure, and green ash woody draws will be monitored on each allotment using the methods described in Table 2.5 below. It is important to note that resources may be monitored more or less frequently than identified in Table 2.5 if the responsible official decides there is a need to do so. Completing needed monitoring will require a coordinated collaborative effort between the Forest Service, its agent the Medora Grazing Association, and others such as the North Dakota State University and Dickinson State University.

Table 2.5 — Effectiveness monitoring schedule

Monitoring Item	Method	General Frequency
Riparian areas	PFC	Every 3 years for streams rated as FAR-NA, FAR-D, or NF. Every 5 years for streams rated as PFC or FAR-U.
Woody draws	Sapling Density	Once within a 3 to 5 year timeframe.
Herbaceous structure	VOR	Approximately 25 percent of the allotments would be monitored annually for 3 years then reevaluated to determine monitoring frequency. A third of the remaining allotments, would be monitored every year over the same 3-year period.
Seral stages	NDSU Ecological Sites and/or NRIS TERRA	Once within a 3- to 5-year timeframe.

WATER QUALITY

In response to comment provided by the EPA on the DEIS, water quality monitoring is proposed for a portion of the Little Missouri River (LMR), Whitetail, Mikes, and Magpie Creeks.

Water quality monitoring is proposed in the main stem of the LMR above and below the confluences with Whitetail and Mikes Creeks. If Whitetail and Mikes Creeks are flowing at the time the LMR is sampled, then water quality data and discharge data will be collected at their

confluence with the LMR. These two intermittent creeks and their supporting tributaries encompass a majority of the project area and therefore, were selected for monitoring.

The state of North Dakota has recently replaced sampling for fecal coliform with testing for E. coli; therefore, sampling done during the monitoring period will be for E. coli. A minimum of five samples will be collected during a 30-day period between June 1st and September 30th to facilitate comparison with North Dakota's water quality standards. All established state water quality sampling and laboratory testing protocols will be followed.

PFC surveys, which would serve as a surrogate for assessing water quality in relation to fecal coliform, will be conducted on Magpie Creek. As a stream reach improves towards PFC, so does its associated riparian wetland plant community. As the riparian habitat improves, so does its ability to filter out fecal coliform, resulting in improved water quality (Shirmohammadi and Montas 2003, Pachepsky et al. 2006, Sullivan et al. 2007).

TRIGGER POINTS

The value of monitoring under an adaptive management approach is that it reveals how management is performing relative to desired conditions. A natural extension of this process is to ask, "At what point do we consider the need to change management if monitoring indicates a lack of acceptable progress towards desired conditions?" The point at which monitoring indicates a possible need for change is called a trigger point.

Once a trigger point is reached, the district ranger will convene a team. The team, composed of Forest Service specialists in consultation with the affected permittee and MGA Director, will review the monitoring data and other pertinent information to determine if a management adjustment is needed. If it is determined that any adjustments are needed, the team will review the adaptive management options identified in Table 3 under each allotment write-up located in Chapter 3 Part 2 and/or the Grazing Management Toolbox and recommend a course of action to the District Ranger.

Monitoring triggers for each of the primary resource issues are identified below. The triggers are applied at the allotment level.

A **trigger point** implements a review process; it doesn't mean a management change is automatically needed. Take, for example, a stream that is rated at FAR-NA (Table 2.9). To start moving the stream towards FAR-U a series of initial actions are implemented on the allotment. If monitoring 5 years hence shows the stream hasn't achieved the next condition class, e.g., FAR-U, the monitoring information would be reviewed. If the review indicates significant progress is being made and that what is needed is an additional 1 to 2 years to achieve the next condition rating, the district ranger may decide to continue the current course of action with continued monitoring to ensure the goal is achieved in that timeframe.

Riparian

The long-term health of riparian areas will be monitored using Proper Functioning Condition protocol. This protocol assesses and classifies streams as: PFC, FAR-U, FAR-NA, FAR-D, or NF

(Table 2.9). These ratings are a classification of riparian condition based on the presence or absence of specific vegetation and the interactions of that vegetation with geology, hydrology, and soils.

The techniques and protocols for monitoring riparian areas are listed in the Riparian Area Management TR 1737-15, 1998, *A User Guide to Assessing Proper Functioning Condition and Supporting Science for Lotic Areas*. Table 2.6 identifies the triggers associated with riparian monitoring.

Table 2.6 — Riparian monitoring trigger points

Existing Stream Condition	Trigger Point Every 3rd or 5th year post implementation*	Trigger Point Every 6th or10th year post implementation
Nonfunctional (NF)	Stream has not improved to FAR status in 3 years. Determine which processes are nonfunctional and what the cause(s) are. Identify management modifications.	If stream has not improved to FAR-U status in 6 years, determine which processes are nonfunctional and what the cause(s) are. Identify management modifications.
Functional-At Risk-Downward Trend (FAR-D)	FAR-U is not met in 3 years. Determine which processes are functional at risk and what the cause(s) are. Identify management modifications.	If stream is not at PFC in 6 years, determine which processes are FAR and what the cause(s) are. Identify management modifications.
Functional-At Risk-Trend Not Apparent (FAR-NA)	FAR-U is not met in 3 years. Determine which processes are functional at risk and what the cause(s) are. Identify management modifications.	If stream is not at PFC in 6 years, determine which processes are FAR and what the cause(s) are. Identify management modifications.
Functional-At Risk-Upward Trend (FAR-U)	PFC is not met in 5 years. Determine which processes are preventing attainment of PFC and identify management modifications.	PFC is not met in 10 years. Determine which processes are preventing attainment of PFC and identify management modifications.
Proper Functioning Condition (PFC)	If no management change is needed, continue to monitor stream every 5 years.	If no management change is needed, continue to monitor stream every 5 years.

*Depending on the alternative selected, the district hydrologist has determined that three to eight stream reaches may take several decades to achieve PFC. Therefore, the monitoring frequency timeframes to reach PFC, identified in Table 2.9 would not be met. Further detailed information regarding these stream reaches is located in Chapter 3 of this document.

Green Ash Woody Draws

The long-term health of woody draws will be monitored based on the number of surviving tree saplings. Among other variables, researchers have identified sapling numbers and cover of the tall shrub layer as key indicators of woody draw condition (Leisica 2001a; Jensen 1991; Butler and Goetz 1984; Bjugstad and Girard 1984; Hansen et al. 1984a; Butler 1983; Nelson 1961, 1960; Severson and Boldt 1978; Boldt et al. 1978). Table 2.7 identifies the triggers derived from sample averages of Healthy, At Risk, and Unhealthy woody draws measured in the project area.

Table 2.7 – Woody draw trigger points

Current Woody Draw Rating	Trigger Points 3 to 5 years post implementation of initial management actions	Trigger Points 6 to 10 years post implementation of initial management actions
Unhealthy Averaged 61 saplings* per acre, 44 trees/acre between 1 and4 inch dbh, and/or 6 percent choke cherry, serviceberry, or combination thereof.	Average number of saplings in a woody draw is less than 85/acre, and there are fewer than 35 trees/acre between 1 and 4 inch dbh, and/or less than11 percent choke cherry, serviceberry, or combination thereof.	Average number of saplings in a woody draw is fewer than 359 per acre and/or less than 24 percent choke cherry, serviceberry, or combination thereof.
At Risk Averaged 85 saplings per acre, 35 trees/acre between 1 and 4 inch dbh, and/or less than11 percent choke cherry, serviceberry, or combination thereof.	Average number of saplings in a woody draw is fewer than 85 per acre and there are fewer than 35 trees/acre between 1 and 4 inch dbh, and/or less than 11 percent choke cherry, serviceberry, or combination thereof.	Average number of saplings in a woody draw is fewer than 359 per acre and/or less than 24 percent choke cherry, serviceberry, or combination thereof.
Healthy Averaged 359 saplings per acre, 150 trees/acre between 1 and 4 inch dbh, and/or 24 percent choke cherry, serviceberry, or combination thereof.	Average number of saplings falls below 359 per acre and there are fewer than150 trees/acre between 1 and 4 inch dbh, and/or less than 24 percent choke cherry, serviceberry, or combination thereof.	Average number of saplings falls below 359 per acre and/or less than 24 percent choke cherry, serviceberry, or combination thereof.

*Saplings refer to deciduous tree species found in green ash hardwood draws that are greater than 2.5 feet in height and less than 1 inch in diameter at breast height (dbh).

Herbaceous Structure

Herbaceous structure refers to the vertical structure and density of vegetation types dominated by grasses, sedges, and forbs, and where shrubs are absent or a minor component. It will be monitored through the collection of Visual Obstruction Readings (VOR). The Robel Pole methodology (Robel et al. 1970, Benkobi and Uresk 2000, Warm 2000) is used to collect the VOR information. Table 2.8 identifies the triggers associated with Herbaceous Structure monitoring.

Table 2.8 — Herbaceous structure trigger points*

Monitoring Frequency	Percentage of allotment in LOW Structure	Percentage of allotment in MODERATE Structure	Percentage of allotment in HIGH Structure	Trigger Points
Third year post implementation (Tier I)	25-30 percent	50-70 percent	≥10 percent	Structure objectives not met at end of third year of monitoring.
Sixth year post implementation (Tier II)	15-25 percent	50-70 percent	≥15 percent	Structure objectives not met at end of sixth year of monitoring.
Ninth year post implementation (Tier III - Grasslands Plan Structure Objectives Met)	10-20 percent	50-70 percent	20-30 percent	Structure objectives not met at end of ninth year of monitoring

*This applies to all allotments except 133D5 because portions of this allotment are hayed on an annual basis.

If monitoring indicates that the existing herbaceous structure condition on a grazing allotment is less than the Tier I objective, shown in Table 2.10, a 3-year period is allotted to meet the herbaceous structure objectives of that tier. This is followed by another 3-year period to reach Tier II and a final 3-year period to reach Tier III, which is the Grasslands Plan Desired Condition for herbaceous structure. The same process is followed regardless of the tier level the existing condition falls into, except for Tier III. If at the end of each 3-year period monitoring indicates that the objectives haven't been met, then a trigger point is tripped, which initiates the review and decision process identified above.

Seral Stages (Plant Composition)

Plant composition for this analysis refers to the diversity of grasses, forbs, and grass-like species in a plant community. This composition is classified into early, mid, and late seral stages.

The trigger point tied to seral stages is the amount of the project area that is in each seral stage (Table 2.9). The Grasslands Plan objectives for seral stages are 10 to 15 percent in early, 65 to75 percent in mid, and 15 to 20 percent in late seral.

The trigger for seral stages is based on incrementally moving towards desired early, mid, and late seral stage objectives across the landscape. Currently, the mid seral stage objective is being met, however, early and late seral stages are falling short of the desired future condition. Under the seral stages trigger, if the percentage of early and late seral stages does not increase to 10 percent

in 3 to 5 years after initial actions are initiated, then the trigger point is tripped, which initiates the review and decision process identified above. If desired seral stage objectives are not being met by the end of the second monitoring period, then the trigger point is tripped. Also, any increase in the percentage of Invaded Grass State would trigger the need for the review and decision process.

Table 2.9 — Trigger points for seral stages

Existing Seral Stages Condition in Project Area	Trigger Point, 3 to 5 Years Post Implementation	Trigger Point, 6 to 10 Years Post Implementation
7% Early	<10%	Not Maintaining 10 to15%
72% Mid	Maintain 65 to75 %	Not Maintaining 65 to 75%
5% Late	<10%	Not Maintaining 15 to 20%
16% Invaded Grass State*	> 16%	> 16%

*Invaded Grass State – A herbaceous plant community where invasive grasses comprise more than 30 percent of the total plant composition and native grasses comprise less than 40 percent (NRCS 2009).

COMPARISON OF ALTERNATIVES

The following tables briefly display the differences between the considered alternatives. Table 2.10 summarizes the ability of the alternatives to meet the purpose and need. Table 2.11 summarizes the effects of the alternative by key issue. Table 2.12 summarizes the Authorized Use by alternative.

Table 2.10 — Summary of how the alternatives respond to the purpose and need

Purpose and Need	Alternative 1	Alternative 2	Alternative 3*	Alternative 3A*	Alternative 4*
Allow grazing and provide forage	No	Yes	Yes	Yes	Yes
Support ranching community	No	Would continue to support existing ranching community.	Would continue to support existing ranching community under initial actions. If reductions in Authorized Use were to occur as an adaptive action there is potential for a reduction in jobs and reduced income in the agricultural sector.	Same as Alternative 3.	Is projected to result in the loss of 1-4 jobs and a reduction in revenue in the agricultural sector.
Meet or move towards Desired Conditions for	See Table 2.11 for a discussion specific to each key resource.				

Purpose and Need	Alternative 1	Alternative 2	Alternative 3*	Alternative 3A*	Alternative 4*
resources					
Provide for management flexibility i.e., Adaptive Management	No	No	Yes	Yes	Yes

*Alternatives 3, 3A, and 4 are adaptive management alternatives. Responses in the table above are to initial actions proposed under each alternative to address resource concerns. The suite of additional management tools, under adaptive management, available to each alternative is the same. The difference among the three alternatives when considering the adaptive management portion of the alternatives is time. Alternative 4 initially takes more aggressive steps to address resource concerns than do Alternatives 3 and 3A. If under Alternatives 3 or 3A monitoring reveals that more aggressive measures are required, being able to implement those measures and see significant results within the 10- to 15-year timeframe associated with this project becomes questionable.

Key issues and their indicator(s) by Alternative are shown in Table 2.11. Key issues were previously listed in Chapter 1.

Table 2.11 — Key issue comparison of the alternatives

Key Issue	Indicator(s)	Alternatives				
		1	2	3	3A	4
Riparian	Existing stream condition and movement towards PFC based on riparian vegetation condition, sediment entrapment, and stabilization of stream banks and beds.	Removal of livestock would afford riparian vegetation recovery which would increase sediment trapping abilities and increase bank stabilization which, in turn, would bring affected streams segments to PFC. Stream segments adversely affected by the effects of road construction may continue to function below PFC.	This alternative would maintain the status quo in terms of the riparian vegetation condition and its ability to trap sediment and stabilized stream banks and beds. Percentages of PFC (51), FAR-U (4), FAR-NA (6), FAR-D (5), and NF (34) stream segments would remain the same.	Initial actions would provide for riparian vegetation recovery, reduced bank disturbance, and improved sediment capture. This would result in 23 of the 28 stream reaches identified as FAR or NF improving towards PFC. Eighteen of the 23 reaches that would improve are rated as FAR-D or NF. Seven of these 18 reaches could improve but could take several decades to reach PFC. Adaptive Management: Implementation of different adaptive management tools would see the additional improvement of four stream segments not improved with initial actions. There will be no improvement in allotment 277 (Scairt Woman Draw). This is because the underlying cause of	Same as Alternative 3.	Initial actions would provide for riparian vegetation recovery, reduced bank disturbance, and improved sediment capture. This would result in 27 of the 28 stream reaches identified as FAR or NF improving towards PFC. Twenty seven of the FAR and NF reaches would improve although two of the 27 reaches are expected to take several decades to reach PFC due to the existing condition. Adaptive Management: Implementation of different adaptive management tools could decrease the recovery time of the two reaches that are expected to take several decades to reach PFC. There will be no improvement in allotment 277 (Scairt

Key Issue	Indicator(s)	Alternatives				
		1	2	3	3A	4
				the functionality problem was not clearly due to the effects of livestock grazing; therefore it was not clear that changes in grazing practices would result in recovery during the time frame of this project.		Woman Draw) for the same reason as identified under Alternative 3.
Woody draws	Intensity, frequency, and season of disturbance on tree and shrub regeneration relative to current levels of disturbance.	Removal of livestock would allow most At Risk and Unhealthy woody draws to recover to a Healthy condition rating. Some woody draws rated as Unhealthy are too heavily impacted and would eventually disappear from the landscape without an investment in additional resources, such as planting of trees and shrubs.	This alternative would maintain current Authorized Use numbers and grazing systems, range facilities, etc. Therefore the intensity and frequency of disturbance associated with livestock use would remain unchanged. Due to low sapling recruitment there is potential for some At Risk woody draws to shift to Unhealthy and for further reduction or loss of Unhealthy woody draws. The percentage of Healthy woody draws would persist. Currently 51 percent of the woody draws are rated as Healthy,	This alternative maintains Authorized Use at Preference and would implement other initial actions to address woody draw concerns. The initial actions would affect both the intensity and frequency of use providing an opportunity for some improvement in woody draw health. Of the 43 allotments in the project 5 have no woody draws and 6 are meeting objectives. Of the remaining allotments 12 are predicted to improve, 14 would experience no change and 6 would decrease in condition. *Adaptive Management*: Adaptive management tools would improve impacted woody draws.	Under this alternative, woody draw conditions would improve in 8 allotments, 16 allotments would experience no change, and in 8 allotments conditions would decrease. *Adaptive Management*: Same as Alternative 3.	This alternative would set Authorized Use at initial estimated carrying capacity. Except in three allotments this action would result in a decrease in both the intensity and frequency of disturbance associated with livestock use of woody draws. Of the 43 allotments, 5 have no woody draws and 6 are meeting objectives. Of the remaining allotments 20 are predicted to improve, 9 would experience no change and 3 would decrease in condition.. *Adaptive Management:* Adaptive management tools, if needed, are the same as Alternative 3 and 3A. The difference between Alternatives

Key Issue	Indicator(s)	Alternatives				
		1	2	3	3A	4
			42 percent At Risk and 7 percent as rated Unhealthy.			3,3A, and 4, is the rate of expected change. Because more aggressive initial actions are implemented under Alternative 4 the expected rate of change would be higher under Alternative 4.
Herbaceous structure	Trend of High structure.	Removal of livestock would see an increase in High structure and decrease in Low structure.	Authorized Use would remain at current levels which in most of the allotments are above initial estimated carrying capacity. The 8 allotments meeting structure objectives would continue. The existing mosaic of structure on the remaining allotments would be maintained.	This alternative would maintain Authorized Use at Preference and would implement a series of different management actions. These actions would modify the existing structure mosaic but no increase in the amount of High structure is projected because the levels of Authorized Use, under initial actions remain at Preference. *Adaptive Management:* Adaptive management tools would move the existing structure mosaic towards structure objectives.	Same as Alternative 3.	Establishing Authorized Use at initial estimated carrying capacity would change the structure proportions of the current structure mosaic. The amount of Low structure would decrease. Moderate and High structure would increase, but to what degree is unknown. Monitoring would document the amount of shift. *Adaptive Management:* Adaptive management tools, if needed, are the same as Alternative 3 and 3A. The difference between Alternatives 3,3A, and 4, is the rate of expected change. Because more aggressive initial actions are

Key Issue	Indicator(s)	Alternatives				
		1	2	3	3A	4
						implemented under Alternative 4 the excepted rate of change would be higher under Alternative 4.
Seral stages	Trend of seral stages.	Removal of livestock grazing would allow for a shift towards late seral stages and a decrease in early seral stages. Increasing invasive grasses would have the potential to impede development or maintenance of late seral native plant communities.	Current management activities are not meeting early and late seral stage objectives. The current level of grazing intensity and frequency of disturbance on native species would maintain the current seral stage mosaic. However, current trends in invasive grasses have the potential to increase the proportion of invaded grass states.	Under this alternative initial management actions would improve seral conditions in twenty percent of the allotments. The remaining allotments would maintain their current seral condition, shift towards early seral stage, or experience an increase in invasive grasses. *Adaptive Management* Adaptive management tools would move towards desired seral objectives, however, invasive grasses may gain a greater foothold before adaptive tools are implemented under this alternative.	Same as Alternative 3.	Under this alternative 33 percent of the allotments would have improved seral conditions through the implementation of initial management actions. Reducing Authorized Use to carrying capacity in native dominated communities would facilitate a shift towards late seral stage at a faster rate than Alternatives 3 and 3A. However, communities with high proportions of invasive grasses may have the potential to transition to an Invaded Grass State. *Adaptive Management*Adaptive management actions would achieve seral objectives faster because there would be fewer allotments compared to Alternatives 3 and 3A to move towards seral

Key Issue	Indicator(s)	Alternatives				
		1	2	3	3A	4
						objectives.
Economics	A combination of jobs and income generated in the agricultural community. Billings County economic analysis indicators are net margins and debt repayment capability.	Loss of 20 to 39 jobs and $359,497 to $708,453 in annual income. The Billings County economic analysis did not address this alternative.	Maintains 20 to 39 jobs. Annual income to the economic analysis area would range from $414,902 to $763,858. The baseline assessment in the Billings County economic analysis showed that smaller operations (≤150 head) have small net margins and little capacity to service debt. Larger operations (250-350head) have larger margins and greater ability to service debt.	Maintains 20 to 39 jobs with potential for two additional jobs. Annual income to the economic analysis area would range from $414,902 to $763,858 The Billings County economic analysis did not specifically address this alternative. As Authorized Use is initially the same as Alternative 2 the economic effects are expected to be similar to Alternative 2.	Same as Alternative 3. Billings County economic analysis identified that 3A would not change their assessment as there is no initial change in Authorized Use. Therefore, economic effects are thought to be similar to Alternative 2.	Potential loss of 1 to 4 jobs. Annual income to the economic analysis area in year one would range from $382,404 to$699,814. At year five, income would be $359,576 to $654,829. Billings County economic analysis - Reductions in Authorized Use would reduce net revenues / net margins and ability to service debt. Smaller operations (≤150 head) have less capacity to service debt and would be more quickly affected than larger 250- 350 head operations.
Drought	Precipitation	No drought strategy needed.	No drought strategy in place. Would adapt DPG strategy when complete.	Would use a modification of the McKenzie Ranger District strategy until the DPG drought strategy is completed.	Same as Alternative 3.	Same as Alternative 3.

In Allotment Management Planning analysis, a common question asked is how many cattle would be permitted by alternative or what would the difference be in how many cattle are permitted by allotment, by alternative. This is normally expressed in how many Animal Months (AMs) or how many Animal Unit Months (AUMs) would potentially be permitted by each alternative. An AM is a month's tenure upon the rangeland by one animal. An AUM is the amount of feed or forage required by an animal unit, a 1,000 pound cow with or without a calf up to 6 months of age, for 1 month. It's important to understand that AMs and AUMs are not synonymous terms. Table 2.15 shows the AUMs by alternative, which specialists used as a way to compare between alternatives and their effects in Chapter 3.

For comparison purposes in Table 2.12, the AMs authorized under Alternatives 2, 3, and 3A were converted to AUMs by multiplying the Authorized Use AM number (Preference) by 1.15 (see Grasslands Plan, Appendix I). This assumes that all of the animal units are larger cows within the range of 1,100 to1,300 pounds with an average of 1,200 pounds to get a conversion factor of 1.15 (the conversion factor is explained in detail in the Range section of Chapter 3). In some cases this will likely result in an over or under estimation, but, again, this is done for comparison purposes.

Alternative 3, 3A, and 4 are adaptive-management-based alternatives. It is possible that the numbers in this table for those alternatives may change over time. If monitoring indicates that the initial actions are not successful in addressing resource concerns, adjusting the AMs/AUMs is one of the tools in the tool box that can be used (see Table 2.1 and other discussions on adaptive management).

Table 2.12 — Comparison of summer Authorized Use by alternative

NOTE DISCLAIMERS ABOVE

Allot #	Alternative 1 AUMs	Alternatives 2, 3, and 3A AUMs	Alternative 4 AUMs
126/128	0	2708	2178
127	0	474	345
129	0	1150	1000
130	0	729	678
131	0	55	48
132A	0	202	202
132H	0	370	353
133	0	313	198
133D5	0	56	35
134	0	292	220
135	0	1793	1559

Allot #	Alternative 1 AUMs	Alternatives 2, 3, and 3A AUMs	Alternative 4 AUMs
136/139	0	416	285
140	0	323	237
141	0	204	113
142	0	192	128
158	0	1801	1527
220	0	184	112
221	0	283	174
230	0	419	358
237	0	331	250
239	0	288	176
240	0	930	876
241	0	413	357
243	0	431	347
244	0	271	241
248	0	359	359
249	0	235	194
256	0	1830	1678
258	0	2382	1694
272	0	1694	1472
277	0	1298	1243
278	0	313	230
281	0	339	270
282	0	2441	2123
283	0	345	340
286	0	320	236
287	0	666	577
288	0	308	216
289	0	2057	1862
300	0	559	524
301	0	1916	1734
302	0	1201	1051
Total	0	32891	27801

Table 2.13 presents a summary of the different initial management actions and other information associated with each of the alternatives.

Table 2.13 — Summary of initial actions by alternative

Proposed Action	Alt 1	Alt 2	Alt 3	Alt 3A	Alt 4
# of allotments with adjusted Authorized Use	0	0	0	0	41
# and (miles) of new fence	0	0	5 (6.2)	7 (6.4)	5 (6.4)
Total forage production in pounds	0	102,522,760	102,522,760	102,522,760	102,522,760
Total Authorized Use	0	29,125 AMs	29,125 AMs	29,125 AMs	28,340 AUMs
# and (acreage) of new riparian exclosures	0	0	1(3)	1(3)	7 (479)
# of new rangeland water wells	0	0	9	9	6
# of sites and (acreage) proposed for native tree & shrub planting	0	0	0	0	2 (129)
# of new water tanks and (approximate miles of new pipeline)	0	0	22 (17.9)	27 (23.2)	13 (11.6)
# of allotments with burning, mechanical, or chemical treatment of juniper or sage encroachment	0	0	2	2	2
# of dugouts, reservoirs, or springs reclaimed	0	0	12	2	6
# of springs or reservoirs fenced	0	0	8	9	9
# of new spring developments	0	0	0	2	0
# of woody draws fenced	0	0	1	0	3
# of allotments with stream crossing hardening and stream control structures	0	0	1	1	1
# of waterlots constructed	0	0	1	2	1
Projected cost of proposed rangeland facilities	0	0	$597,750	$646,826	$486,375

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Chapter 3 Part 1
Affected Environment and Environmental Consequences

INTRODUCTION

This chapter describes aspects of the environment affected by the proposed action and other alternatives. Also described are the environmental effects (direct, indirect, and cumulative) that would result from undertaking the proposed action or other alternatives. Together, these descriptions form the scientific and analytical basis for the comparison of the alternatives.

This chapter has been reformatted since the Draft Environmental Impact Statement (DEIS) was published. There are now two parts to this chapter. Part 1 provides an overview and summarizes the affected environment and environmental consequences for each resource. It also describes the methodology used in analyzing each resource. Part 2 provides specific information and effect analysis by allotment for each alternative and resource. This part was created to bring all the allotment-specific information together in one place. This remedies having to flip back and forth in the document to locate all the allotment-specific information. As a result of this reformatting, the information in the DEIS Appendices A and C has been brought into Chapter 3, so those appendices have been dropped in the Supplemental Draft Environmental Impact Statement (SDEIS) and this Final Environmental Impact Statement.

PROJECT AREA

The project area contains 43 federal grazing allotments located in the northern third of Billings County, and a small portion of Golden Valley County, North Dakota. The allotments encompass all or portions of the following 11 townships: T142N, R101W and R102W; T143N, R99-103W; and T144N, R99-102W. The project area contains approximately 118,587 acres, of which 87,262 are National Forest System (NFS) lands (Figure 1.1). The allotments in the project area are intermingled with private and state lands.

General Setting

The project area is divided between the Rolling Prairie and Badlands Geographic Areas. The Rolling Prairie primarily occurs in the east half of the project area from 7 to 11 miles distance from the Little Missouri River. Topography of the Rolling Prairie is relatively gentle with broad ridgelines and plateaus divided by first and second order ephemeral or intermittent drainages that join perennial tributaries. The area is primarily drained by four intermittent creeks Magpie, Whitetail, Blacktail and Mike's Creek, which flow west into the Little Missouri River, the only perennial stream in the project area. Elevation varies from 2,100 feet above mean sea level (msl)

along the Little Missouri River to 2,800 feet above msl on the plateau in Allotment 272, located on the eastern side of the project area (Figure 1.2).

The intermittent drainages support woody draw communities of green ash (*Fraxinus pennsylvanica* Marsh.), American elm (*Ulmus americana* L.), and chokecherry (*Prunus virginiana* L.). Major intermittent streams have downcut through level terraces or floodplains that support shrubs of silver sagebrush (*Artemisia cana* Pursh) and western snowberry (*Symphoricarpus occidentalis* Hook.). Riparian vegetation along the streams tends to be dominated by various sedges and rushes, with scattered patches of sandbar willow (*Salix exigua* Nutt.) and relatively decadent patches of plains cottonwood (*Populus deltoides* Marsh. subsp. *monilifera (Ait.) Eckenw.*) and peachleaf willow (*Salix amygdaloides* Anderss.). Discontinuous bands of green ash/western snowberry communities are set back from the true riparian zone.

Relatively well-developed and productive soils constitute broad plateaus of the Rolling Prairie with the potential to support climax communities of western wheatgrass (*Agropyron smithii* Rydb.) and needlegrass species. Areas of less developed or less fertile soil, such as those occurring on steep sideslopes and narrow ridgelines, have the potential to support climax communities of little bluestem (*Schizachyrium scoparium* (Michx.) Nash – Gould), prairie sandreed (*Calamovilfa longifolia* (Hook.) Scribn.), and needle-and-thread (*Stipa comata* Trin. & Rupr.).

Much of the projects area's gentler terrain was plowed for agricultural production during the early 1900s before being purchased by the federal government after the Dust Bowl era of the 1930s. These areas are referred to as broken land in this chapter. Broken lands were generally reseeded with crested wheatgrass or simply abandoned and allowed to naturally revegetate. Most of these lands are now composed of varying mixtures of crested wheatgrass (*Agropyron cristatum* (L.) Gaertn.) and other non-native and native grasses. The non-native grasses exhibit varying degrees of invasiveness that have facilitated their establishment in both broken and unbroken land.

The Badlands Geographic Area occurs on either side of the Little Missouri River and exhibits greater topographic relief and general ruggedness. Sharp topography of the Badlands was initiated when glaciers diverted the Little Missouri River eastward through southwest North Dakota (Bluemle, 1980). Increased gradients and relatively soft sedimentary strata along the new river path resulted in rapid downcutting of the river channel and adjacent tributary channels that resulted in the formation of diverse erosional features and exposed sedimentary formations of clay, shale, siltstone, fine-grained sandstone, and scoria. Relatively hard or erosion-resistant scoria and sandstone layers often occur as caprock formations on variously shaped buttes, knolls, and ridge shoulders. The overall landscape in the Badlands is characterized by a repeating pattern of relatively barren south aspect slopes, relatively narrow grass-dominated ridgelines, wooded north aspect slopes, and intervening intermittent/ephemeral drainages. Rocky Mountain juniper constitutes the dominant woodland on many north aspect slopes, with increasing prominence towards the Little Missouri River.

Extensive sedimentary exposures, particularly common on steep south aspect slopes and residual knolls and buttes, exhibit poor physical and chemical soil characteristics for the growth of most plant species. Total plant cover in these areas is low but the assemblage of species is relatively unique in comparison to the typical grassland communities. Common species on fine-grained and often alkaline substrates include grasses such as inland saltgrass (*Distichlis spicata* (L.) Greene var. *stricta* (Torr.)) and alkaligrass (*Puccinellia nuttalliana* (Schult.) A. Hitchc.), along with the more ubiquitous western wheatgrass, slender wheatgrass (*Agropyron. Caninum* (L.) Beauv. subsp. *majus* (Vasey) C. L. Hitchc.), and blue grama (*Bouteloua gracilis* (H.B.K.) Lag. ex. Griffiths) that occur at lower than typical rates. Coarser grained substrates derived from weathered sandstone and scoria are relatively non-alkaline and support a different suite of species that includes Indian ricegrass (*Oryzopsis hymenoides* (R. & S.)), bluebunch wheatgrass (*Agropyron spicatum* (Pursh) Scribn. & Sm.), little bluestem, sand bluestem (*Andropogon hallii* (Hack.) and prairie sandreed.

Various ridgelines, plateaus, and relatively gentle slopes with increased soil development support grassland communities similar to but less extensive than the Rolling Prairie. Sideoats grama (*Bouteloua curtipendula* (Michx.)) often occurs with little bluestem along ridge shoulders with mat-forming shrubs of horizontal juniper (*Juniperus horizontalis* Moench). Lower slope positions and drainages support green ash woody draw communities that tend to exhibit increased prominence of Rocky Mountain juniper (*Juniperus scopulorum* Sarg.) compared to drainages in the Rolling Prairie. Floodplains and terraces of the Little Missouri River support gallery woodlands of plains cottonwood, green ash, and Rocky Mountain juniper, interspersed with shrub communities of silver sagebrush, willows, and western snowberry.

The climate in the area is semi-arid continental with large seasonal and diurnal variations in temperature. Annual average temperatures are near 42 degrees Fahrenheit (F), with monthly averages ranging from 10 degrees F in January to 71 degrees F in July. Precipitation, in the form of rain and snow, averages around 15 inches per year; 75 percent of this precipitation falls in a 6-month period between April and September. In contrast, November through February is a dry period with roughly one-half inch of precipitation monthly in the form of snow. Wind speeds average about 12 miles per hour, with the prevailing wind generally out of the west/northwest. Strongest winds occur during the winter and spring months, with speeds of 30 to 40 mph not uncommon.

Intermingled private land is primarily used for livestock grazing, and lesser amounts of agricultural cultivation occur in both geographic areas. Livestock grazing and related infrastructure of fences, water developments, and two-track roads have occurred throughout the project area since the late 1800s. Currently, the Medora Grazing Association (MGA) holds a 10-year grazing permit for the project area. Oil and gas were first discovered in the Williston basin of western North Dakota in 1950. Within the project area, oil and gas was developed in the 1960s with exploration and development continuing to the present. The mid 1970s saw an oil boom on the LMNG, which lasted through about 1981. With the boom came extensive road development, oil pads, and pipeline and utility corridors, which resulted in visual, wildlife, air, and water impacts.

The project area is accessed by National Forest System Roads (NFSR) #712 (Lower Magpie), #711 (Goats Pass), Forest Highway (FH) 2 (Blacktail), and #702A (Mike's Creek), which serve as the main collector roads for the project area. The area is also served by a host of primitive native surface roads known locally as "two-tracks." The two-track road system is used primarily for administration of range allotments and various recreation activities. Most two-track roads are currently open to the public for their use and enjoyment. Under the January 2001, U.S. Forest Service Northern Region *Off-Highway Vehicle Decision*, motorized use is limited to existing roads and trails with exceptions for livestock permittees, oil and gas lessees, and administrative business (2002 Grasslands Plan ROD, p. 9). Some management areas located in the project area, such as MA1.31 "Nonmotorized Backcountry Recreation," are not open to motorized use. Currently travel management on the Little Missouri National Grassland (LMNG) is being reviewed and analyzed for updates.

There are four inventoried roadless areas (IRA) totally or partially located within the project area boundary: Scairt Woman, Magpie, Blacktail, and Bell Lake. The Two Top/Big Top Research Natural Area (RNA), a small portion of the Mikes Creek RNA, and the Ice Caves Special Interest Area (SIA) are also located within the project area.

PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

According to the Council of Environmental Quality (CEQ) NEPA regulations a, "Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions…" (40 CFR §1508.7). Cumulative effects are those effects from other actions that overlap in time and space with the proposed action as past actions are already included in the affected environment, the cumulative effects analysis builds upon this existing condition assessment by considering the incremental addition of the direct and indirect effects of the proposed action as well as ongoing and reasonably foreseeable future actions.

An overview of past, present, and reasonably foreseeable actions are discussed below.

Past Actions

The environmental analysis required under NEPA is forward-looking in that it focuses on the potential impacts of the proposed action that an agency is considering. Thus, review of past actions is required to the extent that this review informs agency decision-making regarding the proposed action (36 CFR 220.4(f)). The past actions summary is not necessarily exhaustive, as records may not exist for all past activities. This is particularly true for those actions that predate the passage of the NEPA in 1970. Nonetheless, the effects of such past actions are accounted for in the assessment of the existing condition, as the current condition assessment necessarily reflects any relevant impacts of such action. Past actions that are relevant to this analysis are homesteading; drought, depression, and rehabilitation; range management; oil and gas development; and noxious weeds.

HOMESTEADING

In 1862, President Abraham Lincoln signed the first Homestead Act, making it possible for citizens to acquire ownership of 160 acres of land. The Homestead Act and the completion of the Northern Pacific Railroad across North Dakota in 1881 had a significant effect on the settlement of western North Dakota. From 1878 to 1890, North Dakota's population boomed, growing from 16,000 to 191,000 people (Berger and Turck, 2003) and reaching a peak population in the late 1920s, which also signaled the end of homesteading era.

Euro-American settlement brought farming and ranching operations, fences, livestock water developments, and rudimentary roads. Woodlands were heavily utilized for fuel, building materials, fence posts, and livestock fodder. Farmers broke up the native prairies for crops, and ranchers replaced free-roaming bison with domestic cattle.

Loss of the native beaver populations through trapping, construction of reservoirs and dugouts to supply water to livestock, overstocking the range, increased overland flow due to reduced upland vegetation, trampling of stream banks, and heavy utilization of woodlands affected the riparian systems of western North Dakota. The loss of beaver populations impacted groundwater storage systems and lowered water tables. Construction of reservoirs and dugouts interrupted runoff patterns by intercepting water that may have been necessary to maintain perennial streams. Heavily used rangelands allowed overland flows to increase, which when combined with impacted woodlands, resulted in accelerated down cutting of perennial and major intermittent streams. Changes in the water regime also affected associated riparian vegetation, resulting in loss or changes in the diversity and abundance of riparian species.

Cattle have been grazed in western North Dakota since the 1870s. In the early days of open range, cattle stocking rates were often excessive. Overstocking, combined with the summer drought of 1886, reduced an already scanty supply of grass. That winter, one blizzard followed another, accompanied by terrible cold. These events resulted in the loss of about three-quarters of the range cattle (Berger and Turck, 2003). Theodore Roosevelt, a rancher along the Little Missouri River at the time, absorbed his losses and reentered politics and later spoke of the need for conservation and wise use of the range resources.

Euro-American settlement also resulted in early attempts to control fire on the landscape. With time, this has developed into firefighting organizations at the county, state, and federal levels. Controlling fire has resulted in both the expansion and decline of woodlands. The lack of fire has allowed ponderosa pine and Rocky Mountain juniper stands to expand. It has also allowed some green ash draws to expand, but existing green ash stands have lost the regenerative effects of fire. Existing green ash hardwood stands are deteriorating in part due to a lack of fire, which plays a role in maintaining this type of woodland. Native grasses, which evolved with fire, no longer benefit from the nutrient flush and regenerative effects associated with fire.

Around the turn of the 20th century, Lincoln Lang, an early settler said this about the homesteading era: "This was the beginning of the end. Already two waves of commercial vandalism had overswept the region—the primary wave of criminally insensate game butchery

[and] the secondary wave of unintelligent grazing. Now, the third and final disastrous tidal wave of ill-advised settlement, was on its way and coming fast" (Lang 1926:335).

Severson (Undated) observed that "the [Homestead] Act did not recognize the fragile nature of the prairie lands, the realities of the wet-dry cycles, and the unsuitability of much of the land for continual cropping. This was not common knowledge at the time, and the result was further habitat destruction induced by plowing of fragile soils and intensive livestock grazing on small acreages."

Drought, Depression, and Rehabilitation

The effects of the Euro-American settlement era, combined with the drought and depression of the 1930s, affected both the landscape and populace of western North Dakota. The severe drought and past actions such as overgrazing and the cultivation of sub-marginal lands resulted in extensive loss of topsoil to wind erosion. The drought, coupled with the depression, saw the five counties which constitute the LMNG lose 16 percent of their population (USFS 2002).

The government, through the Land Utilization Program (LUP) and other programs, purchased many farms during the 1930s, with a goal of stabilizing and reclaiming eroded lands and then returning the lands to their most suitable use. This job was given to the Soil Conservation Service (SCS), now the Natural Resources Conservation Service (NRCS). From 1938 to 1954 the SCS provided technical and financial assistance for soil stabilization, stock pond construction, shelterbelt plantings, and other range improvements (USFS 2002).

During this time, the SCS introduced the use of non-native species such as crested wheatgrass to stabilize eroding lands. Crested wheatgrass successfully stabilized soils; however, because it breaks dormancy earlier than native species, it is able to out-compete them for water and nutrients. This in turn has prevented or slowed the process of native grasses re-establishing on disturbed lands. Because crested wheatgrass is palatable earlier in the grazing season, management tries to utilize it first. However, in pastures with mixed crested wheatgrass and native grasses, this can have a detrimental effect on the native species because they have not reached the three-and-a-half leaf development stage that signals their readiness for grazing. Other introduced non-natives, such as smooth brome (*Bromus inermis* Leyss. subsp. *inermis*), Japanese brome (*Bromus japonicus* Thunb. ex. Murr.), and Kentucky bluegrass (*Poa pratensis* L.), have invaded native grass communities and have similar effects on native species as those caused by crested wheatgrass.

In 1954, the administration of the LUP lands that constitute the LMNG were transferred to the U.S. Department of Agriculture, Forest Service. As directed by Congress, administration under the Forest Service introduced the concept of multiple use land management to the LMNG. However, management remained focused on commodity production. The 2002 Dakota Prairie Land and Resource Management Plan sought to provide a more balanced approach between commodity and non-commodity uses.

RANGE MANAGEMENT

During the late 1970s and 1980s, Forest Service objectives for rangelands included improving the distribution of livestock to get better utilization of forage produced, reducing impacts on heavily used areas, and increasing red meat production, which was also in concert with the prevailing local opinion at the time (Jim Wickel, personal communication, 2010). The general approach to meeting these objectives was through increased development of range infrastructure, including developing range water (water wells, reservoirs, dugouts, springs); adding stock tanks; cross fencing allotments to create more but smaller pastures, etc. Because a higher level of financial range resources was available from the grazing fee during this time period, a significant amount of new range infrastructure was constructed (Jim Wickel, personal communication, 2010). The increase in range infrastructure affected grazing and utilization patterns, which in turn affected rotations, stocking levels, etc. Development of additional infrastructure provided opportunities to more effectively utilize forage, which affected the mosaic of herbaceous structure and associated wildlife. Opportunities to spread noxious weeds and invasive plants also increased with the development of new infrastructure, because of associated changes in livestock distribution and grazing patterns.

OIL AND GAS DEVELOPMENT

Oil and gas development in the project area was first initiated in the 1960s and continues to the present. Development is located primarily in the Badlands Geographic Area, with a few oil and gas wells having been developed on the Rolling Prairie. Much of the existing transportation system in the project area was constructed or reconstructed to supply year-around access to oil and gas wells. As oil and gas wells played out, their associated well pads and access roads were generally reclaimed.

Approximately 177 oil and gas wells have been developed in the project area since the 1960s. The wells have taken approximately 443 acres out of forage production and other uses. In terms of forage, about 129 animal unit months (AUMs) are temporarily lost due to the construction of the oil and gas pads. An AUM is the number of pounds of forage (913 air dry) required to maintain a 1,000 pound cow with or without calf for one month. However, over the years, 110 of the oil and gas pads have been reclaimed regaining approximately 81 AUMs. Disturbed area, associated with the 67 active oil and gas wells, is approximately 168 acres, with about 48 AUMs temporarily lost to the pads (Table 3.1).

Approximately 54 miles of road have been constructed to provide access to the oil and gas wells. The roads have removed about 391 acres of land from forage production accounting for a temporary loss of 116 AUMs. Since the 1960s, about 13 miles of the total 54 miles of road have been reclaimed regaining 31 AUMs. There are currently about 297 acres occupied by active oil and gas roads in the project area, with roughly 85 AUMs temporarily lost to the roads (Table 3.1).

Table 3.1 — Summary of acres and AUMs associated with active and reclaimed oil and gas pads and roads in the project area

	Active Oil and Gas Wells	Reclaimed Oil and Gas Wells	Active Oil and Gas Roads	Reclaimed Oil and Gas Roads
# of wells or miles of road	67	110	41	13
Acres	168	275	297	94
AUMs regained		81		31
AUMs temporarily lost	48		85	

In total, approximately 245 AUMs have been affected by oil and gas activities in the project area since the 1960s. Reclamation of oil and gas pads and oil and gas access roads has resulted in a return of 112 AUMs. Continuing oil and gas activities have temporarily removed 133 AUMs from the project area.

Arguably, the largest impact of the oil boom was the development of an extensive system of roads. The new roads allowed year-round access into many areas that had formerly been accessible only during dry weather conditions, by foot, or horseback. They served as vectors for the introduction and/or spread of noxious weeds and non-native grasses and forbs. Stream crossings and road ditching adversely affected some intermittent streams. The new road system provided or improved access for livestock into areas formerly inaccessible or unattractive because of natural barriers or rough topography. In some cases, secondary range was likely converted to primary range. The roads also fragmented wildlife habitat, reduced security areas, and exposed wildlife to heavier hunting pressures.

Noxious Weeds

Noxious weeds are a scourge to the prairie ecosystem. They displace and crowd out native plants, modify wildlife habitat, reduce livestock forage, adversely impact watersheds and riparian areas, and are costly to control. To address this concern the DPG in 2007 completed the Noxious Weed Management Project Final Environmental Impact Statement (FEIS) and its accompanying ROD. The ROD approved the use of the integrated adaptive approach to continue to treat existing and future infestations of noxious weeds.

Present and Reasonably Foreseeable Actions

Present actions are the same as past with the exception of farming and homesteading, which no longer occur on NFS lands in the project area. Agricultural practices do occur on intermingled private lands within the project area, which may affect resources on NFS lands. Reasonably foreseeable actions are those federal or non-federal activities not yet undertaken, for which there are existing decisions, funding, or identified proposals (36 CFR 220.3). Identified proposals for the Forest Service are those where the Forest Service has a goal and is actively preparing to

make a decision on one or more alternative means of accomplishing that goal and the effects can be meaningfully evaluated (36 CFR 220.(a)(1)). The present and reasonably foreseeable actions that are relevant to this analysis are travel management, wildfire, Elkhorn Ranchlands Grasslands Plan amendment, and oil and gas development.

TRAVEL MANAGEMENT PLAN

The DPG is currently in the process of completing a travel management plan for the Little Missouri National Grassland, which contains the project area. In November 2005 the *Travel Management; Designated Routes and Areas for Motor Vehicle Use* (Travel Management Rule) was published. The Travel Management Rule requires that NFS roads, trails, or areas open to motor vehicles be designated on a motor vehicle use map, which is available to the public. Depending on the final decision associated with this action and if access to single use roads are blocked, it is possible that additional two-track roads could be created as livestock grazing permittees seek to administer their permits.

WILDFIRE

Wildfire is a continuing natural event that cannot be predicted. Past fires in the project area have included the Fantail, Magpie, and Mikes Creek fires, among others. All of these fires have occurred in the Badlands setting. The fires burned through areas of mixed grasses, juniper woodlands, and green ash woody draws. The general effect of fire in juniper woodlands has been the replacement of juniper with herbaceous plants communities. Varying degrees of tree and shrub mortality have resulted from wildfires, but surviving plants exhibit increased basal sprouting. Burned areas in Fantail Creek have responded with an increase in both grasses and tall shrubs such as serviceberry and chokecherry, which in turn are providing shelter for sapling trees. Noxious weeds such as Canada thistle and hounds tongue often pioneer burned areas but are generally replaced by native species over the course of a few years.

ELKHORN RANCHLANDS GRASSLANDS PLAN AMENDMENT

In 2007 the Forest Service and partners purchased an area known as the Eberts Ranch, which is now known as the Elkhorn Ranchlands. As a condition of purchase the Forest Service was required to sell an amount of NFS lands on the Medora Ranger District equal to the amount of land gained from the purchase. As a result of this condition, in 2008 NFS lands in Allotments 144, 218, 224, 228, 229, 285, and pasture 4 in Allotment 127 were conveyed to private ownership. Lands gained in the purchase were, with three exceptions, outside of the project area. Section 27, T143N, R101W (640 acres), the southwest quarter of the northwest quarter of Section 27, T144N, R102W (3 acres), and the west half of the west half of Section 35, T144N, R101W (140 acres) are the three outlying parcels of the purchase that are located in the project area of this analysis.

Portions of Allotments 128, 135, 158, 256, and 287 were associated with the above-mentioned sections when they were privately held. The purchased lands are still part of the federal allotments; all that has changed is the land owner. Because the purchased lands are not covered

by the current Grasslands Plan, it has to be amended to bring them under its management direction. When completed, the amendment will identify the final decision regarding how all the purchased lands are to be managed. In the interim, the 783 acres associated with the above-noted allotments will be managed for livestock grazing in accordance with the allotment within which they are located, and consistent with the adjoining Management Area 3.65.

Oil and Gas

The Forest Service has received five applications for permit to drill (APDs) on NFS lands in the project area. The APDs seek to drill oil and gas wells. The well pads associated with each well would be approximately 4 to 5 acres in size, encompassing about 22 acres total. Two wells would reuse all or a portion of existing reclaimed well pad sites and the remaining pads would involve new construction. Approximately 4,250 feet of roads would be built to access the well sites, of which 2,900 feet would be located on old reclaimed road sites.

General short-term effects associated with oil and gas development include sight, sound, and smell associated with heavy construction equipment. Drilling an oil and gas well, on average, takes about 2-1/2 weeks. Disturbed areas except for the well pad are reseeded to native grass species, but disturbances tend to facilitate the establishment of invasive grasses. After production is established well pads are generally reduced in size to what is necessary to produce the well; this action reduces the average well pad by 0.5 to 1 acre. Well pads are visited several times a week by a maintenance truck or daily if crude oil and saltwater, stored on site, need to be trucked to refineries or saltwater disposal sites.

Summary of Past, Present, and Reasonably Foreseeable Actions

Table 3.2 lists past, present, and reasonably foreseeable actions considered in the cumulative effects analysis. All actions do not apply to each resource. Only those actions with relevant impacts to a specific resource were analyzed and discussed in the following resource sections.

Table 3.2 — Summary of past, present, and reasonably foreseeable future actions considered in the cumulative effects analysis

Actions	Occurrence of Actions: Past (P), Present (C), and Reasonably Foreseeable (RF)	Location	Effects
Livestock grazing	P, C, RF	Throughout the project area	Livestock grazing coupled with the development of supporting range infrastructure has changed the natural pattern of disturbance in the project area. This has altered the mosaic of herbaceous structure to where the desired structure mosaic, described by the Grasslands Plan, is not being met. Some intermittent stream reaches are no longer at PFC because of the effects of trampling, trailing, and loafing on stream banks in addition to the removal of too much riparian forage by livestock. Green ash woody draws are affected by livestock actions similar to those associated with riparian areas. Slightly more than half of the green ash woody draws are rated as Healthy. Modification of grazing systems to take advantage of non-native grass species can adversely affect the native component intermingled in these plant communities.
Oil and gas development	P, C, RF	Throughout project area	Construction of roads, well pads, pipelines, and production facilities has removed some forage production. The construction of all-season roads for oil and gas activities opened up country that was historically accessible only by foot, horseback, or weather-dependent two-track road systems. The improved road system provides access for livestock into formerly inaccessible or poor access areas. The improved road network serves as a vector for noxious weeds and invasive grasses. Oil and gas roads have also affected some riparian areas by concentrating overland runoff into ditches, which is transported to streams. Concentrated runoff can affect sediment transport into the stream, accelerate stream downcutting, lower water tables, and reduce riparian vegetation diversity. The increase in new roads also fragmented wildlife and botanical habitats.
Noxious weeds treatment	P, C, RF	Throughout project area	The 2007 DPG Noxious Weed Management Project FEIS and ROD provide criteria for treatment of noxious weed infestations. Weeds have been treated in the past, and will continue to be treated under the Noxious Weed ROD; therefore, noxious weeds are anticipated to remain stable or decrease in abundance.

Actions	Occurrence of Actions: Past (P), Present (C), and Reasonably Foreseeable (RF)	Location	Effects
Farming	P, C	Primarily Rolling Prairie portion of project area	Farming no longer occurs in the project area on NFS lands. Reclamation of broken (cultivated) lands in the project area has introduced non-native invasive grass species. These species are displacing native grasses, thus affecting wildlife habitat and complicating livestock management. Agricultural practices do occur on intermingled private lands within the project area, which may affect resources on NFS lands.
Wildfire	P, C, RF	Throughout the project area	Wildfire is aggressively fought when it occurs. This has allowed woodlands and woody plant communities to expand but has also adversely affected those woodlands that need fire to help maintain the health of different woodland components. Native vegetation that evolved with fire no longer benefits from the nutrient flush and regenerative effects associated with fire. Control of wildfires has also facilitated the accumulation of plant litter that can assist the establishment of several invasive grass species. General vegetative response to wildfire in the badlands has been an increase in grasses and shrubs in juniper-dominated woodlands and riparian areas. Wildfires are often detrimental to woody draws because of their season of occurrence and intensity, but beneficial effects can also occur through increased basal sprouting or regeneration of trees and shrubs.
Travel Management	RF	Project area	The travel management plan is expected to have minimal effect on grazing permit holders unless single use roads are blocked from access by the permittees. If access were to be blocked then additional two-track roads could be created as permittees seek to administer their permits.
Elkhorn Ranch Grasslands Plan Amendment	RF	Located within project area boundary	Management action implemented under the decision for this analysis for those portions of the purchase contained in allotments 128, 135, 158, 256, and 287 may change under the forthcoming Grasslands Plan amendment.
Drought	P, C ,RF	Throughout the project area	Drought is a normal cyclic event that occurs in western North Dakota. Drought limits moisture, so all fauna and flora to one degree or another are affected. This analysis has adopted a modification of the 2007 NE McKenzie FEIS drought strategy as interim direction until the DPG-wide strategy is completed.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section provides an overview and summarizes by resource the existing condition and environmental effects resulting from the different alternatives. It also describes the methodology used in analyzing each resource. Topics discussed in this section include range, riparian, woody draws, herbaceous structure, seral stages, sharp-tailed grouse, economics, climate change, and water quality.

RANGE

Introduction

The Grasslands Plan provides direction for livestock grazing; however, this section and Chapter 3 Part 2 discuss more than just livestock grazing. They also discuss range administration; therefore, from this point forward the topic will be referred to as simply, Range.

The project area has been grazed by domestic livestock since the late 1880s. Over the decades, the land has been heavily impacted by a combination of farming sub-marginal lands, poor grazing practices, and drought. The environmental and economic devastation of the 1930s led to federal action to assist people and communities in the Great Plains. Through several acts, the federal government repurchased land and relocated families. This effort to purchase lands was called the Land Utilization Program (LUP). As part of the LUP in western North Dakota, cooperative grazing associations were formed to integrate management of the purchased lands with private ranch and farm operations. The Medora Grazing Association (MGA) was formed in December 1937.

In the 1970s and 1980s, allotment management plans (AMPs) were developed for the grazing allotments on the LMNG. An AMP guides the management of an allotment based on the management direction contained in the overarching land and resource management plan. Prior to the development of AMPs, the majority of the allotments within the Badlands and some of the Rolling Prairie were managed as commons. Individual members were allocated livestock use in a particular common from May 1 to December 31. The individual member then wintered the livestock, January 1 to April 30, on a headquarters allotment. The commons and their names were generally associated with a watershed, such as Ash Coulee, Blacktail, Whitetail, and Magpie; however, a few individual commons extended beyond the watershed, such as Ash Coulee and the Lower Thirty. During the development of AMPs, many of the commons were cross-fenced, creating new allotments that were allocated to a specific permittee for their sole grazing use. There are now six commons in the project area.

By the 1990s, because of the age of the existing AMPs and new technology and research, many of the permittees requested a deviation from the rotations set forth within their AMPs. Changes were agreed upon based on the approval of the MGA and the Forest Service through an Annual Operation Plan, later changed to Annual Operating Instructions (AOI). All association members are required to fill out an AOI prior to livestock turn out.

Spatial and Temporal Setting

The analysis area for range analysis is the NFS lands contained in the 43 allotments in the project area (Figure 1.2). Once the analysis is completed and an alternative selected by the district ranger, then AMPs will be created. The AMPs will be written based on the management information contained in the FEIS under the selected alternative. Once completed, the AMPs will cover a 10- to 15-year timeframe.

Methodology

Information used in the range analysis was gathered from the sources identified below. Also covered in this section is the methodology used to calculate initial estimated carrying capacity, which was used to set Authorized Use levels under Alternative 4.

The allotment folders for each allotment were reviewed to obtain historical information, existing AMPs, pasture rotations, and reference points and their documentation. Information—such as livestock distribution mapping and general observation notes—was obtained from allotment inspections conducted during the growing seasons of 2004 through 2007. Also, data were obtained through a cooperative monitoring agreement between the Forest Service, MGA, and North Dakota State University (NDSU).

Carrying Capacity Analysis

1. What is it?

Carrying capacity is defined as the average number of livestock and/or wildlife that may be sustained on a management unit compatible with management objectives for the unit. In addition to site characteristics, it is a function of management goals and management intensity (Society for Range Management 2005).

2. What is it used for?

The carrying capacity analysis was used to determine a starting point for authorization levels. More specifically, carrying capacity was analyzed to help determine what forage allocation to authorize for each allotment while considering the Grasslands Plan goals and objectives and identified issues for each allotment in Alternative 4. An estimated livestock carrying capacity for the allotment is also one of the items described as a minimum to be included in an AMP (Grazing Agreement and Rules of Management between MGA and USDA FS, 2009–2/28/2019).

3. How was it calculated?

The following methodology was used to calculate the initial estimated carrying capacities within the project area. Soil survey data from Billings and Golden Valley Counties were downloaded from the NRCS Soil Data Mart website in 2005 (http://soildatamart.nrcs.usda.gov/). Dry-weight production values for each ecological site within Major Land Resource Areas (MLRA) 54 and 58C were populated using data obtained from the NRCS State Rangeland Conservationist (Jeff

Printz, personnel communication, 2007, 2009). Pivot tables in Microsoft Excel were then used to combine tables to display the map unit symbol and name, percentage of map unit, component name, ecological site, and production data. Forage production values for each mapping unit within the soil survey were calculated using a weighted average of the listed ecological sites within the mapping unit. This weighted average figure was based upon the ecological site reference plant community production, the representative value (RV), for each ecological site within the soil mapping unit (all soil series were weighted for 100 percent). Assumptions associated with the RV are based on normal growing conditions and reference plant community. In very general terms, the assumption of "normal" growing conditions could either under or over estimate production depending upon the given climatic conditions for the year. The assumption of the reference plant community could also under or over estimate production depending on the existing plant community on the ecological site.

The above information was migrated into an attribute table in a GIS soils layer. Within ArcView (ArcView GIS 3.3, 2002), a coverage was created that intersected the analysis area by allotment/pasture, land ownership, potential vegetation, and soils. The attribute information was then updated to include calculations for total forage production by polygon. This was calculated by multiplying the weighted production by the number of acres for a given map unit polygon. Initial estimated carrying capacity was calculated by multiplying the total production for a given polygon by 0.25 (harvest efficiency) and then dividing by 913 (the number of pounds of forage, air dried, to maintain a 1000 pound cow with or without calf for one month). An assumption made in this calculation is seasonlong grazing, which could weight the formula towards a lighter carrying capacity. Data were then summarized into individual allotments/pastures by land ownership to provide an initial estimated carrying capacity (Project Record, Supporting Documentation, Range).

Through discussions and reviews, some discrepancies of previous calculations of carrying capacity have been discovered. In the 1960s and 1970s, carrying capacity was figured by using 50 percent of the total estimated forage production based on the assumption of take half/leave half (Forest Service Winter Range Meeting, 2009). No harvest efficiency factor was applied in the calculation. Harvest efficiency factors have varied through the years. In the past, 35 percent was used in the calculation of carrying capacity by North Dakota NRCS offices. Based on discussions with adjacent states, and to be consistent with those offices, North Dakota NRCS offices now use the 25 percent harvest efficiency factor (Jeff Printz, personal communication, 2008). This factor is also the recommended harvest efficiency number identified for rangeland in the 1997 NRCS National Range and Pasture Handbook. Another value in the carrying capacity calculation that was used in the past was 790 pounds instead of 913 (the amount of pounds of forage required to maintain a 1,000 pound cow with or without calf for 1 month). The previous value of 790 was an oven-dried forage value. The current value of 913 pounds (air dried) is used to be consistent with the production values reported in the NRCS ecological site descriptions, which are also air-dried values.

The carrying capacity equation expressed in AUMs is: (area in acres)(herbage production per acre)(0.25) / 913 pounds/AUM. Applying the equation to a hypothetical 100 acre pasture that

produces an average of 1,400 pounds of herbaceous forage per acre gives us: 100 acres x 1400 pounds/acre = 140,000 pounds x 0 .25 = 35,000 pounds / 913 pounds/AUM = 38.3 AUMs.

4. Do others use it?

Carrying capacity calculation is a standard equation taught in range management textbooks such as *Range Management Principles and Practices* (Holechek, et al. 1989). It is also described in the NRCS's *Range and Pasture Handbook* (1997) under calculating stocking rates.

5. Peer review

To help assure that the carrying capacity analysis was calculated correctly, the Medora Ranger District range staff had the analysis, methodology, and calculations were reviewed by the USDA's Agricultural Research Service (ARS). The ARS confirmed that the process used was correct (Project Record, Inter & Intra-agency Memos, Conversations and Agreements, I-7).

6. What other methodologies are out there, are they similar or not? Why didn't we use them? Why was it reasonable to use the method we did?

NRCS methodologies—As described in the NRCS *Range and Pasture Handbook* (1997), determining the grazing capacity of an area can be complex. Rates of stocking vary over time depending upon season of use, climate variations, site, and previous and current management goals. A safe starting point for stocking rates would be determined initially. Then adjustments throughout the year based on the current on-the-ground conditions would occur. Also, adjustments based on attainment of management goals should be considered. The handbook describes four methods for establishing initial stocking rates as follows: (1) based on trend, health, and utilization; (2) based on production data and growth curves; (3) based on the usable production method or the forage preference method; and (4) forage value rating method. However, it should be noted that the NRCS does not set stocking rates; they make recommendations to private land owners based on the operators goals and objectives.

In the NRCS's Prescribed Grazing conservation practice description (Conservation Practice Specification – 528 Appendix C) it further says that, "without the benefit of field collected production data, use Table 1 to establish an initial estimated stocking rate for each ecological/range site." This table utilizes a conservative methodology since only half of the RV production value is incorporated into the equation as is footnoted under the above-referenced Table 1. The Forest Service's analysis utilized the whole, updated RV production values for each ecological site in the analysis. Since Alternatives 3, 3A, and 4 are written adaptively, monitoring will show whether the initial actions proposed are aiding the allotment in meeting or moving towards Grasslands Plan goals and objectives, or whether further actions need to be taken in the management of the allotment.

a. SRT recommendations

The SRT recommended (Recommendation I-1, page 3, October 2006) the use of NRCS Order 2 soil surveys for Billings and Golden Valley counties along with the associated ecological site information in the development, implementation, monitoring, and refinement of pasture or allotment-level management plans. The SRT also recommended that herbage production be estimated for all sites through the use of ecological sites associated with the soil survey maps. (Recommendation I-2, page 4, October 2006). These recommendations were used in the analysis as noted above.

b. MGA suggestion

The MGA suggested that the Forest Service did not follow the preferred protocol of clipping and weighing key areas of the land base in order to assign carrying capacity, but did not express which protocol they preferred (Response to DEIS Comments, Comment K-64). However, the production information provided by the NRCS ecological site descriptions is based on various clipping information and personal experience from a wide range of personnel from the field of range management. The NRCS ecological site description production information was applied to a standard carrying capacity equation (noted above) that has been used for years and is taught in standard range management textbooks. This is not a theoretical exercise, as valid production information and a standard equation for calculating carrying capacity were used to determine a starting point for Authorized Use in Alternative 4 given the identified issues for an allotment. Production information that was collected through a cooperative monitoring effort and is site-specific to the project area has been analyzed to determine if fine tuning of the carrying capacity analysis is necessary. A detailed discussion of this information is contained in the following Cooperative Monitoring Data section. Ultimately, monitoring of how each allotment is meeting Grasslands Plan goals and objectives will indicate whether or not additional management is necessary on an allotment.

After the completion of the DEIS, new production information was released by the NRCS soil survey. This new information updated the NRCS soil survey vegetation production information used in this analysis. This new information affected the carrying capacity analysis, which was re-analyzed using the new information. This resulted in changes in Authorized Use for about half of the allotments contained in the project. Tables and discussion have been updated in the SDEIS to show the results of the new information, and now this FEIS which to date are based on the best available information.

COOPERATIVE MONITORING DATA

In 2007, a cooperative monitoring effort between the MGA, North Dakota State University (NDSU), and the Forest Service was initiated, and data collection began in 2008. This cooperative effort includes gathering species composition, forage production, VOR, and the 17 Indicators of Rangeland Health in upland sites; and species composition, forage production, VOR, and tree/shrub data in green ash woody draw sites. Under this effort, NDSU is collecting

data representing each individual allotment beginning in northern Billings County, and eventually throughout the MGA.

Monitoring data for 2008 and 2009 have recently been provided to the Forest Service. During these years data were collected in 34 of the allotments in this project. Data collection for the nine remaining allotments in the project will continue in 2010; however, it will not be available before this analysis is completed. Methodologies for this data collection effort have been supplied by NDSU and are included in the Supporting Documentation – Range section of the Project Record. The new data were reviewed by the IDT and are addressed in the analysis under the appropriate resource sections.

Through this monitoring effort, biomass information was collected on upland plots in 32 of the allotments in the project area. The Forest Service range staff reviewed the biomass information to determine how it compared to that supplied by the NRCS in the ecological site descriptions. The biomass information is important in determining initial estimated carrying capacity. Following is a summary of the detailed analysis information included in the Supporting Documentation – Range section of the Project Record.

To date, NDSU has collected raw biomass data on 115 upland sites. This represents 34 percent of the total upland sites (337 upland plots) that NDSU identified as necessary to represent the allotments within the project area. Of the 115 plots, 18 were dropped from the analysis because of missing biomass data or missing species information, because the species didn't match the summary sheet, or because there were two different dates for a plot. The remaining 97 plots (29 percent of the total upland plots) contained a total of 644 clipped frames. Of the 644 frames, 378 were in MLRA 54 – Rolling Soft Shale Plain, commonly referred to as Rolling Prairie; and 266 frames were in MLRA 58C – Northern Rolling High Plains, commonly referred to as Badlands.

MLRAs are broad geographic areas that are characterized by a particular pattern of soils, climate, water resources, vegetation, and land use (National Range and Pasture Handbook 1997). Each MLRA in which rangeland and forest land occur is further broken into ecological sites. An ecological site is a distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation (National Range and Pasture Handbook 1997).

MLRA 58C makes up the majority (69 percent) of the project area. Currently, much of this MLRA in the project area has not been assigned an ecological site by the NRCS. However, for those areas in MLRA 58C that are classified in the project area, the dominant ecological sites by acreage are Thin Loamy and Loamy. The 2008 and 2009 data (42 plots) shows the two most sampled ecological sites to be Claypan and Thin Claypan. Because of the limited amount of samples taken from Thin Loamy and Loamy ecological sites to date, the data set is not representative of MLRA 58C located in the project area. Therefore, the current production information from this sample set is not representative of the dominant ecological sites in the project area and therefore was not used in the analysis of carrying capacity.

According to the NRCS Soil Survey, by acreage MLRA 54 is dominated by Loamy and Claypan ecological sites in the project area. The 2008 and 2009 data (52 plots) shows that most of the

sampled plots occurred on the two dominant ecological sites. Overall, however, the data set is not currently complete enough to be representative of MLRA 54 and therefore was not used in the analysis of carrying capacity.

The primary concern at this point is that neither MLRA 54 nor 58C has a sufficient number of sampled plots needed to represent the project area. Plots sampled to date by ecological site are identified in Table 3.3. However, the monitoring project is continuing to collect plot information. As that information becomes available, it will be reviewed to determine if production information for the project area varies significantly from that provided by the NRCS soil survey.

Table 3.3 — Sampled plots in MLRA 54 and 58C

	Ecological Sites							
	Loamy	**Claypan**	**Sandy**	**Clayey**	**Thin Claypan**	**Thin Loamy**	**Shallow Clayey**	**Shallow Loamy**
# of sampled plots in MLRA 54	20	11	6	6	4	3	1	1
# of sampled plots in MLRA 58C	8	12	3	5	9	5	NA	NA

Although there are not currently enough sample plots to be representative of the project area, there are a sufficient number of samples to be representative of the following individual allotments: 132H, 221, 239, and 248. However, for allotments 132H and 221, the sample plots were not taken on the dominant ecological sites for these allotments, which means that production information would not be representative of the allotments. Allotment 239 has sample plots that represent only one of the two dominant ecological sites. The set for the second ecological site had a labeling discrepancy; therefore, this allotment is not fully represented either.

The sampling in Allotment 248 was consistent with the dominant ecological sites identified by the NRCS Soil Survey. On Claypan ecological sites, sample plots indicated that biomass production would contribute 0.06 AUM/acre more than the reference value, and on the Loamy ecological site the sample plot indicated that biomass production would contribute 0.24 AUM/acre more than the reference value.

For Allotment 248 this is somewhat of a moot point as there are no reductions in Authorized Use proposed under any of the alternatives. Once all of the sample plots for the project area have been completed, a review of the data set would be conducted. If significant differences were found between the NRCS RV production value and the biomass data set, additional calculations of the carrying capacity analysis would occur incorporating the biomass data set into the

analysis. If adjustments in Authorized Use are necessary based on the carrying capacity analysis, they will still be driven by the need to work towards Grasslands Plan goals and objectives.

A detailed description of the Forest Service review of the 2008/2009 cooperative monitoring data is located in the Supporting Documentation – Range section of the Project Record.

LIVESTOCK WEIGHT ADJUSTMENT

One of the SRT recommendations (V-2) was to *"Redefine the Animal Unit to reflect current cow size along with older, larger calves and recalculate the corresponding authorized livestock numbers on allotment."*

A discussion of cow size was held at the January 2007 MGA board meeting to address the SRT recommendation. Range staff from the Medora District reviewed how other Forest Service districts were addressing this issue; provided information from the Dickinson Research and Extension Center's Cow Herd Appraisal Performance Software (CHAPS) program, which contains cow weights by area; and shared how this would be treated as a tool in the grazing management toolbox. Upon being asked what the MGA Board of Directors felt was the average cow size in their grazing association, a range of 1,100 to 1,300 pounds, with the median being 1,200 pounds, was provided (Project Record, Correspondence Permittee). Appendix C of the Grasslands Plan provides three different calculations to address cow size in determining animal unit equivalents (AUE). After discussion of the different methods of calculation, the MGA Board of Directors chose method number 3, a metabolic weight formula, utilizing the 1,200-pound average size of a cow. The animal unit equivalency factor would equate to 1.15 AUEs as the median within the above stated weight range.

Because current Authorized Use is expressed in terms of animal months (AMs), a conversion factor was needed to convert AMs to AUMs so the alternatives could be compared in like units. This was accomplished by multiplying the number of authorized AMs by 1.15 AUEs to determine AUMs. This conversion assumes that all of the AMs are cow/calf units with an average weight of 1,200 pounds. This may result in an overestimation or underestimation of AUMs depending on what is actually being run and the true weight of the livestock, which can run on average as high as 1,600 pounds for cattle in western North Dakota.

Affected Environment—Range

EXISTING CONDITION

This section provides a general description of range-related information for the project area. A detailed description of the existing condition of each allotment is provided in Chapter 3 Part 2.

Grazing Permits

The MGA currently holds a permit from the Forest Service through a grazing agreement, which includes grazing within the project area. Currently there are 29,125 federal AMs allocated to the 43 grazing allotments covering approximately 87,262 acres of NFS lands (2006 MGA grazing permits). These AMs are permitted to the MGA, who in turn distributes them to grazing association members through issuance of annual grazing association grazing permits.

As noted above, the Forest Service issues a grazing permit to the MGA, who serves as the Forest Service's agent. Therefore, the MGA is a permittee of the Forest Service. The MGA in turn issues permits to its individual members. Technically these individuals would be MGA permittees. When referring to permittees in this document we are generally referring to the MGA permittees, unless specified otherwise.

There are several different types of grazing association grazing permits issued by the MGA to its members. The most common are inventory, turn-in, private allocation inventory, and private allocation turn-in.

An inventory permit normally has 8 months of summer grazing (May 1 to December 31), and 2 months of winter grazing and 2 months of winter feeding within the time period of January 1 to April 30. Under this type of permit, livestock are located within the allotment 12 months out of the year. Typically there are intermingled land ownerships, and wintering on NFS lands may occur. If adjustments are made due to resource conditions, normally those adjustments are taken in the number of livestock grazing. With such a permit management decisions can be difficult to make, since the livestock are on the allotment 12 months out of the year.

A turn-in permit's grazing season can be no longer than 8 months (May 1 to December 31), has no wintering on NFS lands, and the allotment typically consists solely of NFS lands, meaning that adjacent private lands are normally fenced out. Private and/or state lands may be included within the allotment if they are not conducive to fencing out or the permittee chooses not to fence them out. Turn-in permits allow for a certain number of AMs, which provides for some flexibility in management, such as an increased number of livestock for a shorter grazing season.

The term private allocation is normally added to the permit to identify that, at one point in time, this allotment was part of a larger common, and that now that member has been allocated a portion of the common and is no longer part of the common. Several of the allotments within the North Billings County AMP Revision project area have the term "private allocation" included on the permit.

The annual grazing association grazing permit provides a Preference number, which is the maximum number of livestock for a given amount of time allocated to that allotment. In Forest Service terminology, this would be the Permitted Use for the allotment. The permit also lists the kind and class of livestock, the number of livestock, and the dates on and off of the allotment applied and approved for the grazing season. In Forest Service terminology, this would be the Authorized Use for the allotment. Typically, the number of livestock authorized on an annual basis is equal to or less than the Preference number.

Actual Use

Actual use describes the number of livestock, the grazing season (turn on, turn off dates), and rotation that a permittee actually grazed on an allotment in the past grazing season. The MGA has stated that actual use is provided in the grazing association grazing permits and AOIs/Allotment Worksheets. The AOIs/Allotment Worksheets are rotation plans developed by the individual permittees in January through March as a tentative plan for the upcoming grazing season, and are recognized as needing updates as the season progresses. The Forest Service is provided some updates to the AOIs/Allotment Worksheets in a very timely matter by some permittees, but not in all cases.

Between the DEIS and SDEIS, the Forest Service conducted a review of MGA files for actual use information. The review found the same AOI and permit information that was supplied by MGA and some additional information documenting changes to some of the AOIs. The review noted a general lack of documentation updating the AOIs as the grazing season progressed. There was no evidence that the grazing association requests actual use from their members at the end of the grazing season.

It is possible to collect actual use data for the allotments in this EIS; however, that would take 3 to 5 additional years during which time existing adverse resource impacts would not be addressed. To address this concern, mechanisms are currently in place that will require the MGA to provide actual use for the 2010 season and annually thereafter. A letter has been sent to the MGA detailing, as per the MGA Grazing Agreement, the required actual use information, and the need to complete year-end reviews with each permittee to verify or amend the AOIs to reflect what actually occurred for the past grazing season (Project Record, Correspondence Permittee).

Information regarding actual use would aid in the analysis of past effects of grazing systems and whether or not those effects would continue, based on the alternatives. This is also described in the NRCS National Range and Pasture Handbook (1997) as part of the method to establish an initial estimated stocking rate for an operating unit. In addition, actual use would aid in disclosing the potential effects of the alternatives to the permittee by comparing actual use to Preference and/or the use authorized under the alternatives.

In lieu of actual use, the interdisciplinary team used the 3-year (2005 through 2007) average MGA permitted use and/or AOIs as was provided by the grazing association to compare to the Authorized Use under the different alternatives. The 3-year average MGA permitted use is information taken from grazing association grazing permits, which are completed prior to turn

out. The AOIs/Allotment worksheets were used to help describe how an allotment is managed under current management, as far as rotation and type/class of livestock. As noted before, the AOIs and the information they contain are completed in the winter or early spring by the permittee before turn-out. They represent the permittees "best guess" at that point in time as to the number of animals they'll run, rotations, etc., in the coming grazing season. In lieu of actual use, this is the best information available to use in the analysis.

This information will be used in the analysis to evaluate the effects of past grazing systems and whether or not trends would likely increase, decrease, or stay the same based on the alternatives and the comparison to the 3-year average MGA permitted use from the grazing association grazing permits, as well as Preference. It is important to note that 1 of the 3 years in the average was a drought year in which mandatory grazing reductions were implemented. This information is provided strictly for comparison purposes to more sharply define differences between the alternatives.

Tables 3.4 and 3.5 provide comparisons of the Authorized Use, by alternative, to Preference; and the Authorized Use, by alternative, to the 3-year (2005 through 2007) average MGA permitted use. The 3-year average MGA permitted use was converted to AUMs by converting the lines on the grazing association grazing permit by animal unit equivalency (AUE); i.e., all cows were assumed to weigh 1,200 pounds and therefore had an AUE of 1.15; yearlings had an AUE of 0.75; horses had an AUE of 1.5; and, due to language in the grazing agreement about breeding bulls, bulls were factored at 1.0 AUEs. Preference, which is authorized under Alternatives 2, 3, and 3A, was converted to AUMs using the same conversion factor identified above. This assumes that all of the animal units are larger cows within the range of 1,100 to 1,300 pounds, with an average of 1,200 pounds to get a conversion factor of 1.15. In some cases this will likely result in an over estimate, but this is done for comparison purposes. This assumption is correct for those allotments running only cow/calf operations, but results in a higher estimate for others that run different classes of livestock, such as yearlings. As actual stocking numbers and average livestock weight information was unavailable, the above assumptions were made to allow a comparison to be made between existing Authorized Use of Alternatives 2, 3, and 3A, which have the same Authorized Use, and Alternative 4.

Table 3.4 — Comparison of alternatives to 3-year average MGA summer permitted use

NOTE DISCLAIMERS ABOVE

Allotment	3-year Avg. AUMs	Alt. 2, 3, & 3A AUMs	% Difference between Alt. 2,3, &3A and 3-year Avg.	Alt. 4 AUMs	% Difference between Alt. 4 and 3-year Avg.
126/128	2516	2708	8	2178	-13
127	440	474	8	345	-22
129	1032	1150	11	1000	-3
130	647	729	13	678	5
131	26	55	109	48	81
132A	163	202	24	202	24
132H	349	370	6	353	1
133	280	313	12	198	-29
133D5	Hayed	56	Hayed	35	Hayed
134	275	292	6	220	-20
135	1647	1793	9	1559	-5
136/139	385	416	8	285	-26
140	429*	323	-25	237	-45
141	178	204	14	113	-36
142	96	192	100	128	34
158	1673	1801	8	1527	-9
220	151	184	21	112	-26
221	254	283	11	174	-31
230	401	419	4	358	-11
237	234	331	41	250	7
239	258	288	12	176	-32
240	855	930	9	876	2
241	379	413	9	357	-6
243	397	431	9	347	-13
244	254	271	7	241	-5

Allotment	3-year Avg. AUMs	Alt. 2, 3, & 3A AUMs	% Difference between Alt. 2,3, &3A and 3-year Avg.	Alt. 4 AUMs	% Difference between Alt. 4 and 3-year Avg.
248	277	359	30	359	30
249	234	235	0	194	-17
256	1588	1830	15	1678	6
258	1735	2382	37	1694	-2
272	1566	1694	8	1472	-6
277	1158	1298	12	1243	7
278	276	313	13	230	-17
281	289	339	18	270	-7
282	2133	2441	14	2123	0
283	193	345	79	340	76
286	184	320	74	236	29
287	661	666	1	577	-13
288	238	308	30	216	-9
289	1880	2057	9	1862	-1
300	501	559	12	524	5
301	1772	1916	8	1734	-2
302	1108	1201	8	1051	-5
Total**	29112	32835	13	27767	-5

*Because the percent federal listed on the permit does not reflect the management described for this allotment, it appears that more AUMs are being utilized than Federal Preference. It is a case of additional private land being included on the rotation described by the permittees that is not included on the grazing association permit.
**Total does not include Allotment 133D5, since this allotment is hayed, not grazed.

The above comparison indicates that Authorized Use under Alternative 2 and initial actions under Alternatives 3 and 3A would result in Authorized Use ranging from 1 to 109 percent above the 3-year average, with the exception of Allotment 140 (see above footnote). When compared to the 3-year average, Alternative 4 would result in a reduction in Authorized Use on 27 allotments ranging from 1 to 45 percent; 13 allotments would see an increase in AUMs; one allotment would remain unchanged; and one allotment would be hayed.

Table 3.5 provides a comparison of Authorized Use by Alternative to Preference. For comparison purposes Authorized Use under Alternatives 2, 3, and 3A and Preference have been converted to AUMs in the same manner as discussed above Table 3.4, When compared to Preference, Alternative 2 and the initial actions under Alternatives 3 and 3A show the range in percent reduction in Authorized Use is zero for all allotments. Alternative 4 shows that all allotments, except for two that were meeting Grasslands Plan objectives, would see Authorized Use reductions ranging from 1 to 44 percent, when compared to Preference. Excluding the two allotments for which no reductions are proposed, the average reduction for allotments that would see a change is approximately 20 percent.

Table 3.5 — Comparison of alternatives to Preference

Allotment	Preference in AUMs	Alt. 2, 3, & 3A AUMs	% Difference between Alt. 2,3, &3A and Preference	Alt. 4 AUMs	% Difference between Alt. 4 and Preference
126/128	2708	2708	0	2178	-20
127	474	474	0	345	-27
129	1254	1254	0	1090	-13
130	958	958	0	891	-7
131	314	314	0	273	-13
132A	202	202	0	202	0
132H	382	382	0	364	-5
133	313	313	0	198	-37
133D5*	56	56	0	35	-38
134	292	292	0	220	-25
135	1793	1793	0	1559	-13
136/139	416	416	0	285	-32
140	323	323	0	237	-27
141	204	204	0	113	-44
142	192	192	0	128	-33
158	1801	1801	0	1527	-15
220	184	184	0	112	-39
221	283	283	0	174	-38
230	419	419	0	358	-14

Allotment	Preference in AUMs	Alt. 2, 3, & 3A AUMs	% Difference between Alt. 2,3, &3A and Preference	Alt. 4 AUMs	% Difference between Alt. 4 and Preference
237	331	331	0	250	-24
239	288	288	0	176	-39
240	930	930	0	876	-6
241	413	413	0	357	-14
243	431	431	0	347	-20
244	271	271	0	241	-11
248	359	359	0	359	0
249	235	235	0	194	-17
256	1830	1830	0	1678	-8
258	2382	2382	0	1694	-29
272	1694	1694	0	1472	-13
277	1298	1298	0	1243	-4
278	313	313	0	230	-26
281	339	339	0	270	-20
282	2441	2441	0	2123	-13
283	345	345	0	340	-1
286	320	320	0	236	-26
287	666	666	0	577	-13
288	308	308	0	216	-30
289	2057	2057	0	1862	-9
300	559	559	0	524	-6
301	1916	1916	0	1734	-9
302	1201	1201	0	1051	-12
Total	33437	33437	0	28305	-15

*Allotment 133D5 is an 80-acre allotment that is partially hayed on an annual basis and is not grazed; therefore, it is not included in the totals.

Infrastructure

Water developments within the project area include springs, artesian wells, wells powered by electricity or windmills, water pipeline and stock tank systems, dugouts, and reservoirs. Reservoirs and dugouts depend on measurable snow pack and overland runoff to fill their basins. Without this runoff many of these reservoirs and dugouts are dry, or the quality of the water is poor for livestock use. Due to age, lack of maintenance, location, and sedimentation, many of the reservoirs and dugouts are only 2 to 4 feet in depth. This is a more common situation in the Badlands than in the Rolling Prairie because of the Badlands' erosive nature. With evaporation, many of these reservoirs and dugouts only hold water for a couple of months within a grazing season, thereby limiting season of use changes in pasture rotations.

The spring developments in the project area have generally been in place for long periods of time, which has affected their flow rate. Insufficient ground water recharge can also affect the spring flow rates. Many of the spring developments in the project area produce only enough water to supply a small number of livestock. Others have been poorly maintained and are in need of repair to continue to function properly. The spring developments in the project area are normally located within woody draws or within riparian areas. These are sensitive areas that, in some cases, have been adversely affected by livestock use.

Artesian wells and windmills also provide livestock water in the area. These water sources can be unreliable due to falling head pressures, fluctuation in aquifer levels (North Dakota State Water Commission 2007), or lack of wind. As a result, it can be difficult to balance a grazing rotation for proper use and timing. Indirectly, this can cause livestock to hang out along riparian areas within the project area.

Fences to divide allotments into pastures, for exclosures, and for hay yards are common rangeland infrastructures, as are corrals. Both are found throughout the allotments in this project area. Existing range developments for each allotment are identified on the allotment maps located in Appendix B.

Desired Condition

The Desired Condition for range is to annually provide forage for livestock on suitable rangelands within the sustainable capability of the rangeland ecosystem (Grasslands Plan, p. 1-5). The Demonstration Project also identifies a goal of maintaining or improving on-the-ground conditions to maintain, to the maximum extent possible, a grazing program at current levels and provide sufficient habitat for grassland species (Grasslands Plan ROD 2006, p. 16).

Environmental Consequences—Range

Direct and Indirect Effects

Alternative 1

This alternative would result in no livestock grazing of NFS lands 2 years after permittees were notified of the selection of this alternative. There would be a 100 percent reduction in the existing federal AMs allocated on the NFS lands in the project area, which in 2008 equated to 29,125 AMs. No grazing fees would be collected and, therefore, there would be no Conservation Practices (CP) completed. Most of the existing range infrastructure—such as fences, wells, tanks, developed springs, etc.—would be removed and reclaimed in the project area. Some structures may be kept for other resource reasons; however, those decisions would be made through other NEPA analysis. If the infrastructure were to not be removed, a maintenance plan would need to be developed, thereby adding an additional expense to the Forest Service.

There is a potential for the spread of noxious weeds associated with reclamation of removed range infrastructure. The Forest Service would become solely responsible for noxious weed control on the allotments. The spread of some noxious weeds species may decrease owing to the removal of livestock as one vector source.

This alternative would affect private lands intermingled with NFS lands within allotments. If private land owners wanted to graze their private land, fencing out that land would be their responsibility. New water sources would also need to be constructed on private lands to offset sources lost on NFS lands.

Permittees seeking to maintain their current herd sizes would need to replace forage from NFS lands with additional rented pasture, land purchase, or by switching to a more focused management system, such as a feed lot operation. Those not able to implement these options may reduce herds numbers, focus more on farming in combined ranching /farming operations, seek an additional source of income, or pursue a different career.

This alternative would not meet the desired condition for livestock grazing.

Alternative 2

This alternative maintains the current grazing management on each allotment. There are no changes in infrastructure, grazing rotations, Authorized Use levels, etc. Grazing distribution and use patterns would remain the same. As there are no additional management actions proposed, resource problems resulting from the intensity, timing, or duration of livestock use would be maintained.

Noxious weeds would continue to be cooperatively managed by the Forest Service, MGA, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds. Continuing to control noxious weeds would help maintain or increase the amount of native forage available to livestock and wildlife.

Under this alternative, Authorized Use would be set at Preference (Table 3.6), which is expressed as AMs. A cow/calf pair under this alternative would continue to be treated as one AM, regardless of the weight of the cow or its forage requirements. The number of AMs authorized would be similar to the currently permitted 29,125 AMs based on conditions.

Table 3.6 — Authorized Use under Alternative 2

Allot #	Authorized Use (AMs)	Allot #	Authorized Use (AMs)
126/128	2355	240	809
127	412	241	359
129	1090	243	375
130	833	244	236
131	273	248	312
132A	176	249	204
132H	332	256	1591
133	272	258	2071
133D5	(hay) 49	272	1473
134	254	277	1129
135	1559	278	272
136/139	362	281	295
140	281	282	2123
141	177	283	300
142	167	286	278
158	1566	287	579
220	160	288	268
221	246	289	1789
230	364	300	486
237	288	301	1666
239	250	302	1044

As existing numbers, rotations, etc., would be maintained, the existing grazing patterns would remain the same, which means that areas that are receiving too much use would continue to receive the same level of use.

Periods of drought would have a direct effect on the available forage for the project area. When reduced precipitation occurs during the growing season (April through July), it has a major impact on the production of forage (Heitschmidt et al. 1995). Less available forage results in the utilization level of 50 percent to be reached earlier in the grazing season. The end result is a decrease in the annual AMs authorized for that year. To extend the grazing season, the number of animals can be reduced, the class of livestock can be changed, or calves can be weaned early.

Alternative 3

This alternative uses a variety of different management actions—both structural and non-structural—to move impacted resources towards desired conditions. There are no initial reductions in Authorized Use under this alternative. Authorized Use is the same as that identified in Table 3.6 under Alternative 2.

Livestock distribution can be altered by changes in both range structural and non-structural improvements. Distribution would be altered in 18 allotments where new range infrastructure is proposed. Grazing rotation changes would affect distribution in 9 allotments. However, not all rotational changes would result in a change in livestock distribution; this is due to the influences of topography and pasture size, and is the case for 19 allotments. The effect of this alternative on noxious weeds is the same as Alternative 2.

Under this alternative, a total of 48 range developments estimated at a value of $597,750 would be constructed. In addition to initial construction costs there will be future maintenance costs associated with these structures.

This is an adaptive-management-based alternative and if monitoring shows that additional management actions are needed, then adjustments in Authorized Use may be required. Adjusting Authorized Use downward would result in fewer livestock numbers, fewer grazing days, or a combination of the two for a turn-in permit. For an inventory permit, adjusting Authorized Use downward would result solely in fewer livestock numbers. Adjusting Authorized Use, regardless of the type of permit, would not change the distribution of the livestock; however, the amount of forage harvested would be less than the existing forage harvested.

Alternative 3A

The effects of this alternative are the same as Alternative 3, except for the number of proposed range developments and their associated costs, which are 58 and $646,826 respectively.

Alternative 4

This alternative uses a variety of different management actions, both structural and non-structural, to move impacted resources towards desired conditions. Authorized Use is set based on initial estimated carrying capacity for those allotments where Preference is greater than the initial estimated carrying capacity. For the four allotments where this was not the case, Authorized Use was set by adjusting Preference for cow size. Two allotments, 132A and 248, are

authorized Preference since they are meeting resource objectives. Authorized Use for this alternative is identified in Table 3.7.

Livestock distribution can be altered by changes in both structural and non-structural range improvements. Distribution will be altered in 19 allotments where new range infrastructure is proposed. Grazing rotation changes will affect distribution in 10 allotments. However, not all rotational changes will result in a change in livestock distribution; this is due to the influences of topography and pasture size and is the case for 20 allotments. The effect of this alternative on noxious weeds is the same as Alternative 2.

Under this alternative, a total of 45 range developments estimated at a value of $486,375 would be constructed. In addition to initial construction costs there will be future maintenance costs associated with these structures.

This is an adaptive management based alternative and if monitoring shows that additional management actions are needed, then additional adjustments in Authorized Use may be required. Adjusting Authorized Use downward would result in fewer livestock numbers, fewer grazing days, or a combination of the two for a turn in permit. For an inventory permit, adjusting Authorized Use downward would result solely in fewer livestock numbers. Adjusting Authorized Use, regardless of the type of permit, would not change the distribution of the livestock; however, the amount of forage harvested would be less than the existing forage harvested.

Table 3.7 — Authorized Use under Alternative 4

Allot #	Authorized Use (AUMs)	Allot #	Authorized Use (AUMs)
126/128	2178	240	876
127	345	241	357
129*	1090	243	347
130	891	244	241
131*	273	248**	312 AMs
132A**	176 AMs	249	194
132H	364	256	1678
133	198	258	1694
133D5	(Hay) 35	272	1472
134	220	277	1243
135*	1559	278	230
136/139	285	281	270
140	237	282*	2123
141	113	283	340

Allot #	Authorized Use (AUMs)	Allot #	Authorized Use (AUMs)
142	128	286	236
158	1527	287	577
220	112	288	216
221	174	289	1862
230	358	300	524
237	250	301	1734
239	176	302	1051

*Allotments with Authorized Use set by adjusting Preference for cow size.
**Allotments where Authorized Use is maintained at Preference.

CUMULATIVE EFFECTS

Cumulative effects result from the combination of effects resulting from past, present, and reasonably foreseeable actions plus the direct and indirect effects of the alternatives. A discussion of past and present actions, reasonably foreseeable actions, and a summary of the cumulative effects by alternative follows.

Past and Present Actions

The following past and present actions have contributed to the existing range management.

Livestock grazing has occupied what is now the LMNG since the late 1880s. During the early decades, livestock stocking rates were dictated more by how many cattle a person had than by what the range was capable of supporting. This led to overgrazing, which helped precipitate the dust bowl era of the 1930s. The development and application of grazing systems and stocking guidelines has reversed many of the effects associated with overgrazing. Fortunately, the range has since recovered.

Past oil and gas development has resulted in the creation of a year-round road system, particularly in the Magpie, Blacktail, and Whitetail Creek watersheds. The road system has made it easier to transport livestock into areas that formerly required livestock to be moved in on horseback. The roads have also provided improved access for livestock into areas that, due to the difficulty of access, had previously been considered less desirable.

Noxious Weeds/Invasive Grasses, It is unknown when noxious weeds first appeared in the project area. In the past and today noxious weed management has been a cooperative effort between the counties, grazing associations, and the Forest Service. Noxious weeds displace native forage species and can/do affect available forage for livestock and wildlife.

Wildfires have been actively suppressed on the LMNG and adjacent private and state lands for about a century. The result has been an increase in some tree communities, such as Rocky

Mountain juniper and ponderosa pine, and a reduction or loss of vigor in plant communities where fire plays a role in maintaining the health of those systems. Ponderosa pine does not occur in the project area, however, Rocky Mountain juniper does. The juniper has expanded into rangeland due to a lack of fire and is beginning to affect available forage.

Drought is a recurring natural event in western North Dakota. When reduced precipitation occurs during the growing season (April through July), it has a major impact on the production of forage (Heitschmidt et al. 1995). Less available forage results in the utilization level of 50 percent to be reached earlier in the grazing season. The end result is a decrease in the annual AMs authorized for that year.

Reasonably Foreseeable Actions

Elkhorn Ranchlands. The recently purchased Elkhorn Ranchlands require that the Grasslands Plan be amended to establish management direction for the newly acquired lands. Approximately 800 acres of the 5,200 acre Elkhorn purchase are directly associated with five of the allotments in the North Billings project area. Under the proposed amendment these lands would be managed in accordance with the adjacent management area, which is MA 3.65 Rangelands with Diverse Natural Appearing Landscapes. In the interim, as directed by 36 CFR 254.3(f)(2008), this portion of the purchase is being managed in accordance with the adjacent MA 3.65. If the proposed action is selected and implemented there would be no change from the current situation.

The proposed Grasslands Plan amendment also includes establishing a special interest area (SIA) for the remaining 4,400 acres of the purchase, and approximately 17,160 acres contained in grazing allotments 279 and 280, which were associated with the Elkhorn Ranchlands when they were privately owned. If implemented, the SIA would establish a forage reserve on those acres. The reserve would provide a place where livestock could be moved in the event an allotment is burned out or if management actions, such as a prescribed fire or additional rest, were needed to help restore an allotment.

Travel Management Plan. An environmental assessment (EA) for travel management on the LMNG was released for comment in 2010. The proposed action for this EA would close all single use oil and gas roads, unauthorized roads (i.e., two tracks), and an additional 18 miles of system roads in the project area. The travel management plan is expected to have minimal effects on grazing permit holders unless single-use roads are blocked from access. If access should be blocked, then additional two-track roads could be created as permittees can travel cross county to administer their permits. Depending on the location of the new roads, this may lead to the spread or establishment of noxious weeds.

Oil and Gas Development. The Forest Service has received five applications for permit to drill (APDs) on NFS lands in the project area. The APDs seek to drill oil and gas wells. The well pads associated with each well would be approximately 4 to 5 acres in size encompassing about 22 acres total. Two wells would reuse all or a portion of existing reclaimed well pad sites and the remaining pads would involve new construction. Approximately 4,250 feet of roads would be

built to access the well sites, of which 2,900 feet would be located on old reclaimed road sites. The wells are located in Allotments 127, 135, and 287. These sites would affect fewer than 2 AUMs of forage in Allotment 127, 4 AUMs in Allotment 135, and 3 AUMs in Allotment 287 for the life of the oil and gas wells and roads.

Cumulative Effects by Alternative

This section summarizes direct and indirect effects of the alternatives and the effects of reasonably foreseeable actions on range. These effects in combination with past and present effects combine to create cumulative effects.

Alternative 1 would result in the removal of livestock and all or most of the range infrastructure, the removal of a noxious weed vector, possible spread of noxious weeds associated with reclamation activities, potential development of new water sources and fences on private property, and the locating of new forage to replace that lost on NFS lands. Oil and gas development and the LMNG Travel Management analysis would not have any additive effects under this alternative, as they do not affect Authorized Use. The Elkhorn Ranchlands Grasslands Plan amendment may offer forage for a limited amount of livestock for a temporary time, but would offer no long-term opportunity for the permittees in the project area.

Alternative 2 maintains the existing Authorized Use levels, rotations, noxious weed control actions, etc. The distribution of livestock would remain unchanged. Oil and gas development would result in the temporary loss of about 22 acres associated with the oil and gas well pads, and roughly 5.5 acres associated with the access roads. The temporary loss of forage associated with oil and gas development would not result in an adjustment in Authorized Use for the affected allotments. The Elkhorn amendment would offer alternate forage opportunities if wildfire or proposed management actions resulted in a temporary loss of forage.

Alternative 3 and 3A, initial actions utilize an array of structural and non-structural actions to address improving resource concerns. These would change livestock distribution in some allotments, but not all, as topography and pasture size also affect cattle distribution. Authorized Use would initially remain at Preference. The additive effects of reasonably foreseeable actions are the same as those identified under Alternative 2.

Alternative 4, initial actions utilize a combination of structural and non-structural actions plus set Authorized Use at the initial estimated carrying capacity or at Preference adjusted for livestock size, depending on the allotment. Livestock distribution would be affected in some allotments and not in others for the same reasons identified under Alternatives 3 and 3A above. An adjustment in Authorized Use would not affect how livestock are distributed. The additive effects of oil and gas exploration and the Elkhorn Plan amendment are the same as in Alternative 2.

Adaptive Management. Alternatives 3, 3A, and 4 are all adaptive-management-based alternatives. If monitoring shows that initial actions are not making acceptable progress towards desired conditions, management adjustments would be needed. Determining the cumulative effects of an array of different adaptive management actions on Authorized Use, livestock

distribution, and costs is not possible at this point because the application of the different management tools would be allotment specific.

Consistency with Grasslands Plan—Range

The following are the primary range-related standards and guidelines associated with this project. For a complete listing see the Grasslands Plan Standard and Guide Consistency Table located in the Supporting Documentation – Grasslands Plan Documents and Misc. section of the Project Record.

Modify livestock grazing practices as needed to reduce adverse impacts of drought to food and cover for prairie grouse and other wildlife. **Guideline**

This guideline would be addressed under Alternatives 3, 3A, and 4 through the interim drought strategy identified in Chapter 2 of this FEIS. Alternative 1 would remove grazing, so no modification of grazing practices would be needed. Alternative 2 does not encompass a formal drought strategy. However, drought is informally addressed through adjustments in timing, number of livestock, or a combination thereof when drought conditions exist.

Manage livestock grazing to maintain or improve riparian/woody draw areas. Implement the following practices.

- Avoid grazing activities, such as feeding, which concentrate livestock in riparian/woody draw areas.
- Control the timing, duration, and intensity of grazing in riparian areas to promote establishment and development of riparian species. **Guideline**

Alternative 1 would remove livestock grazing, so this guideline is not applicable. Under Alternative 2, areas affected by livestock concentrations would continue except in those situations where the Forest Service becomes aware of adverse impacts associated with livestock concentrations in riparian and woody draw areas. Alternatives 3, 3A, and 4 address the guideline to differing degrees. Actions such as moving stock water, creating riparian pastures and riparian exclosures, moving supplements, etc., would avoid concentrating livestock in riparian/woody draws and promote establishment and development of riparian species. Field reviews and AOIs would continue to address the issue where found.

Meet rest objectives based on, but not limited to, the following desired conditions:

- Where high structure is required for plant and animal communities and reproductive success for Management Indicator Species (see Geographic Area direction).
- Where increased fuel loads are desired for prescribed burning.
- Where ungrazed areas are desired for monitoring vegetation structure or for research needs. Where ungrazed areas are desired for biological diversity. **Guideline**

Alternative 1 would exceed the rest objective. The rest objective of 5 percent would be met through grazing rotations under Alternatives 2, 3, 3A, and 4.

When allotment management plans are revised, adjust stocking levels to account for the variations in liveweight of livestock if needed to meet desired vegetative conditions (see Appendix C). **Guideline**

This guideline does not apply to Alternative 1 because all livestock would be removed under that alternative. Alternative 2 would maintain the existing condition, which does not adjust for livestock weight; therefore, this guideline would not be implemented under this alternative. Alternatives 3 and 3A under initial actions would not address livestock weight. If monitoring indicated that adjustments for livestock weight were needed, this would be accomplished as an adaptive action. Alternative 4 would account for livestock weight in the determination of the Authorized Use. If monitoring indicated that additional adjustments for livestock weight were needed, this would be accomplished as an adaptive action.

Prioritize and remove fences or water developments that are not contributing to achievement of desired conditions. **Guideline**

Alternative 1 would remove many of the existing fences because, with the cessation of livestock grazing, they would no longer be needed. Alternative 2 would maintain the current system of fencing. Alternatives 3, 3A, and 4 propose, to differing degrees, the removal of fences or water developments see Chapter 3 Part 2 for additional detail.

Manage grazing units that are composed of at least 70% crested wheatgrass (*Agropyron cristatum*) as crested wheatgrass units. Manage other pastures not meeting this definition as native grass units. **Guideline**

Alternative 1 would remove livestock grazing, therefore this guideline would not apply. Under Alternative 2 some, but not all, of the crested wheatgrass pastures would be managed as such, providing deferment to native pastures. Under Alternatives 3, 3A, and 4, crested wheatgrass pastures, to the extent possible, would be managed as early season pastures to defer use on native pastures as identified in the design criteria located in Chapter 2.

Design and implement range management strategies for meeting desired vegetation objectives using existing monitoring information and stocking rate guidelines for livestock grazing (see Appendix I). **Guideline**

Alternative 1 would remove livestock from the landscape, so this guideline is not applicable. Alternative 2 would not incorporate any changes to livestock grazing to meet desired vegetation objectives. The analysis (existing monitoring information) shows a need to change some range management practices in order to trend towards desired condition. Alternatives 3 and 3A would apply a variety of different range management strategies to address vegetation objectives. These alternatives would not initially modify Authorized Use; however, Authorized Use may be adjusted if monitoring indicates the initial actions do not trend the allotment towards desired conditions using the process described below, or other available methods. Alternative 4 would

also apply a variety of range management strategies to trend towards desired vegetation objectives and would use the process described below to adjust Authorized Use.

The analysis followed SRT recommendations utilizing a standardized methodology in place of Appendix I to set Authorized Use. This approach was taken because the SRT reported that erroneous assumptions were made in estimating livestock carrying capacities by equating grazing/harvest efficiency to high, medium, and low structure without considering the production potential of the ecological site (Report of the Scientific Review Team, May 2005, p. 20). The SRT also recommended Order 2 soil surveys in estimating livestock carrying capacities. Due to the two SRT recommendations, the Forest Service decided to estimate livestock carrying capacities by using available NRCS Order 2 soil surveys and a standard carrying capacity formula in order to establish Authorized Use under Alternative 4 to meet or move towards vegetation objectives. This is in addition to the variety of different range management strategies (Chapter3 Part 2) initially identified to help address meeting desired vegetation objectives.

Allow haying only where noxious weeds are not present or are pre-treated to prevent seed set unless haying is needed as a method of noxious weed control. If used as such a control, ensure proper disposal of hay. **Guideline**

One allotment, 133D5, is hayed. There are currently no identified noxious weeds associated with this allotment.

Allow haying and mowing only when grazing or prescribed fires are not viable methods to accomplish desired objectives. **Guideline**

Haying is allowed in Allotment 133D5 because there is no available livestock water source.

Control the timing, duration, and intensity of grazing on grass-dominated ridge tops and valley bottoms to prevent overuse and to promote the desired structure and species composition. **Guideline**

Since Alternative 1 removes livestock grazing altogether, overuse would be prevented. In the short term, this guideline would be met; however, in the long term desired structure and species composition objectives would not be met. Alternative 2 would not meet this guideline because it would maintain the current conditions, which do not meet Grasslands Plan structure and species compositions objectives and guidelines. Alternatives 3 and 3A would utilize a variety of different initial management actions, such as change in season of use, grazing rotation changes, fencing, and water development, to address this guideline. Alternative 4 is similar to Alternative 3 and 3A except that it would establish Authorized Use at carrying capacity, which may affect the intensity of use.

Use livestock grazing strategies that maintain or improve the vegetative composition and structure associated with the scenic qualities of the area. **Guideline**

This guideline is associated MA 4.22 "River and Travel Corridor." Approximately 1,030 acres of this MA is associated with the Little Missouri River in the project area. A field review of the riparian vegetation did not reveal any vegetative composition or structure concerns.

Design grazing practices to provide landscape diversity for plant composition and structure.
Guideline

Alternative 1 would remove livestock grazing which in the short term would move towards landscape diversity of plant composition and structure. However, in the long term it is expected that landscape diversity for plant composition and structure would decrease with livestock grazing removal. Currently, the desired mosaic of structure and composition is not being achieved under Alternative 2 management actions. Alternatives 3, 3A, and 4 are designed to provide diversity for plant composition and structure; however they differ in how quickly and in the degree to which plant composition and structure would change.

Initial actions under Alternatives 3 and 3A would shift the structure mosaic by moving some of the Low structure into Moderate structure. The initial actions would also improve the diversity of plant composition in some of the allotments. Alternative 4 would modify the structure mosaic by shifting more areas from low to moderate and moderate into high structure than Alternatives 3 and 3A. In addition, Alternative 4 would improve the diversity of plant composition in more allotments than Alternatives 3 and 3A. Also, these alternatives include adaptive actions that would be applied if monitoring shows the initial actions are not meeting the objectives.

RIPARIAN

Introduction

Soil and water are among the most valuable natural resources. They sustain life, distribute nutrients, provide energy, and shape the landscape. In addition, water develops transportation corridors and provides diverse recreational opportunities. One of the primary reasons for the creation of the Forest Service was to protect soil and water resources. In the semiarid badlands of western North Dakota, water is especially important, as it is a limiting factor for wildlife and livestock. Water also greatly influences distribution of livestock in NFS allotments.

Commonly, the first signs of ecosystem failures appear in riparian areas where wildlife and livestock concentrate. The creation and maintenance of properly functioning riparian areas is imperative in maintaining healthy watersheds which are critical for economic, ecological, and social reasons.

Information provided in this section is taken from the Revision of Allotment Management Plans, North Billings County Watershed Report (SDEIS revision), which is located in the Project Record.

Spatial and Temporal Setting

The analysis area for the riparian issue is the same as the project area. This is a sufficient analysis area because riparian exclosure fences and allotment fences across streams in the project area demonstrate that pasture-specific management actions have localized effects on riparian functionality. For example, upstream reaches with impaired riparian areas can show complete recovery within tens of meters of entering an allotment with a properly managed riparian area (Figure 3.1). Conversely, upstream reaches that are properly functioning can change within tens of meters to nonfunctional upon entry into poorly managed riparian areas. The following streams and their associated riparian areas are the focus of the riparian analysis: Ash Coulee, Betsy Creek, Blacktail Creek, Fantail Creek, Green River, Magpie Creek, Mikes Creek, North Creek, Scairt Woman Draw, Spring Creek, and Whitetail Creek (see Figure 3.2). The temporal setting for the riparian analysis is 10 to 15 years.

Figure 3.1 shows the rapid transition from a reach of Magpie Creek with a riparian functionality rating of Functional-At Risk-Downward Trend (FAR-D) to the left (upstream) of the fence to one with a rating of Proper Functioning Condition (PFC) on the right (downstream) side of the fence. Note that upstream of the fence there is no riparian vegetation, and sediment-transport rates are high. In contrast, abundant riparian vegetation has trapped and ponded sediment-laden water within 10 meters of the fence. Beyond 10 meters, the riparian vegetation is dense, vigorous, diverse, and shows no evidence of excess sedimentation.

Figure 3.1 — Fenceline contrast displaying rapid transition in riparian functionality rating.

Photo by Mark Gonzalez, July 2006.

Methodology

The condition of riparian areas in the project area was assessed using the Proper Functioning Condition Protocol (Prichard et al. 1993, 1994, 1998, 1999 (revised 2003)); a copy of the protocol is located in the Supporting Documentation – Watershed section of the Project Record. Results of earlier riparian surveys (1997-1998) were summarized by Kurt Hansen and others (USDA Forest Service 1998) and were used to indicate a trend in riparian conditions. PFC data were collected by interdisciplinary teams, including that of Brooks (2005, p. ix), and Forest Service personnel in the summers of 2004, 2006, 2007, and 2008 (Project Record, Supporting Documentation – Watershed, L-26). The PFC data provided a context for determining if the ecological function of a particular stream reach has been improving, declining, or holding steady.

The Proper Functioning Condition Protocol is an interdisciplinary method to evaluate the existing condition of riparian areas, to examine the ecological functions of riparian areas, and to identify potential causes of riparian problems. Members of the IDT walk the entire length, or a representative set of reaches, of a riparian area and complete a checklist to determine the overall ecological function of the riparian area. Separate checklists are used to evaluate riparian areas that border lotic systems (those with running water, such as streams) and those that border lentic systems (areas where there is primarily standing water, such as ponds, fens, bogs, etc.).

Individual riparian reach breaks are designated based on observable differences in landform, geology, geomorphology, fluvial processes, major soil and/or vegetation changes, and hydrologic changes (Prichard et al. 1998). The IDT assigns one of five possible functionality ratings to each riparian reach based on field observations, team discussions, and checklist data: Proper Functioning Condition (PFC); Functional-At Risk-Upward Trend (FAR-U), Functional-At Risk-

Trend Not Apparent (FAR-NA); Functional-At Risk-Downward Trend (FAR-D); and Nonfunctional (NF). An explanation of ratings is provided in Table 3.8.

Table 3.8 — PFC functionality ratings and definitions

PFC	Stream is in balance with the landscape, erosion and deposition are not excessive, vegetative cover indicates high soil-moisture (wetland) conditions and has high vigor, channel is sinuous with little or no bank erosion.
FAR-U	May indicate past problems that are healing through better vegetative cover, decreased erosion, better sinuosity, and better soil-moisture retention.
FAR-NA	Some deposition and erosion are occurring, vegetative vigor is moderate, some stream banks are drying, riparian elements are still in place for recovery without large inputs, and the functionality trend could go either way depending on disturbances.
FAR-D	Plant communities are dominated by more upland species rather than wetland species, erosion is happening at large rates, channel is beginning to straighten with increased velocity from lack of stream bank cover, and floodplain storage is reduced.
NF	Stream channel and banks characterized by little or no vegetative cover; stream channel is less defined, water not stored in banks due to lack of plant cover and continual erosion/deposition. Stream bank storage of high flows is short lived due to lack of plant cover to slow evaporation rates, channel has little sinuosity, upland plant species are present where they typically are not found, and large expenses required to bring back into a functioning condition.

Source: Modified from Prichard et al. 1998.

The PFC protocol has been developed to assess the ecological functionality of riparian areas along perennial and intermittent streams as well as riparian habitat at springs and seeps. The basis of evaluation is local site potential and capability.

A comment was received on the DEIS that this project hadn’t addressed SRT Recommendation VI-3 of determining the applicability of PFC to North Dakota. The IDT reviewed the SRT recommendation (Final Response to the SRT Reports, p. 19) and confirmed that PFC is applicable to North Dakota. The PFC methodology is a widely accepted, interagency protocol used to assess riparian conditions. It was developed in the American West by federal land-management agencies and has been used extensively for more than a decade. The DPG's climatic, geologic, and fluvial conditions are highly representative of many watersheds where the PFC methodology was developed and refined. Wayne Elmore, a former director of the National Riparian Service Team (NRST), visited the Little Missouri National Grassland in 1999 and found the methodology well-suited for use in North Dakota. Elmore and three other members of the NRST visited the nearby Sioux Ranger District of the Custer National Forest in South Dakota in 2005 and again concluded the methodology was well suited for the region. The methodology is universally applicable because all assessments are made with respect to potential condition.

Affected Environment—Riparian

This section provides a general description of riparian related information for the project area. A detailed description of the existing condition of riparian areas in each allotment is provided in Chapter 3 Part 2.

EXISTING CONDITION

The combination of topography, vegetation patterns, and herding practices has had negative impacts on many riparian areas in the Badlands Geographic Area (GA) of this project area. Many riparian areas in the Badlands GA have low to moderate ecological functionality. In contrast, most riparian areas in the Rolling Prairie GA have high ecological functionality.

PFC surveys were conducted on 56.4 miles of intermittent stream reaches occurring on NFS lands in the project area. Intermittent streams flow only at certain times of the year when they receive water from surface sources such as snow melt, storm runoff, or from ground water discharge. The surveyed riparian areas were located along the following streams: Ash Coulee, Betsy Creek, Blacktail Creek, Fantail Creek, Green River, Magpie Creek, Mikes Creek, North Creek, Scairt Woman Draw, Spring Creek, unnamed tributary to Blacktail Creek, and Whitetail Creek (see Figure 3.2). The Little Missouri River (LMR) is the only perennial stream (a stream that flows year-round) located in the project area. A small portion of the river flows through the western portion of the project area. A 2010 field review of the four allotments bordered by the LMR, by the Medora District hydrologist, did not identify any riparian concerns.

Ephemeral streams were not evaluated because these areas generally hold water for so short a period that livestock rarely concentrate there. Ephemeral streams flow in direct response to rainfall or snowmelt events. They have no base flow and do not support riparian habitat. Allotments 127, 131, 132A, 132H, 133D5, 136/139, 140, 142, 158, 220, 221, 239, 241, 243, 248, 249, 272, 281, and 288 contain only ephemeral streams and were not evaluated.

Table 3.9 provides a summary of riparian functionality ratings for the surveyed stream reaches in the project area. Figure 3.2 identifies the surveyed streams and functionality rating by stream reach. The definition of the functionality ratings is located in Chapter 1 in the Key Issues section.

Table 3.9 — Riparian functionality ratings (miles and percent miles of channel) for intermittent streams in the North Billings project area

Stream	Riparian Functionality Rating* (miles)					Total
	PFC	FAR-U	FAR-NA	FAR-D	NF	
Ash Coulee	2.01		1.13	0.45		3.59
Betsy Creek			0.72		0.43	1.15
Blacktail Creek	2.88		0.7		3.59	7.17
Unnamed Trib. to Blacktail			0.75		1.1	1.85
Fantail Creek		2.51				2.51
Green River	1.26					1.26
Magpie Creek	10.18			0.84	5.86	16.88
Mikes Creek					6.51	6.51
North Creek	3.14					3.14
Scairt Woman Draw	2.13				0.77	2.9
Spring Creek	0.76					0.76
Whitetail Creek	6.25			1.58	0.86	8.69
Total (miles)	**28.61**	**2.51**	**3.3**	**2.87**	**19.12**	**56.41**
Percent (%)	**50.7**	**4.4**	**5.9**	**5.1**	**33.9**	**100.0**

*PFC= Proper Functioning Condition; FAR-U = Functional-At Risk-Upward Trend; FAR-NA = Functional-At Risk-Trend Not Apparent; FAR-D = Functional-At Risk-Downward Trend; NF = Nonfunctional.

The data in Table 3.9 show that slightly more than one-half (50.7 percent) of the intermittent stream reaches (measured by length) were at PFC; and slightly more than one-third (33.9 percent) of reaches were NF. Functional-At R streams constituted the remaining 15.4 percent of riparian areas.

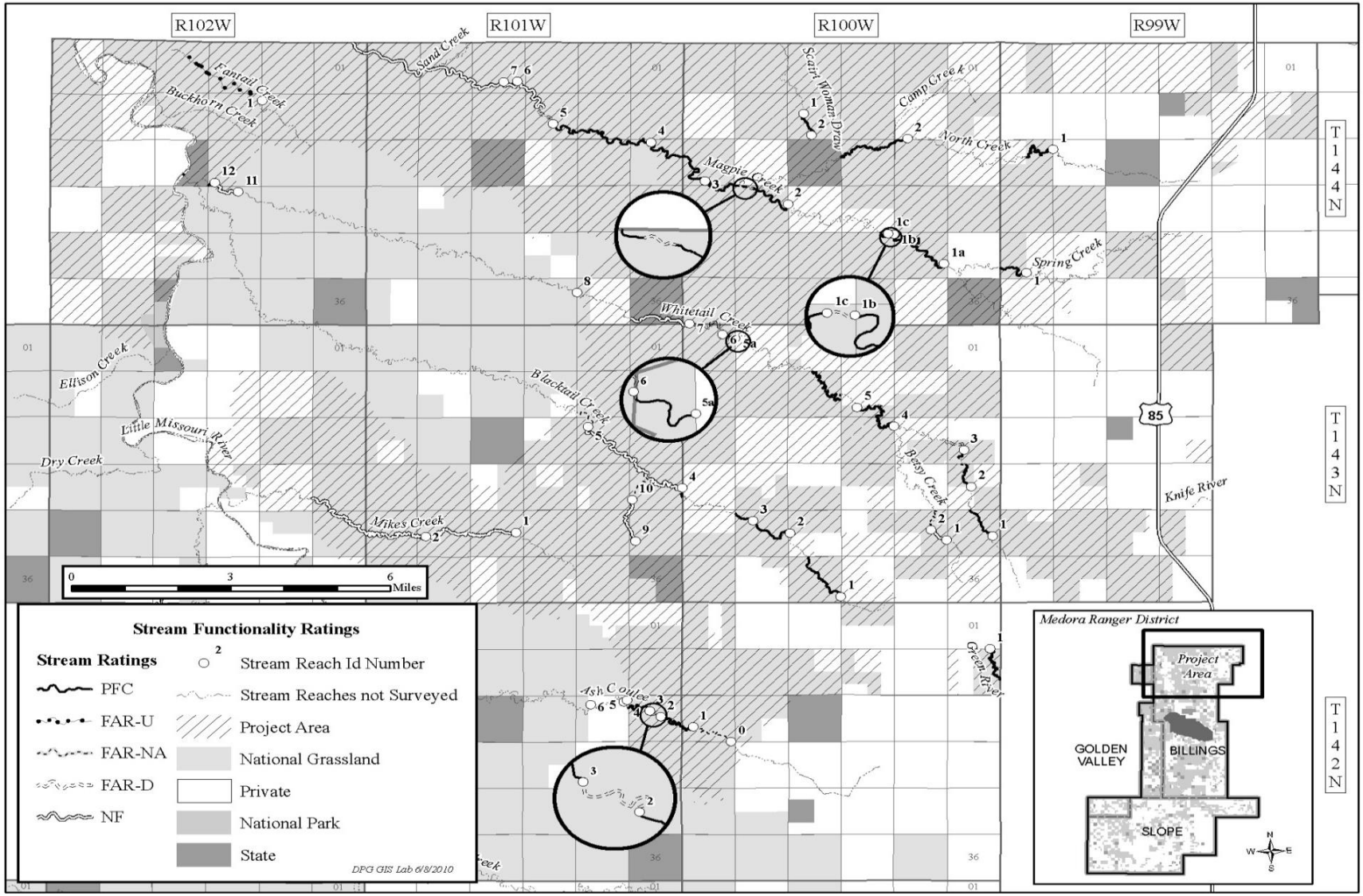


Figure 3.2 — Surveys streams and functionality ratings.

Detailed existing condition information for surveyed stream reaches by allotment and pasture is presented in Part 2 of this Chapter. Table 3.10 provides riparian functionality ratings for each surveyed stream segment by allotment and pasture.

Table 3.10 — Riparian functionality ratings for intermittent streams in the N. Billings project area

Allotment/Pasture #	Stream (Reach #)	Miles of Stream in each Functionality Rating* Group					
		PFC	FAR-U	FAR-NA	FAR-D	NF	Total
126-05	Whitetail (5)	0.11					0.11
126-06	Whitetail (5)	1.61					1.61
128-01	Whitetail (6)				1.07		1.07
128-01	Whitetail (7)					0.19	0.19
129-01	Magpie (4)	0.66					0.66
129-02	Magpie (4)	1.81					1.81
129-01	Magpie (5)				0.58	1.55	2.13
130-01	Whitetail (4)	1.84					1.84
130-02	Whitetail (4)	0.27					0.27
133-01	Blacktail (1)	0.41					0.41
134-01	Whitetail (2)	0.76					0.76
134-03	Whitetail (1)	0.73					0.73
135-08	Mikes (2)					2.79	2.79
135-09	Mikes (2)					1.98	1.98
135-10	Mikes (1)					1.74	1.74
140-01	Blacktail (2)	0.07					0.07
141-01	Green (1)	0.44					0.44
141-03	Green (1)	0.82					0.82
230-03	Blacktail (1)	0.91					0.91
237-01	Blacktail (2)	1.4					1.4
240-03	North (1)	1.28					1.28
240-04	Spring (1)	0.76					0.76
244-02	Whitetail (2)	0.26					0.26
244-02	Whitetail (3)				0.51		0.51
256-02	Blacktail (3)	0.09					0.09
256-02	Blacktail (4)					1.76	1.76
256-02	Unnamed Trib to Blacktail (9)					0.45	0.45
256-02	Unnamed Trib to Blacktail (10)			0.75			0.75
256-03	Blacktail (4)					1.83	1.83

Allotment/Pasture #	Stream (Reach #)	Miles of Stream in each Functionality Rating* Group					
		PFC	FAR-U	FAR-NA	FAR-D	NF	Total
256-03	Blacktail (5)			0.7			0.7
258-01	Ash Coulee (1)	0.06					0.06
258-01	Ash Coulee (2)				0.32		0.32
258-02	Ash Coulee (0)			1.13			1.13
258-02	Ash Coulee (1)	1.15					1.15
258-02	Ash Coulee (2)				0.13		0.13
258-02	Ash Coulee (3)	0.8					0.8
277-02	North (2)	1.53					1.53
277-02	Scairt Woman Draw (2)					0.55	0.55
277-05	Magpie (1a)	2.45					2.45
278-01	Whitetail (1)	0.1					0.1
282-03	Fantail (1)		0.4				0.4
282-04	Whitetail (11)	0.22				0.67	0.89
282-05	Fantail (1)		2.11				2.11
282-06	Magpie (6)					0.47	0.47
282-06	Magpie (7)					3.84	3.84
283-01	Whitetail (5a)	0.35					0.35
286-01	Betsy (1)					0.43	0.43
286-01	Betsy (2)			0.13			0.13
286-03	Betsy (2)			0.59			0.59
287-03	Unnamed Trib to Blacktail (9)					0.65	0.65
289-02	North (2)	0.33					0.33
289-03	Scairt Woman Draw (1)	2.13					2.13
289-03	Scairt Woman Draw (2)					0.22	0.22
300-01	Magpie (1b)				0.12		0.12
301-01	Magpie (2)	1.87			0.14		2.01
301-04	Magpie (3)	2.04					2.04
302-01	Magpie (1c)	0.28					0.28
302-01	Magpie (2)	0.22					0.22
FS	Magpie (4)	0.85					0.85
Total (miles):		**28.61**	**2.51**	**3.3**	**2.87**	**19.12**	**56.41**
Percent (%)		**50.7**	**4.4**	**5.9**	**5.1**	**33.9**	**100.0**

*PFC= Proper Functioning Condition; FAR-U = Functional-At Risk-Upward Trend; FAR-NA = Functional-At Risk-Trend Not Apparent; FAR-D = Functional-At Risk-Downward Trend; NF = Nonfunctional.

DESIRED CONDITION

The overall Desired Condition for riparian resources is identified under Goal 1a. of the Grasslands Plan: "Improve and protect watershed conditions to provide the water quality and quantity and soil productivity necessary to support ecological functions and intended beneficial water uses." The Badlands and Rolling Prairie GA section of the Grasslands Plan further defines the desired condition for riparian areas with direction to maintain streams at PFC or improve them to an upward trend.

Capability

Comment received on the DEIS indicated that the Grasslands Plan needed to be amended prior to undertaking this project because the Grasslands Plans direction was unattainable. This would include desired conditions for riparian. PFC surveys and field observations on the existing riparian exclosure on Ash Coulee Creek demonstrate that stream reaches heavily impacted by livestock use are capable of significant recovery when grazing activities are removed. The exclosure was built in 2000 in response to livestock impacts on the stream. The stream reach located within the exclosure recovered to PFC within several years of construction of the exclosure. Additionally, a riparian pasture constructed upstream of the above exclosure in 1996 is also at PFC. The creation of this pasture combined with light grazing has allowed the stream to recover to PFC. The above information shows that the riparian systems in the project area are capable of meeting PFC.

Environmental Consequences—Riparian

DIRECT AND INDIRECT EFFECTS

As noted previously, no riparian surveys were conducted in allotments that contained only ephemeral streams. Furthermore, there were also a number of riparian areas in the allotments that are currently meeting riparian objectives. Those allotments (130, 133, 134, 141, 230, 237, 240, 283, 289, 302) are not addressed in this analysis. Instead this analysis focuses on FAR and NF stream reaches.

Alternative 1

The cessation of grazing would have an immediate positive effect on FAR and NF riparian areas. Riparian plant communities would begin to expand in areas where plant density is light, sparse, or absent. Stream bank impacts resulting from trampling and trailing would cease, which, along with recovering riparian vegetation, would result in the stabilization of stream banks and beds. Improving riparian vegetation would also result in improved sediment entrapment, building banks, and narrowing the width to depth ratio.

Alternative 2

Alternative 2 calls for no change in livestock management. Livestock grazing would continue in the future as it has for the past decade or more, with no new range improvements, no increase or decrease in livestock numbers except in response to annual operating instructions that evaluate climatic conditions and seasonal forage production, and no changes in grazing systems.

The net effect of no change in current management is that areas that are currently at desired condition are likely to remain so, and areas that have resource concerns or management problems are likely to show continued or additional impairment. Impacted riparian areas are unlikely to heal until the underlying cause is addressed. Specifically, under current management, bank erosion, channel incision, and livestock trailing are likely to remain. Deficiencies in riparian vegetation, including lack of diversity, lack of cover, problems with composition, invasion of non-native species and noxious weeds, and the lack of regeneration will persist under current management. Rates of channel erosion and sedimentation will remain high in impaired reaches. Elevated sediment loads will impair the ability of desired riparian vegetation to colonize and flourish.

Currently, slightly more than half (approximately 51 percent) of the riparian areas in the project area are at desired condition (Tables 3.4 and 3.5). Under Alternative 2, all impaired reaches (those rated as FAR-NA, FAR-D, and NF) would continue in impaired condition.

Alternatives 3, 3A and 4

Alternatives 3, 3A, and 4 use an array of different initial actions including range improvements, establishment of riparian pastures, riparian exclosures, implementation of different rotational grazing systems, Authorized Use adjustments, etc., to move impaired stream reaches towards PFC. Specific actions associated with each allotment are identified in Part 2 of this chapter. Table 3.11 identifies the number of reaches by allotment that would improve under initial and adaptive actions by alternative.

Table 3.11 — Number of stream reaches that would improve by action alternative

Allot #	Creek	# of Stream Reaches rated FAR-U or NA	# of Stream Reaches rated FAR-D or NF	Alternatives 3 & 3A				Alternative 4			
				FAR-U or NA		FAR-D or NF		FAR-U or NA		FAR-D or NF	
				Initial	Adaptive	Initial	Adaptive	Initial	Adaptive	Initial	Adaptive
128	Whitetail	-	2	-	-	2	-	-	-	2	-
129	Magpie	-	2	-	-	2	-	-	-	2	-
135	Mikes	-	2	-	-	2*	-	-	-	2	-
244	Whitetail	-	1	-	-	1	-	-	-	1	-

Allot #	Creek	# of Stream Reaches rated FAR-U or NA	# of Stream Reaches rated FAR-D or NF	Alternatives 3 & 3A				Alternative 4			
				FAR-U or NA		FAR-D or NF		FAR-U or NA		FAR-D or NF	
				Initial	Adaptive	Initial	Adaptive	Initial	Adaptive	Initial	Adaptive
256	Blacktail, Unnamed Trib[1]	2	3	1	1	2	1	2	-	3	-
258	Ash Coulee	1	2	-	1	1	1	1	-	2	-
277[2]	Scairt Woman	-	1	-	-	-	-	-	-	-	-
282	Whitetail/ Magpie/ Fantail	2	3	2	-	3*	-	2	-	2 1*	-
286	Betsy	2	1	2*	-	1*	-	2*	-	1*	-
287	Unnamed Trib	-	1	-	-	1*	-	-	-	1	-
289	Scairt Woman	-	1	-	-	1	-	-	-	1	-
300	Magpie	-	1	-	-	1	-	-	-	1	-
301	Magpie	-	1	-	-	1	-	-	-	1	-
Total		**7**	**21**	**5**	**2**	**18**	**2**	**7**	**0**	**20**	**0**

[1]Unnamed tributary of Blacktail Creek [2]Unable to determine the cause of NF condition for Scairt Woman Draw; will continue to monitor. *PFC achieved over several decades.

As identified in Table 3.11, Alternatives 3 and 3A's initial proposed actions would improve five of the stream reaches rated as FAR-U and FAR-NA. While all five reaches would improve, it is predicted that two of the reaches located in allotment 286 on Betsy Creek would take several decades to reach PFC because of channel incision and the lack of riparian vegetation. Adaptive actions are predicted to improve the two remaining reaches in allotments 256 and 258 on Blacktail and Ash Coulee Creeks.

Of the stream reaches rated as FAR-D or NF, a total of 19 would improve through the implementation of initial actions. However, seven of the reaches located in allotments 135, 282, 286, and 287 would take several decades to reach PFC due to channel incision, loss of water table, and the lack of riparian vegetation.

Under Alternative 4, initial proposed actions would improve all seven of the stream reaches rated as FAR-U and FAR-NA. While all seven reaches would improve, it is predicted that two of the reaches located in allotment 286 on Betsy Creek would take several decades to reach PFC due to channel incision and the lack of riparian vegetation.

Of the stream reaches rated as FAR-D or NF, a total of 20 would improve through the implementation of initial actions. However, three of the reaches located in allotments 282, 286,

and 287 would take several decades to reach PFC due to channel incision, loss of water table, and the lack of riparian vegetation.

Under all of the alternatives it is unknown if the management actions proposed would improve the NF status of a stream reach located on Scairt Woman Draw in Allotment 277. This is because the underlying cause of the functionality problem was not clearly due to the effects of livestock grazing, therefore it was not clear that changes in grazing practices would result in recovery during the time frame of this project.

Table 3.12 provides a comparison of the MGA 3-year average permitted use to the range of alternatives. As explained under the range section of this chapter, the 3-year average is used for comparison purposes and to more sharply define the differences between the alternatives.

A comparison of the Authorized Use (Preference) under Alternatives 2, 3, and 3A with the MGA 3-year permitted average shows an increase in AUMs ranging from 4 to 74 percent if permittees utilized their full Authorized Use, i.e., Preference. With regard to riparian conditions, it is not necessarily the number of cattle that is the issue, but the location. Alternatives 3 and 3A use a variety of actions, including fencing, to control access to water, creation of riparian pastures and exclosures, stock tank water management, etc., to move cattle away from riparian areas or control access. Therefore, even if numbers are higher, riparian conditions are still anticipated to improve. Allotment 258 would increase by 37 percent; however, a proposed riparian exclosure would mitigate an increase in Authorized Use. Oil and gas development has also adversely affected the reach associated with this allotment. The 74 percent increase in AUMs in Allotment 286, however, would likely cause increased impacts to the two affected stream reaches in the allotment.

Table 3.12 — Comparison of alternatives to MGA 3-year average summer permitted use for allotments with streams reaches rated as FAR-NA, FAR-D, or NF

Allotment Number	MGA 3 yr. Average Permitted Use (AMs)	MGA 3 yr. Permitted Use Converted to (AUMs)	Alts[1] 2, 3, 3A Authorized Use Converted to AUMs	Alts[1] 2, 3, 3A compared to MGA 3 yr. average Permitted Use (%)	Alt 4 Authorized Use AUMs	Alt 4 compared to MGA 3 yr. average permitted use AUMs (%)	Alt 4 compared to Alt 2, 3, and 3A (Preference) (%)
126/ 128	2188	2516	2708	+8	2178	-13	-20
129	897	1032	1254	+22	1090	+6	-13
134	239	275	292	+6	220	-20	-25
135	1432	1647	1793	+8	1559	-5	-13
256	1381	1588	1830	+15	1509	-5	-8
258	1510	1735	2382	+37	1529	-12	-29
277	1007	1158	1298	+12	1129	-3	-4
282	1855	2133	2441	+15	2859	+34	-13
286	160	184	320	+74	236	+28	-26
300	436	501	559	+4	486	-3	-6
301	1541	1772	1916	+8	1509	-15	-9

[1] Authorized Use for Alternatives 2, 3, and 3A is the same as Preference.

Comparing the MGA 3-year permitted average to Authorized Use under Alternative 4 shows a range of potential increases and decreases in Authorized Use. Allotments 129, 282, and 286 could see an increase in Authorized Use of 6, 34, and 29 percent, respectively. The remaining allotments could see decreases in Authorized Use ranging between 3 and 20 percent. Due to a proposed riparian exclosure which would be constructed along Magpie Creek where the impacted stream reach is located, the 3 percent increase in Allotment 129 would not affect current PFC ratings. Allotment 282 shows a 32 percent increase, associated with a reach located Magpie Creek and one on Whitetail. Because of a proposed riparian exclosure that would be constructed on this reach, the reach on Magpie Creek would not be affected by an increase in Authorized Use. The reach located on Whitetail Creek has been affected by accelerated runoff attributable to oil and gas development and roads directly above the watershed, so an increase in Authorized Use should not have much effect. Allotment 286 could see a 28 percent increase Authorized Use, which could cause additional impacts to the two affected stream reaches.

CUMULATIVE EFFECTS

Cumulative effects result from the combination of effects resulting from past, present, and reasonably foreseeable actions plus the direct and indirect effects of the alternatives. A discussion of past and present actions, reasonably foreseeable actions, and a summary of the cumulative effects by alternative follows.

Past and Present Actions

The following past and present actions have contributed to the existing NF and FAR stream reaches.

Livestock grazing has affected, and continues to affect, riparian areas in the project area. In the past, the effects of livestock grazing in combination with poor farming practices and drought resulted in loss of vegetation. This accelerated down cutting in streams such as Mikes and Blacktail Creeks, which resulted in loss of water tables, unstable banks, etc. Some of those effects have continued to the present. Livestock continue to graze riparian areas and utilize streams for watering. The use of riparian vegetation on some stream reaches in the project area has been high, which, in combination with mechanical effects such as trampling and trailing, has decreased some stream reaches' abilities to trap sediment and maintain stable banks and beds. Livestock actions have contributed to the poor riparian conditions of the 28 stream reaches rated at FAR and NF in the project area.

Past oil and gas development has resulted in the creation of an all-weather road system. Roads can alter hydrologic patterns by concentrating runoff in ditches, directing water through culverts, depriving some down slope segments of moisture from natural runoff, and inducing incision of channels and erosion of drainage ways due to the increased volume and velocity of runoff. This has primarily occurred in the Magpie, Blacktail, and Whitetail Creek watersheds.

Where channel incision and gully formation has occurred, it has generated excessive amounts of sediment that overwhelms the transport capacity of downstream reaches. Deposition ensues downstream with adverse effects on riparian vegetation.

Currently, oil and gas activity is primarily focused around maintenance of existing oil and gas facilities and maintenance of oil and gas roads. These activities still offer the opportunity to put sediment into the streams and concentrate runoff. Oil and gas activity will continue; however, road construction techniques have improved. Past actions adversely affecting streams are being corrected, such as the future replacement of a low-water ford with a bridge on Blacktail Creek. The implementation of BMPs will help mitigate the effects of roads associated with the streams in the project area.

Noxious Weeds/Invasive Grasses. It is unknown when noxious weeds and invasive grasses first appeared in the project area. Some invasive species appeared sometime in the 1930s, such as crested wheatgrass, which was successfully used in the reclamation of sub-marginal lands. The primary past, current, and future effect of these groups of plants is that they alter or replace native plant communities, which in turn affects the functionality of riparian areas by altering the diversity of bank-forming vegetation thus increasing the potential for eroded banks and stream bars.

Wildfires have been actively fought on the LMNG and adjacent private and state lands since Euro-American settlement began. The result has been an increase in some tree and shrub communities and a reduction or loss of vigor in plant communities where fire plays a role in maintaining the health of those systems. Wildfire may alter upland vegetation, which may

increase overland flow in heavily utilized areas and indirectly affect stream functionality; however, these effects are generally temporary in nature. Riparian areas tend to be more resilient to fire due to the presence of moisture, which tends to alter fire behavior. The presence of moisture also helps burned riparian areas recover more quickly, as evidenced by the recovery of Fantail Creek which burned in 1988.

Drought is a recurring natural event in western North Dakota. Approximately 51 percent of stream reaches rated as PFC would generally be the least or last to be impacted by drought. However, the remaining 49 percent of stream reaches rated as FAR or NF have a reduced ability to withstand the effects of drought due to the loss of or lowered water tables, increased evaporation due to the loss shading vegetation, etc.

Farming of sub marginal lands in the 1930s in combination with several other factors resulted in massive erosion, sediment delivery, and accelerated stream down cutting in some cases. The cultivation of crops is no longer conducted on the LMNG; however, it does occur on the intermingled private lands in and adjacent to the project area. This activity might be contributing sediment to the streams of the area, but it is uncertain if this is occurring and, if so, to what degree this activity may be impacting streams.

Reasonably Foreseeable Actions

Elkhorn Ranchlands. The recently purchased Elkhorn Ranchlands require that the Grasslands Plan be amended to establish management direction for the newly acquired lands. Approximately 800 acres of the 5,200-acre Elkhorn purchase are directly associated with five of the allotments in the North Billings project. Under the proposed amendment, these lands would be managed in accordance with the adjacent management area — MA 3.65 Rangelands with Diverse Natural Appearing Landscapes. In the interim, as directed by 36 CFR 254.3(f)(2008), this portion of the purchase is being managed in accordance with the adjacent MA 3.65. If the proposed action is selected and implemented there would be no change over the current situation.

The proposed Plan amendment also includes the establishment of a special interest area (SIA) for the remaining 4,400 acres of the purchase and the approximately 17,160 acres contained in grazing allotments 279 and 280 that were associated with the Elkhorn Ranchlands when they were privately owned. If implemented, the SIA would establish a forage reserve on those acres. The reserve would provide a place to move livestock to in the event an allotment is burned out or if management actions such as a prescribed fire or additional rest were needed to help restore an allotment.

Travel Management Plan. An environmental assessment (EA) for travel management on the LMNG was released for comment in 2010. The proposed action for this EA would close all single use oil and gas roads, unauthorized roads i.e. two tracks, and an additional 18 miles of system roads in the project area. The travel management plan is expected to have minimal effects on grazing permit holders unless single-use roads are blocked from access. If access were to be blocked, then additional two-track roads could be created as permittees can travel cross county to administer their permits. Depending on the location of the new roads, this may lead to increased

erosion, increased sediment transport to streams, adverse effects on wildlife, and possible impacts to woody draws.

Oil and Gas Development. The Forest Service has received five applications for permit to drill (APDs) on NFS lands in the project area. The APDs seek to drill oil and gas wells. The well pads associated with each well would be approximately 4 to 5 acres in size encompassing about 22 acres total. Two wells would reuse all or a portion of existing reclaimed well pad sites and the remaining pads would involve new construction. Approximately 4,250 feet of roads would be built to access the well sites, of which 2,900 feet of would be located on old reclaimed road sites. The wells are located in Allotments 127, 135, 287. Three of these wells are not located near any riparian areas; however, two of the proposed wells are located 400 feet or greater from Mikes Creek. These wells would be evaluated by the Forest Service district hydrologist during the NEPA process for these wells.

Cumulative Effects by Alternative

This section summarizes direct and indirect effects of the alternatives and the effects of reasonably foreseeable actions on streams and riparian areas. These effects in combination with past and present effects combine to create cumulative effects.

Alternative 1, in combination with reasonably foreseeable travel management, provides the best opportunity of all the alternatives for the most rapid recovery of all NF and FAR stream reaches to PFC due primarily to the removal of disturbance associated with livestock, which affords the best opportunity for riparian vegetation recovery and stream bank stabilization. Implementation of the travel management plan offers the potential to improve FAR and NF stream reaches by closing or reducing traffic on roads that may be contributing sediment to streams. Two foreseeable oil and gas wells are located 400 feet or greater from Mikes Creek. Before development, these wells would be reviewed by the Forest Service district hydrologist and mitigation measures would be implemented, if needed, to prevent potential adverse impacts to Mikes Creek.

Alternative 2 may see some improvement to FAR and NF rated stream reaches because of the potential beneficial effects of the Elkhorn Ranchlands Grasslands Plan amendment. The forage reserve portion of the proposed amendment offers opportunities to potentially hasten the rate of recovery of some stream reaches by offering an alternate source of forage, thereby providing additional recovery time for FAR and NF stream reaches. The potential effects associated with the travel management plan and oil and gas development are the same as identified under Alternative 1. However, because this alternative maintains the existing Authorized Use levels, rotations, etc., the opportunity to achieve a cumulatively positive effect in FAR and NF stream reaches is the least likely of all the alternatives.

Alternative 3, initial actions would improve riparian conditions in 18 of the 21 stream reaches identified as FAR-D or NF. Seven of the 18 reaches are rated as NF, and, though improvement is expected during the next 10 to 15 years, it is predicted to take several decades to achieve PFC in these reaches. Five FAR-U and FAR-NA stream reaches would also improve, however, two of

these five reaches are expected to take several decades to accomplish PFC. The potential effects associated with the travel management plan, oil and gas development, and the Elkhorn Ranchlands Grasslands Plan amendment are the same as those identified under Alternatives 1 and 2, respectively.

Alternative 3A would not affect any of the FAR or NF stream reaches differently than Alternative 3 so the cumulative effect of these two alternatives is the same.

Alternative 4, initial actions would improve 20 of the 21 FAR-D and NF stream reaches; however, two of the reaches located in Allotments 282 and 286 would take several decades to reach PFC. Seven FAR-U and FAR-NA stream reaches would also improve. However, two of the seven reaches are expected to take several decades to accomplish PFC. The potential effects associated with the travel management plan, oil and gas development, and the Elkhorn Ranchlands Grasslands Plan amendment are the same as those identified under Alternatives 1 and 2, respectively.

Under all of the alternatives it is unknown if their management actions will improve the NF status of a stream reach located on Scairt Woman Draw in Allotment 277. This is because the underlying cause of the functionality problem was not clearly due to the effects of livestock grazing, therefore it was not clear that changes in grazing practices would result in recovery.

Adaptive Management. Implementation of adaptive management options under Alternatives 3, 3A, and 4, including actions identified in the tool box, would improve FAR and NF stream reaches not addressed by the initial actions. In terms of adaptive management, the greatest difference between these alternatives is the rate of change.

In most cases, alternatives 3 and 3A initiate more indirect actions to deal with riparian concerns, such as rotation changes, water management, etc. Determining whether these actions are effective requires time, generally 3 to 5 years, so this time is lost if the actions are determined to be ineffective. Alternative 4 implements a higher number of direct riparian actions such as riparian pastures, exclosures, etc., which directly improve riparian areas in a shorter time frame, as shown by riparian enclosures and pasture on Ash Coulee Creek.

Consistency with Grasslands Plan—Riparian

The following are the primary range-related standards and guidelines associated with this project. For a complete listing see the Grasslands Plan Standard and Guide Consistency Table located in the Supporting Documentation – Grasslands Plan Documents & Misc. section of the Project Record.

Manage land treatments to conserve site moisture and to protect long-term stream, wetland, and riparian area health from damage by increased runoff. **Standard**

All of the alternatives except Alternative 2 implement actions to improve the mosaic of herbaceous structure towards Grasslands Plan Objectives. This would reduce any excess overland flow that may be occurring; however, there is no evidence that excessive runoff is occurring other than in localized situations in response to sudden short-term, high-intensity

downpours. Implementation of different actions under Alternatives 3, 3A, and 4—such as the creation of riparian pastures and exclosures, changes in rotations, and/or adjustments of Authorized Use—would improve riparian vegetation on impacted stream reaches and improve stream health.

Design activities to protect and manage the riparian ecosystem. Maintain the integrity of the ecosystem, including quantity and quality of surface and ground water. **Standard**

Activities such as drilling rangeland wells, construction of rangeland pipelines, placement of stock tanks, etc., would be carried out under Forest Service construction specifications and applicable BMPs. These facilities would not be placed in riparian areas and are often used with a goal of pulling livestock away from riparian areas in order to minimize impacts resulting from livestock.

Maintain and protect the hydrologic regime that supplies ground water to the wetlands in order to support species and habitats that depend on the existing water table and its natural variations. **Standard**

Wetlands in the project area are mostly narrow intermittent green bands located directly adjacent to intermittent streams. The primary factor that may affect the ground water regime is rangeland water wells. Several wells are proposed under Alternatives 3, 3A, and 4; however, the Forest Service district hydrologist has determined that the rate of withdrawal of these wells would not affect ground water supplies to the point at which there would be an adverse effect to wetlands in the project area.

Allow only those actions next to perennial and intermittent streams, seeps, springs, lakes, and wetlands that maintain or improve long-term proper functioning of riparian ecosystem conditions. **Standard**

See the response to the next standard.

Maintain long-term ground cover, soil structure, water budgets, and flow patterns of wetlands to sustain their ecological function and meet regulations found in Section 404(b)(1) of the Clean Water Act. The 404 regulations were established by the Environmental Protection Agency and constitute the substantive environmental criteria used in evaluating activities. **Standard**

- Maintain enough water in perennial streams and ground water tables to sustain or improve function.
- Manage water-use facilities to prevent gully erosion on slopes, sediment discharge, and bank damage to streams.
- Design projects to minimize sediment discharge into streams, lakes, and wetlands.
- Protect seeps, springs, wetlands, and riparian ecosystems.

Projects proposed under Alternatives 3, 3A, and 4 include such elements as fencing springs and reservoirs, developing rangeland water wells, placing stock tanks, and constructing rangeland pipelines (see Table 2.11). Fencing of springs and reservoirs would provide additional protection to water sources. Rangeland water wells, pipelines, and placement of stock tanks

would not be located near riparian areas and would be constructed in accordance with Forest Service specifications and guidelines. Implementation of these actions would include BMPs to further assure that these types of projects would not adversely affect long term ground cover, soil structure, water budgets or flow patterns associated with wetlands.

WOODY DRAWS

Introduction

Euro-American settlement of the Northern Great Plains (NGP) during the late 1800s brought large and often excessive livestock numbers (Holechek et al 2004) that likely had adverse effects on many woody draw systems. Trees from woody draws were harvested for fuel and construction needs, and springs along drainages were developed for human and livestock consumption. Ponds or reservoirs were eventually constructed to store ephemeral flow along drainages, and these ensured high livestock concentrations along woody draws. Rangeland fires that likely controlled the encroachment of woody species into grassland habitat occurred at moderate to high frequency prior to European settlement, both from natural lightning strikes and as set by indigenous tribes (Grant and Murphy 2005, Higgins 1984, Higgins et al 1989, Sieg 1997). Upon Euro-American settlement, intensive control of wildfires was conducted as a necessity for protecting property, livestock, and agricultural assets, and increased the potential spread of woody draws and several other woody communities (Bailey 1976, Grant and Murphy 2005, Lura 2009, Higgins et al. 1989). It is also possible that high levels of livestock grazing disturbances assisted the expansion of woody species by decreasing the vigor, density, and structure of grassland communities, thus increasing their susceptibility to woody invasion (Butler 1983). However, comparison of aerial photographs from 1939 and 1953 with 2009 indicate that woody draw expansion has been minor in the project area. These comparisons are contained in the Botany Report (Project Record, Specialist Reports and Notes).

Woody draw habitats in the project area tend to occur as linear stringers along various ephemeral and intermittent drainages and adjacent slopes with moderately increased amounts of available moisture. These habitats constitute less than 10 percent of the LMNG, which increases their attractiveness for many wildlife species and a variety of human-related uses. Structural and ecological diversity provided by woody draws within the semi-arid grassland-dominated landscape attracts a disproportionately high number and diversity of wildlife species seeking forage, cover, and nesting habitat (Rumble and Gobeille 1998; Hodorff et al. 1988; Sieg et al. 1984; Hopkins 1983a,b; Grosz et al. 1981; Seabloom et al. 1978; Stewart 1975). Combined with low or sheltered topographic positions, woody draw structure provides the primary source of shade in the summer and thermal cover in the winter. Woody draws trap, store, and release limited moisture, sediment, and nutrients, thus influencing downstream riparian systems.

Livestock also seek the amenities of woody draws that attract wildlife. Shade and cooler temperatures reduce heat stress and the torment of horn flies (*Haematobia* spp) and other insect pests. The increased moisture and shaded understory of woody draws result in lengthened green periods of herbaceous growth that along with several shrub species and tree saplings can attract

livestock. Developed water sources involving springs and reservoirs have been constructed along many woody draw drainages, and result in heavy livestock concentrations. The terrain along woody draw drainages is often gentler than the surrounding topography, so these sites often serve as travel corridors for daily livestock movements to and from water developments and forage areas.

As disturbance from livestock increases, successful tree and shrub regeneration decreases and mature or decadent trees begin to dominate the population. Structure of the shrub layer similarly decreases, often with an increased dominance of low-statured western snowberry. Kentucky bluegrass begins to dominate the herbaceous layer and can form a dense sod that can impede the reproductive success of woody species by inhibiting seed germination and increasing competition with developing seedlings. Relatively static or decreasing populations of the tree and shrub components are indicators of poor ecologic conditions and a trend towards the woody draw community being replaced by shrub and grass communities (Bjugstad and Girard 1984; Boldt et al. 1978; Butler 1983; Butler and Goetz 1984; Girard et al. 1987; Hansen et al. 1984a, 1995; Hopkins and Ryan unpublished; Jensen 1991; Lesica 1989; Lesica and Atthowe 2001; Nelson 1960; Severson and Boldt 1978; Uresk et al. 2009).

Woody draws also attract recreation users for a variety of uses including hiking, bird watching, hunting, trapping, and firewood harvest. Hunting, trapping, and firewood harvest associated with woody draws in the region of western North and South Dakota, eastern Montana, and eastern Wyoming, have been estimated to contribute 38 million dollars per year to local economies when combined with related costs of fuel, lodging, and incidental expenses (Bjugstad and Sorg 1985).

There are a variety of woodlands located on the LMNG; however, there are primarily two types of woodlands located in the project area, Rocky Mountain juniper and green ash. The Rocky Mountain juniper stands are located primarily in the Badlands geographic area and are expanding, likely due to the lack of fire on the landscape. As described in the Botany Report (Project Record, Specialist Reports and Notes), the expansion of Rocky Mountain juniper into grassland habitat is especially evident in the Badlands geographic area, but is also occurring in the Rolling Prairie, and is beginning to constitute greater amounts of woody draw tree cover within both of these settings.

Green ash woodlands are generally composed of a variety of hardwoods, with green ash being the dominant tree and American elm the most frequent codominant. Other tree species found in this type of woodland include box elder (*Acer negundo* L.), quaking aspen (*Populus tremuloides* Michx.), plains cottonwood, and peachleaf willow. These species generally occur as inclusions in proximity to springs or other sites of increased moisture. Dominant shrubs of the understory usually include chokecherry, serviceberry (*Amelanchier alnifolia* Nutt.), and western snowberry , but other common species include northern hawthorn (*Crataegus rotundifolia* Moench), American plum (*Prunus americana* Marsh.), gooseberry (*Ribes* spp.), aromatic sumac (*Rhus aromatica* Ait.), buffaloberry (*Shepherdia argentea* (Pursh) Nutt.), and wild rose (*Rosa woodsii* Lindl.).

Under light or relatively undisturbed conditions, green ash woody draws exhibit a range of tree age classes or population structure that include prominent amounts of seedlings and saplings, young to middle-aged trees, and a mature overstory that create a moderately dense canopy. Dense shrub layers of varying diversity and height add to the structural complexity. A mosaic of sedge and native grasses mixed among leaf litter and mineral soil characterize the ground layer.

This analysis focused on the condition of green ash woodlands, hereafter referred to as woody draws, because previous analyses have suggested declining conditions of this habitat on the LMNG (FS 2002, Duxbury 2009, and others).

Spatial and Temporal Setting

The area for the woody draw analysis consists of the NFS lands located within the project area boundary, because management decisions within this area will have an effect primarily on woody draws within, not outside of, the project area. The temporal scope of the analysis is 10 to 15 years.

Methodology

Four data sources were used to assess woody draw conditions and included:

1) A long-term cooperative study between the North Dakota Game and Fish Department (NDGF) and the Forest Service;

2) Woody draw surveys conducted by the Medora Ranger District during 1998, and 2005 through 2007;

3) Sampling conducted by North Dakota State University (NDSU) during 2008 and 2009 as part of a cooperative agreement between the Forest Service, MGA, and NDSU; and

4) Use of aerial photography to determine the change in the extent of woody draws.

The four sets of data differed in methodology and years of sampling and are briefly described below.

Cooperative NDGF-Forest Service Study

A cooperative woody draw study between the Forest Service and NDGF was initiated in 1987. The study included 17 randomly located, permanent sites within the project area. These sites have been sampled every 5 years since 1987. Within the selected woody draws, 30x75 foot macroplots were established. Within each macroplot, the number and species of all trees over 1 inch dbh (diameter at breast height) were measured with a diameter tape and tallied into 1-inch dbh classes (8 to 9 inches, 9 to 10 inches, etc.). The density of tree saplings (≥2.5 feet tall and <1 inch dbh) and seedlings (<2.5 feet tall) were measured along two 1.5-x75-foot belt transects extending the length of the macroplot. Saplings were also counted along five 1.5-x6-foot belt transects placed along the 30-foot baseline of the macroplot. The 1.5-x6-foot belt transects were also used to count the density of shrub stems by species. The percent canopy cover of

chokecherry and western snowberry were measured from twenty-five 20-x50-centimeter Daubenmire plot frames spaced at 3-foot intervals along the two 75-foot belt transects. Woodland class structure codes were recorded for each macroplot beginning with the third measurement period in 1997.

Long-term monitoring of the NDGF-Forest Service woody draw sites was assessed to evaluate any trends in tree density and shrub cover over 20 years of sampling. Although there were 17 potential sites for this analysis, 1 site was excluded because of a wildfire and 3 sites were excluded because of non-measurement during one or more of the sample years.

FOREST SERVICE SURVEY 1998

Landscape level assessments of woody draw communities were conducted in 1997-1998 for preparation of the LMNG Rangeland Assessment (USDA Forest Service 2002). Eighty-one randomly selected sample sites occurred in the project area and were included in the present assessment of existing conditions.

Sampling involved a traverse of woody draw communities at least 5 acres in size while conducting ocular estimates of the percentage of canopy cover for tree, shrub, and herbaceous species. Complexes of distinct communities based on the dominant woody species were identified, apportioned as a percentage of the total woody community, and assigned a Woodland Structure Code (WSC). Ocular estimates of canopy cover for different age classes of tree and shrub species were recorded. Representative segments of each site were photographed. Seral stages of woody draw communities were determined from a previously developed model that utilized values of tree basal area and canopy cover of chokecherry and western snowberry (Uresk, unpublished). Condition classes of Healthy, At Risk, and Unhealthy were assigned to each sample site based on the WSC, the degree of woody species regeneration, estimates of seral stage, the presence of noxious weeds, and supplemental observations such as erosion, trailing, livestock and wildlife browsing, the extent of plant diseases and pests such as Dutch Elm, leaf blight, and tent caterpillars, and the degree of dead or dying trees.

The 1998 surveys' condition parameters that identify the effects of livestock use on woody draws were separated from other less relevant survey information and are used in this analysis. Adverse impacts, such as Dutch Elm or other diseases, invasive/noxious weeds, and beaver-cut trees not directly linked to excessive livestock use, were not used to assign At Risk or Unhealthy condition ratings. In order to focus on adverse livestock related impacts and maintain consistent rating criteria, the original condition ratings for some of the 1998 Forest Service sample sites were adjusted based on a review of the previously collected data and site revisits during 2005 through 2007. The majority of rating adjustments involved an increase in condition class.

FOREST SERVICE 2005-2007 SURVEY

To supplement existing data, woody draw surveys were conducted at 187 sites during 2005 through 2007. Potential sample sites were selected from aerial photographs to characterize existing conditions and variability within pastures and allotments. Approximately 41 of the 1998

Forest Service sites were revisited to ensure that the previous condition ratings were based on the same criteria as the 2005 through 2007 ratings. The sampling methods for 2005 through 2007 surveys followed the Forest Service 1998 methodology, except that there was no minimum acreage for a sample site and complexes or inclusions identified by a change in the dominant tree and/or shrub species were not delineated. Ocular estimates of the percentage of canopy cover were recorded for the most prominent tree and shrub species and each surveyed site was assigned an average WSC. Canopy cover by tree species was recorded among size classes of saplings, pole-sized trees, medium-sized trees, and large trees. Tree densities by 1-inch dbh classes were recorded from circular plots located to represent average conditions of the woodland. These plots were generally established with a 50-foot radius, but sometimes reduced to a 30-foot radius when tree sapling and shrub layers were dense enough to make access and counting difficult. Supplemental observations were recorded similarly to the 1998 samples and representative segments of most sites were photographed.

NDSU 2008-2009 Surveys

Twenty-nine randomly selected sites were sampled by NDSU. The sample protocol is located in the Supporting Documentation – Range section of the Project Record, but, in summary, a 328-foot plot centerline was established parallel with the long axis of the woody draw drainage and two transects were established 49 feet on either side of the centerline. The density of mature trees (≥3.1 inches dbh) and saplings (<3.1 inches dbh and > 8.2 feet tall) were recorded from four 49-x 49-foot squared (ft^2) plots equally spaced along the centerline and between the two outer transect lines. Herbaceous or ground layer measurements included plant basal cover, canopy cover, percent frequency, and biomass production. Basal cover and canopy cover were measured with a total of 30 ten-pin point frames spaced along each of the two outer transects. Grass species frequency and forb and shrub density were measured with a total of 30 plot frames measuring 1.3 ft^2 spaced along each of the two outer transects. Biomass clippings were collected from four 1.92-$foot^2$ circular plots.

Aerial Photo Assessment of Historical change in woody draw extent

To evaluate potential changes in woody draw extent, 8- inch to the mile (1:7920) historical aerial photographs from 1939 and 1951 were obtained from the Soil Conservation District office in Dickinson, ND for comparison with a 2009 digital photo layer (USDA FSA 2009). Historical photo coverage was not complete for the entire project area for the years of 1939 and 1951. The historical photos covered primarily the Rolling Prairie geographic area and a smaller amount of the Badlands geographic area. A partial set of 1939 Forest Service 4-inch to the mile photographs (1:15840) were used to fill in gaps across the project area.

Portions of the historical aerial photographs were digitally scanned and saved as bitmap files for comparison with the 2009 digital layer. The picture files for each site and year were resized to similar scales for comparison and to estimate changes in woody draw acreage or canopy density.

Affected Environment—Woody Draws

This section provides a general description of woody-draw-related information for the project area. A detailed description of the existing condition of woody draws in each allotment is provided in Chapter 3 Part 2.

EXISTING CONDITION

Of the 43 allotments in the project area, five (132A 133D5, 141, 220 and 248) contained no green ash woody draws. Six allotments (127, 135, 249,258, 282, and 283) met woody draw objectives. The remaining allotments exhibited varying percentages of Healthy, At Risk and Unhealthy woody draws. The definition of woody ratings is located in Chapter 1 in the Key Issues section.

Of 275 woody draws surveyed by the Forest Service and NDGF, 51 percent were rated Healthy, 42 percent were rated as At Risk, and 7 percent were Unhealthy. Table 3.13 identifies by allotment the proportion of woody draws that were rated as Healthy, At Risk, or Unhealthy.

Table 3.13 — Percentage of sampled woody draws rated as Healthy, Unhealthy, or At Risk by allotment

Existing Condition				Existing Condition			
Allot #	Percent			Allot #	Percent		
	Healthy	At Risk	Unhealthy		Healthy	At Risk	Unhealthy
126	31	69		**241**	17	83	
127	80	20		**243**	67	33	
128	63	32	5	**244**	75	25	
129	56	44		**249**	100		
130	27	67	6	**256**	50	50	
131	56	44		**258**	86	14	
132H		100		**272**	50	50	
133	33	67		**277**	50	42	8
134	71	15	14	**278**		50	50
135	100			**281**	20	60	20
136/139	40	40	20	**282**	81	19	
140		100		**283**	100		
142	40	60		**286**		100	
158	69	23	8	**287**	33	50	17
221		100		**288**		100	
230	67	33		**289**	45	33	22
237	60	40		**300**	50	50	
239		100		**301**	47	35	18
240	30	70		**302**	50	40	10

Healthy woody draws (see Figure 3.3, a and b) exhibited the greatest average tree (339/acre) and sapling density (359/acre) and shrub canopy cover. Tree saplings were common among the tall shrub (chokecherry, serviceberry) layer that was generally dense enough to inhibit access. Although the herbaceous layer of Healthy communities often contained areas of Kentucky bluegrass, longbeak sedge (*Carex sprengelii* Dew. ex Spreng.) and native grasses were usually prominent, as were bare mineral soil and woody leaf litter.

a) **b)**

Figure 3.3 — Healthy woody draw conditions.

Photos a) and b) show Healthy woody draw conditions; note the mixed tree age classes and dense shrub layers of desirable species, i.e., green ash, serviceberry, chokecherry, etc.

About 42 percent of the surveyed woody draws were rated At Risk due to a scarcity of tree saplings (<85 /acre) and poorly represented tall shrub layers (<11 percent canopy cover) and/or a dominance of short shrub layers, i.e., western snowberry (see Figure 3.4, a and b). Woody draws in At Risk condition consistently exhibited evidence of high livestock use including browsing and mechanical damage to trees and shrubs, trampling, and damage caused by livestock lounging within the shaded understory. Livestock trails observed in woody draws tended to involve multiple intertwining paths that were usually barren and exhibited dense and deep hoof prints that compact the soil.

At Risk conditions in photo a) shows some mixed tree ages but no sapling/shrub layer is present and the herbaceous layer is dominated by Kentucky bluegrass sod and dandelion (*Taraxacum officinale* Weber). Photo b) is dominated by old and middle-aged trees with no saplings. A low shrub layer of western snowberry is present but the desired mid and tall shrub layers are absent.

a) b)

Figure 3.4 — At Risk woody draw conditions.

About 7 percent of the sites were rated as Unhealthy and exhibited the same livestock impacts described under the At Risk discussion above (Figure 3.5, a and b). Unhealthy conditions in photos a and b show remnant tree populations with only a few shrubs and younger trees confined to scattered patches.

a b

Figure 3.5 — Unhealthy woody draw conditions.

Basal sprouting from mature or decadent trees was common and constituted the majority of saplings among several of these sites, but heavy browsing of the basal sprouts and independently establishing saplings was typical (Figure 3.6). Low densities of tree sapling (<61/acre) and smaller 1- to 4-inch dbh classes (<44/acre) indicated that minimal successful recruitment was occurring. Kentucky bluegrass and other invasive grasses usually dominated the herbaceous layer with or without western snowberry shrubs. When bare ground was present among Unhealthy sites, it was generally trampled, compacted, and rilled, decreasing the ability of the drainage to trap or slow the movement of sediment and moisture. Although tall shrubs were usually present, they tended to be confined to scattered patches along the least accessible slopes of a woody draw and constituted less than 6 percent of the shrub canopy. Some of the Unhealthy woody draws are likely to revert to grass or western snowberry/grass communities due to a lack of tree regeneration and loss of all or most of the tall shrub layers.

As identified above, the proportion of tree and shrub canopy cover and tree numbers vary with the condition of a woody draw. Tables 3.14 and 3.15 summarize tree and shrub cover and tree density by condition class for the surveyed woody draws.

Figure 3.6 — Decadent box elder tree with more than 100 basal sprouts that have been regularly browsed.

Table 3.14 — Characteristics of tree and shrub canopy cover among Healthy, At Risk, and Unhealthy sites

	Proportion Of Sites with >39 Percent Tree Canopy Cover	Proportion Of Sites with >34 Percent Canopy Cover of Tall Shrub Layer	Average Chokecherry Canopy Cover	Average Western Snowberry Canopy Cover	Proportion of Sites Dominated by Grass Below 2.5 Feet
Healthy	51	59	24	13	18
At Risk	25	7	11	21	65
Unhealthy	5	0	6	14	82

Fifty-one percent of Healthy woody draws exhibited more than 39 percent mature tree canopy cover, compared to 25 and 5 percent for At Risk and Unhealthy woody draws. The table shows that average tree canopy cover increased with increasing woody draw condition ratings. A similar relationship was observed among the tall shrub layer, with 59 percent of the Healthy woody draws exhibiting more than 34 percent canopy cover for the tall shrub layer compared to 7 percent for At Risk and none for Unhealthy woody draws. At Risk sites exhibited the greatest cover of western snowberry, while Unhealthy sites contained the least amount of any shrub structure and the greatest degree of grass dominance in the ground layer.

As shown in Table 3.15, the average sapling density was more than four times greater among Healthy than At Risk or Unhealthy woody draws. Tree densities among size classes up to 5 inches dbh were at least twice as great among Healthy compared to At Risk and Unhealthy woody draws. Tree density among the 5- to 10- and greater than 10-inch dbh classes were

slightly to moderately greater among Unhealthy sites compared to Healthy and At Risk sites, but total tree density among Healthy sites was more than twice as great as Unhealthy and At Risk sites. As identified in Chapter 2 the number of saplings is key to a healthy woody draw. Without saplings there would be no recruitment of trees into the different tree size classes found in a healthy woody draw, which would eventually result in the loss of the woody draw.

Table 3.15 — Tree density per acre by size classes among Healthy, At Risk, and Unhealthy sites

Tree DBH Size Class (Inches)	Saplings							
	0-1	1-2	2-3	3-4	4-5	5-10	>10	total
Healthy N=31	359	59	40	51	45	108	36	698
At Risk N=44	85	12	9	14	13	77	37	247
Unhealthy (N=10)	61	8	14	22	21	119	56	301

Topographic influences on woody draw conditions were evident, as Healthy sites were most frequently located along relatively inaccessible drainages with steep side slopes. At Risk and Unhealthy woody draws were most commonly found in relatively open drainages with low topographic relief. The influences of topography were also evident within individual woody draws that contained a relatively flat accessible drainage bottom and steep side slopes. This type of woody draw exhibited high livestock use and poor conditions on the flat bottomed portion of the woody draw, while the steep side slopes of exhibited less livestock use and better conditions.

Several drainages among all condition classes supported ephemeral or intermittent pools, fens, developed and undeveloped springs, dugout ponds, and beaver ponds. These water sources and associated woody draws tended to be heavily disturbed by livestock trampling (Figures 3.7 and 3.8).

Figure 3.7 — (Left) Ephemeral water sources with typical livestock trampling.

Figure 3.8 — (Right) Intermittent water sources with typical livestock trampling.

Headcuts were moderately common along several drainages, but, with few exceptions, these were partially vegetated and not particularly active. Wide or deep narrow headcuts, which hampered livestock access, were often sites of increased green ash regeneration (Figure 3.9).

Figure 3.9 — Young green ash establishing immediately downstream of a 10- to 15-foot headcut and the terminus of the existing woody draw.

There was evidence of poor woody draw conditions occurring among pastures with high proportions of invasive grasses in the uplands. This may be the result of greater use of the woodlands for browse and green herbaceous species when palatability of the upland grasses decreases.

It was observed during field surveys that there was a general correlation between the number of woody draws in a pasture and their condition. As the number of woody draws increased, so did their condition. This is likely due to livestock effects being spread across a larger acreage and number of locations compared to a small number of woody draws, which tends to concentrate livestock use and effects.

Cooperative Monitoring Results

Of the 29 NDSU woody draw surveys conducted in 2008 and 2009, 23 were within green ash woody draws. Six sites were dominated by Rocky Mountain juniper and were not evaluated for condition classes. Based on comparisons with average measurements from the NDGF-Forest Service data sets and tree and shrub densities reported from other researchers (Project Record, Specialist Reports and Notes, Botany Report), the proportion of Healthy, At Risk, and Unhealthy sites among the NDSU sample sites was about 22, 65, and 13 percent, respectively. However, the lower proportion of Healthy woody draws among the NDSU sites is largely attributed to differences in sample methodology. For instance, sampling of the NDSU plots was concentrated along portions of the drainage bottoms where livestock disturbances are greatest. Although the 17 long-term Forest Service/North Dakota Game & Fish (FS/NDGS) monitoring plots were also concentrated along the drainage bottoms, greater familiarity with the sites and/or additional sampling by other Forest Service surveys provided information to evaluate average conditions across the entire woody draw area. Thus, Healthy conditions in portions of the site had the

potential to compensate for At Risk or Unhealthy conditions in other portions of the site such as the drainage bottom. Of seven sites sampled by both the Forest Service and NDSU, three sites rated Healthy based on Forest Service surveys were rated At Risk when comparing the NDSU data with average tree density measurements from the FS/NDGF data. One site rated At Risk by the FS/NDGF surveys was Unhealthy based on the NDSU data. Three of the seven overlapping sample sites were consistently rated in both data sets.

NDSU sampling provided quantitative measurements of the herbaceous understory composition, and indicated that invasive grasses and primarily Kentucky bluegrass were the dominant species in all but three of the 23 sample sites.

Woody Draw Trend

The trend in woody draws was analyzed by reviewing average tree density and shrub canopy cover information and through comparison of historic and current aerial photographs. Tree-size class and shrub canopy cover information was obtained from 13 permanent FS/NDGF woody draw sample sites measured every 5 years between 1993 and 2008. Aerial photography from the 1930s and 1953 was compared to 2009 photography to determine if woody draws had expanded in size.

From 1993 to 2008 the average density of all trees greater than one inch dbh decreased by about five percent, from 322 to 308 trees/acre. This decrease has occurred mostly in the 4-9-inch dbh class, while smaller and larger size classes showed slight to moderate increases in density (Figure 3.10). This suggests that the 4-9-inch dbh trees are progressing to larger size classes but are not being fully replaced by the progression of smaller diameter trees into larger size dbh classes.

Duxbury (2009) found a 25 percent decrease in the density of trees greater than 1 inch dbh between 1988 to 2003 among sample plots across the LMNG that were situated along the drainage bottoms (Project Record, Specialist Reports and Notes, Botany Report). Jensen (1991) concluded from the 1988 data that 62 percent of the green ash woody draws were trending away from the potential climax community.

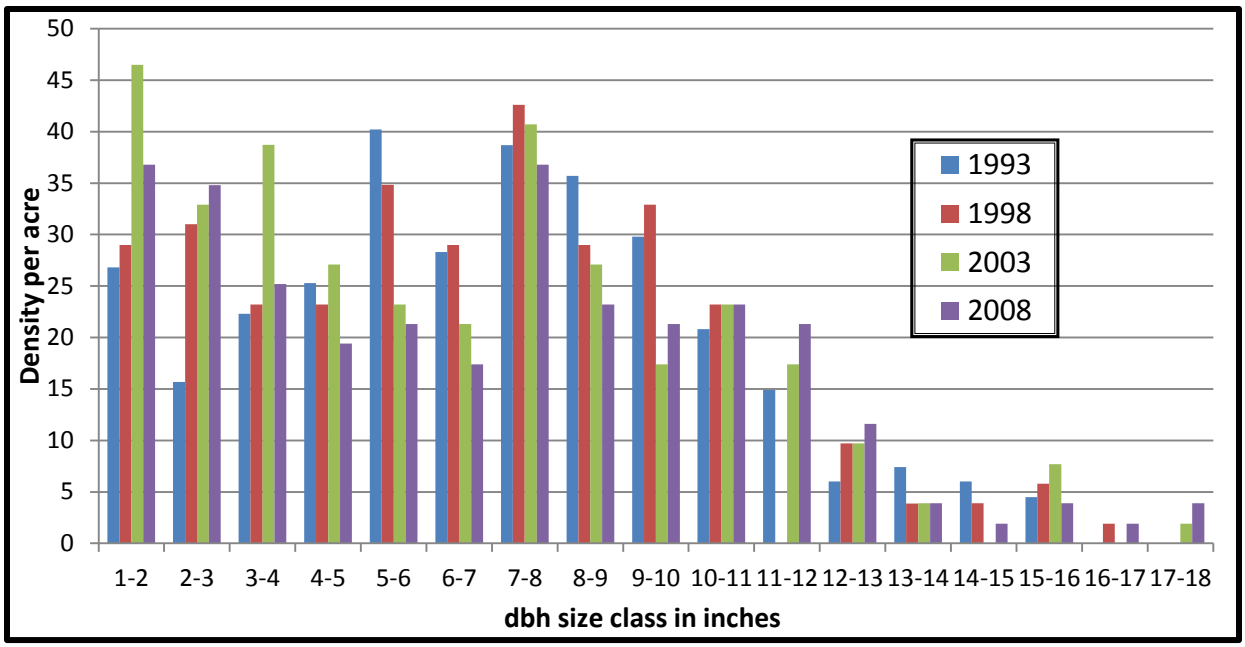


Figure 3.10 — Tree density by size class among Healthy, At Risk and Unhealthy woody draws.

Saplings less than 1 inch dbh exhibited a decreasing trend from 826 to 305 saplings/acre between 1993 and 2008 (Figure 3.11). Some of the decrease in the number of saplings can be accounted for by the progression of saplings to the next size class. The sharpest decline in sapling density occurred between 2003 and 2008.

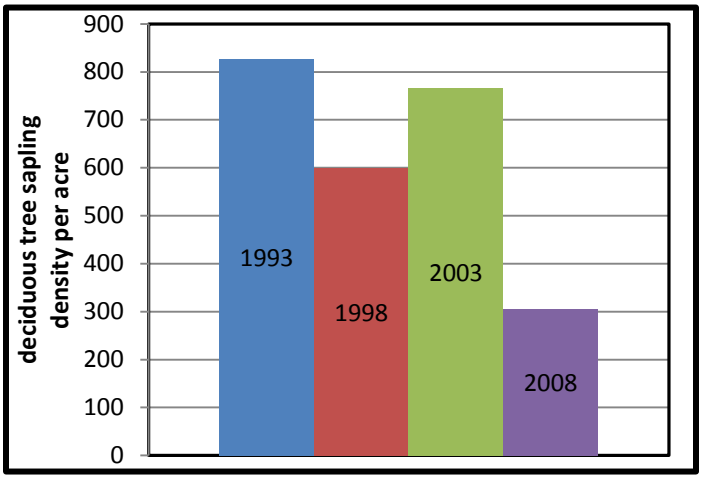


Figure 3.11 — Average sapling densities between 1993 and 2008.

Canopy cover and the proportion of chokecherry and western snowberry have remained relatively level, with chokecherry cover ranging from about 4 to 7 percent, and western snowberry cover from 17 to 25 percent (Figure 3.12).

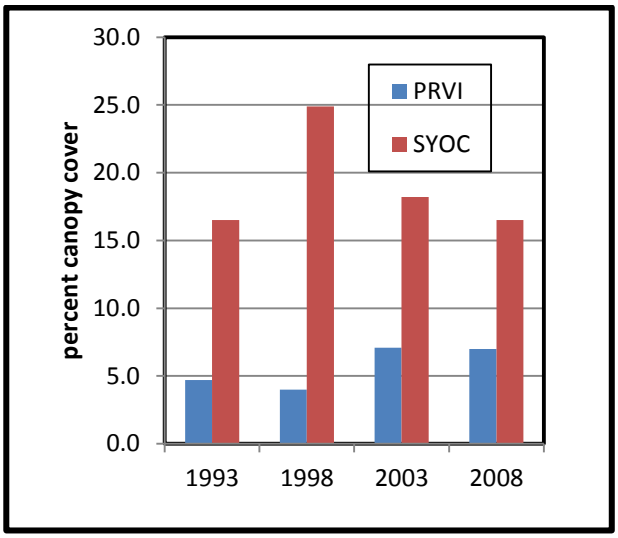


Figure 3.12 — Average percentage canopy cover of chokecherry and western snowberry between 1993 and 2008.

The SRT recommended using black-and-white aerial photographs to document historical woody draw trends for a variety of woody communities (SRT Recommendation VI-1).

As previously mentioned, green ash woody draws were of greatest concern for this analysis. A comparison of aerial photographs from the late 1930s and 1953 with those of 2009 showed an estimated expansion of less than 5 percent for green ash woody draws across the project area. There appeared to be a slight increase in canopy extent among some woody draws, while a smaller number of draws exhibited a decreased extent. Although field observations indicated that a few green ash trees were establishing within satellite shrub patches situated away from the primary woody draw community, there was a lack of photographic evidence of this occurrence, likely due to the small size of these patches. There was no evidence of woody draw expansion into previously unoccupied drainages. Field observations suggested greater expansion of western snowberry and several other shrub species compared to woody draw communities, but this occurrence is not readily observable from the aerial photographs. The expansion of Rocky Mountain juniper is apparent in photographs of some allotments, and analysis initiated by Bismarck State College during late 2010 to assess trends of this species should be available during 2011.

Although the various monitoring data are not adequate to identify a definitive trend in woody draw conditions within the project area, the existing data suggests two things. First there appears to be a downward trend in saplings, which threatens tree recruitment into the larger dbh classes. If this continues, the overstories of the affected woody draws would eventually thin and could ultimately be replaced with a shrub and grass community. Second, based on aerial photography, there appears to be minor expansion (<5 percent) in the extent of woody draw communities.

Factors Affecting Existing Condition of Woody Draws

Livestock Impacts

Repeated browsing and mechanical damage (trampling) of tree and shrub saplings decreases their vigor and inhibits advancement to later growth stages. Overstory canopy cover decreases when an insufficient number of young trees are available to fill canopy openings resulting from the death of mature trees. As the woodland structure becomes more open, livestock access becomes easier, thus perpetuating poor woody draw conditions. The degree of adverse livestock effects on woody draw conditions is a function of the frequency and intensity of disturbance.

Several woody draw surveys and ecological assessments have been conducted in southwest North Dakota and adjacent regions. These surveys and assessments indicated that excessive livestock disturbances were the most obvious causal factor of poor woody draw conditions (Bjugstad and Girard 1984; Boldt et al. 1978; Butler 1983; Butler and Goetz 1984; Girard et al. 1987; Hansen et al. 1984a, 1995; Hopkins and Ryan unpublished; Jensen 1991; Lesica 1989; Lesica and Atthowe 2001; Nelson 1960; Severson and Boldt 1978; Uresk et al. 2009).

Research of woody draws and riparian woodlands, as well as broader range management investigations of livestock distribution/utilization patterns, has consistently noted an affinity of livestock for woodland habitats that is disproportionate to their relatively small area across the landscape (Project Record, Specialist Reports and Notes, Botany Report).

Similar to observations of other studies (Butler et al. 1986, Hodorff et al. 1988, Nelson 1960, USDA Forest Service 2002), topography influences the level of livestock use. Adverse impacts from livestock in the project area were most apparent along relatively open or flat drainage bottoms. Thus, areas with the greatest concentration of livestock use exhibited the greatest departure from potential conditions compared to areas with less livestock use, providing further evidence of livestock induced impacts.

Fires

Fire can have both positive and negative effects on woody draws, and it is possible that successful wildfire suppression for more than 100 years has allowed some woody draw expansion, while also contributing to the eventual stagnation or deterioration of other woody draws. Fire can invigorate woody species regeneration through removal of accumulated litter layers and improvement of seedbed conditions; promotion of vegetative sprouting from burned woody plants; increased nutrient availability that promotes a flush of new growth; and disruption of pest, parasite, and disease cycles (Clark 2006, Fitzpatrick 2003, Sieg and Wright 1996, Zimmerman 1981). The population age structure of some woody draws in the project area suggests an episodic occurrence of stand establishment, such as would occur from a flush of regeneration after fire or other severe disturbance followed by a period of low disturbance that allowed seedlings and saplings to become established.

Conversely, historical wildfire frequencies are generally believed to have inhibited development of woodland communities on the grassland landscapes (Baily 1976, Grant and Murphy 2005, Higgins et al. 1989, Towne and Owensby 1984). There is evidence that several types of woody

communities have been increasing on the LMNG where intensive wildfire suppression efforts have occurred ever since Euro-American settlement. Lesica (2001b) concluded that the overall affect of late summer wildfires on woody draws in eastern Montana was negative. Although many burned shrubs and trees resprouted, the total woody population was decreased by the complete death of a large number of mature trees that did not resprout. Wildfire control on the LMNG has likely led to an increase in the extent of Rocky Mountain juniper in the project area; however, a comparison of historical and current aerial photography indicates that expansion of green ash woody draw communities in the project area has been less than 5 percent.

Disease and Insects

Several different fungi infest green ash trees and hasten the death of older trees when they are less resistant or capable of withstanding infections (Lesica 2001a, Lesica and Anthowe 2001). Many of the sampled stands had mature green ash trees infected by fungus, in particular heart-rot (*Fomes fraxinophilus),* which is evidenced by white fruiting bodies on the outside of the tree. This fungus weakens the tree, making it susceptible to breakage, and hastens mortality.

A common codominant tree in the green ash draws is the American elm. The presence of Dutch elm and other diseases is having an adverse effect on elm trees on the LMNG. Currently diseases have severely impacted the mature American elm in the green ash woody draws on the LMNG. However, as American elm is usually a subordinate species and is often absent from woody draws occurring at the drier end of the habitat range, the effect of potentially extirpated American elm would be less severe than the loss of green ash.

A potential future threat to the green ash draws is an exotic beetle known as the emerald ash borer (*Agrilus planipennis*). The emerald ash borer (EAB) is native to Asia and may have arrived in the United States via wood packing material. Since its discovery in southeastern Michigan in 2002, the borer has spread in all cardinal directions. Its westward expansion currently includes Wisconsin, Minnesota, Missouri, and Iowa. The EMB is a threat to all ash tree species but seems to favor green ash trees. The larvae bore into the tree, where they chew the inner bark and phloem, creating winding galleries as they feed. This cuts off the flow of water and nutrients in the tree, causing dieback and death. There is currently no effective large-scale treatment to control the EAB. Insecticides are being used in municipalities, by property managers, and by homeowners.

Climatic Effects

Severe winters, late spring and early summer frosts, and extended drought can adversely affect trees and shrubs. Overnight temperatures of 24 degrees have been observed in mid June on the Medora Ranger District after recent leaf emergence of green ash, which is one of the last tree species to initiate new growth in the spring. The majority of emerged leaves died in this situation; however, they were replaced by new leaves, and growth was sustained during the remainder of the summer. Extended drought can increase the mortality of woody species. Tree mortality as high as 50 percent was measured toward the end of severe drought during the 1930s (Albertson and Weaver 1945). Both late-season frosts and drought are frequent in the northern Great Plains (HPRCC 2009), and the presence of woody draws attests to adaptation of these

communities to the climate. While these climatic factors do affect woody draws, there is no indication that the current condition of the woody draws has been significantly affected by drought or early season frosts.

WILDLIFE

A comment received on the DEIS indicated that the effects of wildlife on woody draws had not been addressed. Although information was provided in the DEIS, additional detailed information has been added to the SDEIS and finally the FEIS in response to this comment.

The 2008 NDGF surveys from Magpie Creek cite mule deer densities of approximately 8.5 deer/square mile during 2007 and 2008, and about 4.1 deer/square mile from 1991 to 2007 (Project Record, Specialist Reports and Notes, Botany Report). A good portion of the Magpie Creek drainage is located in the project area. In terms of forage utilization, approximately five mule deer are equivalent to one mature cow in the amount of forage consumed (NRCS 1997). Gubanyi, et al. (2008) found whitetail deer densities of about 70 deer/ square mile caused adverse impacts to vegetation structure and species composition of woodland communities in southeast Nebraska. Deer populations in the project area are well below those densities. A 12-year study (Irby et al. 2000) conducted in nearby Theodore Roosevelt National Park (TRNP) indicated that browsing by deer and elk had minimal impact on chokecherry, serviceberry, and green ash populations, which are major components of green ash woody draws.

Deer trails observed in woody draws in the project area indicate that they were relatively narrow (<12 inches) and partially vegetated. These trails were most frequent in high condition woody draws that provided the greatest structure. Bedding sites in the woody draws tended to be small in size, with flattened vegetation. In contrast, livestock trails observed in the project area tended to involve multiple intertwining paths of compacted bare ground with dense and deep hoof prints. Down cutting often occurred along the livestock trails. Communal livestock lounging areas were evidenced by damage to woody and herbaceous vegetation or by large areas of bare ground caused by trampling.

The late 1880s saw the extirpation of elk in the badlands. In March 1985, 47 elk were released into the South Unit of TRNP. This release is the foundation of the current badlands elk population.

In 2003 and 2004, TRNP tracked 70 radio-collared elk to determine their movement patterns. The research noted that 59 and 71 percent, respectively, of the tracked elk left TRNP annually. Of the elk that left TRNP, most (90 percent) remained within 12 to 16 miles of the South Unit of TRNP in the Grassy Butte and Kendley Plateau areas (2010 TRNP Elk Management Plan FEIS, p.139). Both of these areas are outside of the project area. The FEIS also notes that 50 percent of the elk were located on federal and state lands and 50 percent on private lands in the above areas.

TRNP estimates that approximately 1000 +/- 250 elk currently reside in the South Unit of TRNP (2010 Elk Management Plan FEIS, Attachment 1). Applying the higher of the 2003 and 2004 percentages (71 percent) to the estimated elk population would mean that 533 to 888 elk leave TRNP, typically from April to November, and that 480 to 799 (90 percent) of those elk stay in

the Grassy Butte and Kendley Plateau areas. This means that approximately 53 to 89 elk may be utilizing the project area from April to October/November. The project area is approximately 136 square miles (87,262 acres) in size, which equates to one elk per 1.5 to 2.6 square miles of NFS lands. There may be additional elk utilizing NFS lands year-round; however, there is no information available concerning that possibility.

Another big game animal found in the project area is bighorn sheep, which occur in the northwestern portion of the project area (Wiedmann, personal communication, 2007). The bighorn sheep population in the project area is estimated by the NDGF at approximately 40 animals.

It is acknowledged that big game (deer, elk, bighorn sheep) do utilize the project area, including the woody draws; however, their use appears to be light. This is supported by the above population information, studies, and observations of woody draws in the project area. This, compared to livestock numbers of approximately 200-300 head of livestock per square mile for periods ranging from 1 to 8 months, indicates that a majority of impacts (such as trampling, browsing, loafing, trailing, etc.) to the green ash woody draws are the result of livestock actions.

Beaver can also adversely affect woodland communities of certain species, but this was usually confined to inclusions of quaking aspen at a few sites in the project area. Quaking aspen readily resprout after being cut by beaver and their regrowth is a favored browse for many wildlife species.

It is important to note that adverse impacts, such as Dutch elm and other diseases, invasive/noxious weeds, and beaver-cut trees were not used in evaluating the condition of woody draws or in assigning condition ratings.

SUMMARY

About 51 percent of the sampled woody draws were rated Healthy, while 42 percent were rated At Risk and 7 percent were rated Unhealthy. Healthy communities exhibited a diverse range of tree-size classes and tall shrub layers. Shrub species were generally diverse with multiple or, at least, tall height classes and densities that tended to impair movement through the community. At Risk and Unhealthy woody draws exhibited a lack of successful tree regeneration as indicated by the relative absence of saplings and young trees in the lower size (dbh) classes. Shrub layers among these communities tended to be patchy and/or dominated by low statured western snowberry. A dense grass layer, usually dominated by Kentucky bluegrass, occurred throughout most At Risk and Unhealthy woody draws. Without an extensive investment in resources, such as fencing, planting, etc., many of the Unhealthy rated communities will continue deteriorating and will eventually be replaced by low shrub/grass communities with scattered patches of desirable shrubs and trees on poorly accessible microsites. Because of easy access by livestock, At Risk communities located on relatively gentle terrain along drainages have a similar potential to be replaced by shrub/grass communities. The steeper slopes in At Risk woody draws are less impacted because livestock generally favor gentler slopes.

DESIRED CONDITION

The desired condition for woody draw communities in this project area is to maintain or develop a multi-layer and multi-age class of herbaceous plants, shrubs, and trees, moving At Risk and Unhealthy woody draws towards self-perpetuating plant communities that exhibit thick brushy shrub understories and a multi-story, multi-age structure of the tree canopy, according to site capability.

Capability

A comment received on the DEIS indicated that the Grasslands Plan needed to be amended prior to undertaking this project because the Grasslands Plans direction was unattainable. This would include desired conditions for woody draws. Woody draw surveys and field observations do not support this comment.

Although specific site characteristics can influence the species composition and production of a woody draw community, as well as its resistance and resiliency to disturbance, there is ample evidence that environmental conditions are capable of supporting desired woody draw communities with sufficiently decreased levels of disturbance. For example, steep slopes of many woody draw sites are in a Healthy condition, while the bottom of the drainage with increased livestock trailing and lounging are At Risk. Although the slope aspects contribute to decreased temperatures and evaporation demand that can assist the establishment of woody species, the bottom of the drainages also experience a degree of shading, contain greater soil depths, and receive greater moisture and nutrient inputs from the adjacent slopes. Therefore, tree and shrub growth and general conditions should be greatest along the drainage bottoms rather than the slopes, and the relative degree of livestock use in these two habitats is the likely source of differing conditions.

Other evidences of the capability of woody draws to attain desired conditions include the fact that 51 percent of the surveyed woody draws in the project area are rated as Healthy. Additionally, two woody draw exclosures located in Allotment 240, and one located approximately 5 miles south of the project area near Franks Creek, as well as fenceline contrasts with different levels of livestock use, show that the Desired Condition for woody draws identified by the Grasslands Plan is attainable (Project Record, Specialist Reports and Notes, Botany Report).

Environmental Consequences—Woody Draws

DIRECT AND INDIRECT EFFECTS

ALTERNATIVE 1

All grazing would be limited to native wildlife under the no-grazing alternative. In many respects, the termination of livestock grazing would contribute to improved ecological conditions

of many woody draws through decreased browsing and trampling. Reproductive success, density, and canopy cover of desirable woody species would increase, with the greatest increases likely to occur along relatively broad and level drainage bottoms where livestock concentrations have exerted the greatest negative effect.

Invasive Kentucky bluegrass and lesser amounts of smooth brome are well-established within most woody draws and have a high potential to continue spreading without livestock disturbances. The removal of livestock grazing could have negative consequences, in that non-harvest of the herbaceous layer would result in increased litter accumulation, which can assist invasive grass establishment and impair the establishment of woody species seedlings. In time, the dynamics of both the woody and herbaceous layers could stagnate within many woody communities without periodic disturbance.

The termination of livestock grazing would result in improved woody draw conditions as expressed through increased woody plant regeneration and density over the time frame of this analysis. With continued non-use, woody draw dynamics would possibly decrease unless natural ecosystem processes of fire, erosion, flooding, and ungulate grazing occur at sufficient intensity and frequency to facilitate dynamics of the system. Invasive grasses and accumulated litter may hamper the recovery of woody draws improvement.

ALTERNATIVE 2

Amenities of shade, thermal cover, extended herbaceous green periods, woody browse species, and water developments are strong attractants for livestock, and a level of adverse impact resulting from their congregation within woody draws should be expected (Bailey 2004, Porath et al. 2002). The severity of impact is correlated with the intensity and frequency of livestock use that is influenced by stocking levels, the length and season of grazing, the amount or proportion of woody draws occurring in a pasture, and production and composition of the adjacent rangeland.

The low amount of tree regeneration and sparse or absent shrub layers resulting from observed livestock trampling, trailing, browsing, lounging, etc., would continue in At Risk and Unhealthy woody draws because the current intensity, duration, and timing of livestock use would be maintained. In the At Risk and Unhealthy woody draws, existing Authorized Use levels would continue to contribute to excessive use of woody draw communities. Annual use of every pasture, often at the same or similar times of the year, is also a factor contributing to poor conditions among many sites.

Some adverse impacts to woody draws occur from wildlife, climate extremes, and disease; however, as noted previously, these are not the primary factors influencing the conditions of the woody draws.

For the above reasons, the 49 percent of sampled woody draws rated as At Risk or Unhealthy would continue in these conditions.

ALTERNATIVE 3

Under this alternative, a series of different livestock management techniques are utilized to address concerns with At Risk and some Unhealthy woody draws. Proposed actions include relocating water tanks out of woody draws where feasible, fencing or controlling access of some water structures to manage livestock distribution, creating new water sources located to pull livestock away from woody draws, fencing individual woody draws to limit livestock access, and implementing or changing existing rotations to affect the amount of time or season of use that livestock have access to woody draws. This alternative is adaptive-management-based.

A summary of the effects of initial actions by allotment is presented in Table 3.16. Also provided is a short synopsis of the reasoning for the effects determination. A detailed discussion of each allotment is contained in Part 2 of this chapter.

Table 3.16 — Summary of effects rationale by allotment for woody draws, Alternative 3

Allotment Number	Woody Draw Conditions Met	Initial Actions	
		Effect	Rationale
126	No	Slightly positive	Fence springs and/or add new water sources. Separating pastures 5 and 6 could decrease the use of some draws. AU 30% < CC and > reported use, but additional winter use.
127	Yes	Neutral	Delay turn-in 2 weeks but same management and effects. AU 37% > CC and 15-42% > reported use.
128	No	Neutral	Management of some water tanks to control distribution, stabilize Whitetail Creek. AU 56% > CC and 17-58% > reported use.
129	No	Neutral	Create riparian pasture. Exchange pastures with A131 increases proportion of Healthy draws but increased summer use/disturbances. AU 17% < CC and 7-31% > reported use including winter use.
130	No	Negative	Increased summer use of P1 and P7 with increased woody draw disturbances. Adverse effects of hay feeding introduced to P6. AU 8% >CC and < to > reported use.
131	No	Slightly negative	Exchanging pastures with A129 decreases proportion of Healthy draws and new hay feeding pasture. Reclamation of one reservoir with adverse effects to riparian trees. AU 41% < CC, but recently reported use 27-54% > AU not including additional winter use.
132H	No	Neutral	Increased deferred rotation with new water tank – decresed period of access to woody draw but increased livestock density. AU 5% > CC, 15% < to 24% > reported use.
133	No	Neutral	More consistent 2-pasture deferred rotation but increased livestock density and AU similar to reported use that is 58% > CC.
134	No	Neutral	Similar management & AU usually 19-26% > reported use.

Allotment Number	Woody Draw Conditions Met	Initial Actions	
		Effect	Rationale
135	Yes	Neutral	Positive and negative effects of burning juniper, otherwise no appreciable change in management. AU > to < reported use and additional winter use.
136/139	No	Neutral	Shorter early season use of 136-1, but increased use of 136-2. AU 46% > CC and 9-36% > reported use.
140	No	Negative	Increase of mid and late summer use, AU 36% >CC and 0-39% > reported use.
142	No	Neutral	No appreciable change in woody draw pasture, AU 50% > CC and 17-92% > reported use.
158	No	Neutral	No appreciable change in management. AU 18% > CC and much > reported use but additional winter use.
221	No	Neutral	Earlier turn-off of affected pastures, but AU 63% > CC and about 5% > reported use.
230	No	Neutral	Shortened season of P1 but increased livestock density, halt winter use in P3 but potential for increased disturbances with summer grazing season. AU 17% > CC and 30-60% > reported use not including winter use.
237	No	Negative	Increased disturbance in P1 with additional water tank, and in P2 with deferred rotation, AU 32% > CC and 40-55% > reported use.
239	No	Neutral	Decreased period of woody draw access but increased livestock density with smaller pastures. Low invasive grass palatability in uplands. AU 64% > CC and 32-85% > reported use.
240	No	Slightly positive	Potential reclamation of two reservoirs w/adjacent woody draws. Reported use 2-32% > AU not including winter use.
241	No	Neutral	No appreciable change in management. AU 16% > CC and much > reported use but additional winter use.
243	No	Negative	New water tank would increase use of draws, same grazing system and reported use slightly > AU that is 24% > CC.
244	No	Neutral	Some increased woody draw disturbance in new pasture but unchanged use in other pastures. Reported use slightly >AU that is 12% > CC.
249	Yes	Neutral	Staggered season would minimally affect woody draw use and Reported use = AU that is 21% > CC.
256	No	Slightly positive	Fence reservoir and draw in P2. Create riparian pasture in P2 but increased livestock density in remainder of pasture. Same grazing system in P1 & P3. AU 9% > CC and usually > reported use.
258	Yes	Neutral	No appreciable change in grazing system, 3-acre riparian exclosure in P1. AU 41% > CC and at least 45% > reported use.
272	No	Positive	Fence woody draw in P2, reclaim reservoir and construct new tank further from draws. AU & reported use 15% > CC.

Allotment Number	Woody Draw Conditions Met	Initial Actions	
		Effect	Rationale
277	No	Slightly positive	Fence one reservoir w/adjacent small woody draw patches. AU and reported use including winter use close to CC.
278	No	Slightly positive	Increased early season use and cease twice-over use, but only two draws and near water. AU 36% > CC and 10-27% > reported use.
281	No	Slightly positive	New water source outside of draw in P1 but only 1-2 draws present in any pasture. AU 26% > CC.
282	Yes	Neutral	No appreciable change in management but relocating pasture fenceline would increase disturbances in portion of one pasture. AU 15% < CC and 24-44% > reported summer use, and 10-30% > total annual use including winter use.
283	Yes	Slightly positive	New water tank would decrease use of seeps along woody draws. AU approximately = CC.
286	No	Slightly positive	Deferred rotation with decreased access to the only woody draw but increased livestock density. AU 36% > CC and usually much > reported use.
287	No	Neutral	Greater deferment of two main pastures but tank control unlikely to change livestock distribution. AU 15% > CC and 17-25% > typically reported use.
288	No	Slightly positive	Compressed season and deferred rotation but increased livestock density. Tank management could improve surrounding draws. AU 43% > CC and 23-29 > recently reported use.
289	No	Negative	Two new tanks with potential to decrease conditions. Creating new pasture likely to decrease conditions in two pastures. AU 10% > CC, reported use often > AU and additional winter use.
300	No	Slightly positive	Decreased disturbance in one woody draw after fencing developed spring and constructing upland well and water tank. AU 7% > CC and 4-15% > reported use.
301	No	Neutral	Reconstructing two spring developments would control livestock distribution but several other water sources would remain uncontrolled. Creation of 4th pasture would increase woody draw disturbance in secondary range. AU 10% > CC, 0-20% > recent use.
302	No	Slightly positive	Fencing 3 reservoirs would increase control of livestock distribution. AU 14% > CC and 0-66% > reported use.

A=Allotment, P=Pasture, AU=Authorized Use, CC=initial estimated carrying capacity, > = greater than, < = less than.

Collective initial actions under Alternative 3 would result in improved woody draw conditions in 11 of the 32 allotments that contained woody draws not meeting desired conditions. Of the 11 allotments, 11 are projected to show slight improvement and one would show marked

improvement. Slightly positive improvements would have a low potential to shift a large portion of woody draws from At Risk to Healthy condition. Of the remaining 21 allotments, six would experience decreased woody draw conditions and 15 would maintain their conditions.

The most commonly identified tools for improving woody draw conditions include removing or decreasing livestock disturbances through fencing, decreasing the length of time that livestock have access to draws by shortening the grazing period, changing the grazing season to periods of cooler temperatures and increased forage palatability, managing stock tanks to affect livestock distribution, and replacing water sources along woody draws with upland tank sites. Fencing of woody draws or riparian exclosures has beneficial and adverse effects. It removes disturbance associated with livestock and provides the opportunity for rapid recovery of shrub and tree regeneration. However, potential adverse effects include increased spreading and dominance of existing invasive grasses and associated litter that can impede the regeneration of desired woody species. Fencing may also result in increased use of adjacent woody draws. The option for removing fences and and/or halting fence projects exists if desired results are not obtained.

Initial actions resulting in neutral effects to woody draw conditions would occur in 14 allotments that do not currently meet desired conditions for woody draws. Six allotments would experience a decline in the health of woody draws.

Initial actions in five of six allotments that meet desired conditions would have a neutral effect and one allotment would experience a slightly positive effect.

The most frequent adaptive management options that would contribute to improved woody draw conditions include the use of fencing and adjustments (decreases) in Authorized Use. Changes in grazing rotations, creation of riparian pastures, development of new water sources, water management, and prescribed burning also have the potential to improve woody draw conditions. These actions can be used singularly or in combination to address woody draw concerns.

Implementation of the above actions singularly or in combination would improve the condition of impacted woody draws. The key is when these actions are initiated. If these actions are not implemented until the middle of the timeframe (10 to 15 years) associated with this project due to monitoring timeframes, the opportunity to bring At Risk woody draws to a Healthy condition in the remaining time is reduced as is the ability to improve the health of Unhealthy woody draws.

ALTERNATIVE 3A

Alternative 3A is the same as Alternative 3 with several exceptions, which are identified in the description of Alternative 3A in Chapter 2. Table 3.17 identifies 14 allotments where initial or adaptive action(s) were changed to create this alternative. Of the 14 allotments, three are meeting desired condition and initial actions would have a neutral effect. Of the remaining 11, initial actions would have a neutral effect on woody draws within five of the allotments and a negative effect on conditions in four allotments. Two allotments would experience slightly positive effects that are unlikely to shift conditions from At Risk to Healthy. Because Alternative 3A would improve fewer woody draws than Alternative 3, it would decrease the overall percentage of

Healthy woody draws in the project area compared to Alternative 3. The detailed effects for each allotment are identified in Part 2 of this chapter.

Table 3.17 — Summary of effects rationale by allotment for woody draws, Alternative 3A

Allotment Number	Woody Draw Conditions Met	Initial Actions	
		Effect	Rationale
126	No	Slightly positive	Adding two new water sources without fencing developed springs would not appreciably change effects.
127	Yes	Neutral	Create waterlot for access from both pastures but steep slopes limit use of draw, same grazing system and AU.
129	No	Slightly negative	Create riparian pasture but adding 2nd tank in P2 (now part of A131) would increase disturbance in small woody draw patches. Exchanging pastures with A131 increases proportion of Healthy draws but increased summer use/disturbance. AU 17% < CC and 7-31% > reported use including winter use.
135	Yes	Neutral	Adding water tank in P10 would not affect woody draws. Positive and negative effects of burning juniper. AU 16% < CC and 27% > to 16% < reported use not including winter use.
142	No	Neutral	Shorter duration but increased livestock density in woody draw pastures, AU 50% > CC and 17-92% > reported use.
240	No	Neutral	New water tank but two reservoirs near woody draws would not be reclaimed. AU 6% > CC, reported use 2-32% > AU not including additional winter use.
243	No	Negative	Spring development with no effect on woody draws, but other new water tank would increase disturbance in draws. Reported use slightly > AU that is 24% > CC.
244	No	Neutral	No appreciable change in management. Reported use slightly > AU that is 12% > CC.

Allotment Number	Woody Draw Conditions Met	Initial Actions	
		Effect	Rationale
258	Yes	Neutral	May rather than June turn-in would have minimal effect on woody draws. 3-acre riparian exclosure, but new water tank. AU 41% > CC and at least 45% > reported use.
272	No	Negative	Develop spring at north end of Unhealthy woody draw would contribute to additional impacts. Not fencing any draws. AU and reported use 15% > CC.
278	No	Slightly positive	Increased early season use and cease twice-over rotation. Not reclaiming reservoir would minimally affect woody draw due to another adjacent water source. AU 36% > CC and 10-27%> reported use.
287	No	Slightly negative	Increased disturbance around new water tank in secondary range. Greater deferment of two main pastures but tank management unlikely to decrease current disturbances. AU 15% >CC and 17-25% > typically reported use.
300	No	Neutral	Continued unmanaged access to a developed spring in an At Risk woody draw would be only slightly reduced by a new well and upland water tank. AU 7% > CC and 5-15% > reported use.
301	No	Neutral	Access to reconstructed springs would remain unmanaged with persisting woody draw disturbances. AU 10% > CC and 1% > to 20% < recently reported use.

A=Allotment, P=Pasture, AU=Authorized Use, CC=initial estimated carrying capacity, > = greater than, < = less than.

Actions contributing to adverse effects on woody draw conditions include relocating several spring-fed water tanks without reconstructing the plumbing system to maintain flow at the spring when the tank is full. This would result in decreased conditions of the wetland habitat and minimize potential improvement of adjacent woody draws because it would not be possible to manage water flow to control livestock distribution and limit the degree of woody draw disturbances. Initial actions that include the construction of additional water sources, including the development of one spring, would adversely affect woody draw conditions in other

allotments by increasing the level of disturbances. Not fencing woody draws, as proposed under Alternative 3, would decrease the number of allotments with positive effects from the initial actions.

The effects of adaptive management are the same as those identified under Alternative 3.

ALTERNATIVE 4

Alternative 4 is similar to Alternative 3 in the use of management tools such as implementation or changes in rotations, but it does not utilize range infrastructure to the extent of Alternative 3. In addition to these actions, Alternative 4 includes adjustments in Authorized Use based on carrying capacity and an adjustment for livestock weight. This alternative is also adaptive management based.

A summary of the effects of initial actions by allotment is presented in Table 3.18. Also provided is a short synopsis of the reasoning for the effects determination. A detailed discussion of each allotment is contained in Part 2 of this chapter.

Table 3.18 — Summary of effects rationale by allotment for woody draws, Alternative 4

Allotment Number	Woody Draw Conditions Met	Initial Actions	
		Effect	Rationale
126	No	Negative	AU increased 42%. 36-107% > reported use not including additional winter use. Greater pasture deferment and once rather than multiple pasture rotations, but increased livestock density with combined herds, more consistent use of some pastures.
127	Yes	Neutral	AU decreased 27%, 3% > to 16% < than reported use.
128	No	Positive	AU decreased 36%, 0-25% < reported use. Greater pasture deferment with one rather than multiple rotations, but increased livestock density with tank management to control distribution.
129	No	Neutral	Construct two riparian pastures. AU decreased 13%, 7% < to 14% > reported use including winter use. New water tank would increase disturbances.
130	No	Neutral	New rotation in P8 & P9 with decreased disturbance, but increased summer use and disturbance in P1 and P7. AU decreased 7%, < reported use including winter use. Adverse effects of hay feeding introduced to P6.
131	No	Neutral	AU decreased 13% but reported use has been 27-54% > current AU not including additional winter use. Hay feeding introduced to new pasture. Pasture exchange with A129 decreases proportion of Healthy draws.

Allotment Number	Woody Draw Conditions Met	Initial Actions	
		Effect	Rationale
132H	No	Neutral	AU decreased 5%, 19% < to 18% > reported use. No appreciable change in current management and only one draw present.
133	No	Positive	AU decreased 37%. More consistent deferred rotation.
134	No	Slightly positive	AU decreased 25%, 5-11% < reported use, topography main influence on woody draw condition.
135	Yes	Positive	AU decreased 13%, 10% > to 27% < reported use not including winter use. Switch to 5-pasture deferred rotation with combined herd. Riparian exclosures. Positive and negative effects of juniper control.
136/139	No	Slightly positive	AU decreased 32%, 7-25% < reported use. New rotation with positive effects in one pasture and negative in another.
140	No	Slightly positive	AU decreased 27%, 0-28% < reported use. Increased mid to late summer use with increased disturbance potential.
142	No	Neutral	AU decreased 33%, 22% < to 28% > reported use. Switch to deferred rotation but similar woody draw effects.
158	No	Neutral	AU decreased 15%, 21-65%> reported use with additional winter use.
221	No	Slightly positive	AU decreased 38%, about 35% < reported use, but increased late season use of invasive grass / woody draw pastures, scarce draws.
230	No	Neutral	AU decreased 14% but 11% > typically reported use not including winter use. Halt winter use but potential of increased woody draw disturbances. Shortened season of P1 but increased livestock density.
237	No	Slightly negative	AU decreased 24%, 6-17% > reported use. Deferred rotation in P2 has potential for increased disturbance.
239	No	Positive	AU decreased 39%, 19% < to 13% > typically reported use. Decreased access to woody draws with deferred rotation but increased livestock density.
240	No	Slightly positive	AU decreased 6% but additional winter use. Potential reclamation of two reservoirs with adjacent woody draws but they are the only draws present.
241	No	Slightly positive	AU decreased 14% but > reported use. Fence woody draws. Winter use in pasture containing most draws.

Allotment Number	Woody Draw Conditions Met	Initial Actions	
		Effect	Rationale
243	No	Positive	AU decreased 20%, fence woody draw(s).
244	No	Slightly positive	AU decreased 11%. Some increased woody draw disturbance in new pasture, minimally changed management effects in remaining pastures.
249	Yes	Positive	AU decreased 17%. Staggered season of annual use.
256	No	Slightly positive	Fence reservoir and draw in P2. Create two riparian pastures, but increased livestock density/disturbance in south half of P2. AU decreased 8% but much > reported use for most years.
258	Yes	Neutral	AU decreased 29% but 3-55% > reported use. Construct three acre riparian exclosure.
272	No	Positive	AU decreased 13%. Fence 1 of 2 woody draws in allotment. Construct tank further from draws but reservoir near draws not reclaimed.
277	No	Slightly positive	AU decreased 4%, 4-11% < total annual use including winter use. Fence one reservoir w/adjacent small woody draw patches.
278	No	Slightly positive	AU decreased 26%, 6-19% < reported use, but only two woody draws present. Increased early season use and cease twice-over rotation. Minimal effect of not reclaiming reservoir due to proximity of other water.
281	No	Slightly positive	AU decreased 20%. Develop water source in pasture 1 away from draws but low number of draws present in all pastures.
282	Yes	slightly positive	Construct large riparian exclosure/pasture. AU decreased 13%, 13% > to 4% < than total annual use including winter use. Potentially increased disturbance in localized draws from relocating fenceline.
283	Yes	Slightly positive	New water tank could alleviate some use of seeps along woody draws. No significant change in AU.
286	No	Neutral	AU decreased 26% but 15-67% > reported use. Deferred rotation decreases period of woody draw access but increased livestock density, only one draw present extending through two pastures.
287	No	Slightly positive	AU decreased 13%, 1-8% > typically reported use. Limited effectiveness of greater deferment of two main pastures and tank management.

Allotment Number	Woody Draw Conditions Met	Initial Actions	
		Effect	Rationale
288	No	Slightly positive	AU decreased 30%, 9-47% < reported use (9-14% most years). Management of north water tank would improve surrounding draws. Compressed season and deferred rotation but increased livestock density.
289	No	Negative	AU decreased 9%, 9% > to 15% typically reported use not including additional winter use. Two new tanks with potential to decrease conditions. Tank management in P3 unlikely to improve conditions. Creating new pasture and rotation likely to decrease conditions in two pastures.
300	No	Slightly positive	AU decreased 6%, 2% < to 8% > reported use. Fencing/reclaiming spring and constructing upland tank would decrease disturbance in one draw. Removing alleyway fence would disperse disturbances but decrease potentially Healthy conditions in alleyway.
301	No	Slightly positive	AU decreased 9%, 9% > to 10% < reported use. Reconstructing two spring developments with increased control of livestock distribution but several other water sources would remain uncontrolled.
302	No	Slightly positive	AU decreased 12%, 45% > to 12% < typically reported use. Fencing of 3 reservoirs and managing access along with a water tank could decrease use of adjacent woody draws.

A=Allotment, P=Pasture, AU=Authorized Use, CC=initial estimated carrying capacity,> = greater than, < = less than.

Collectively, the initial actions under Alternative 4 would contribute to improved conditions in 21 of the 32 allotments that do not meet woody draw desired conditions (Table 3.18). The degree of improvement would be relatively high in 3 allotments and relatively low in 18 allotments. Of the remaining 11 allotments, 4 would experience a decrease in woody draw conditions and 7 would maintain current conditions. The net effect of proposed actions are predicted to increase the proportion of Healthy woody draws to about 60 percent, but decreasing conditions in 4 allotments could decrease this value to 58 percent.

Initial actions would have negative effects on four allotments. Factors contributing to negative effects involve a substantial increase in Authorized Use for one allotment proposed to be combined with another allotment. The construction of new water tanks, decreases in pasture size as a result of splitting pastures, increased livestock density, increased mid to late summer use, and additional winter use not accounted in Authorized Use also contribute to negative or neutral effects on woody draw conditions among some allotments. Fencing of woody draws or riparian exclosures has the same beneficial and adverse effects as identified in Alternative 3.

Among the six allotments currently meeting woody draw objectives, two would experience slightly positive effects, two would experience a high degree of positive effects, and two would be neutral. Improvements in woody draw conditions are associated with decreases in Authorized Use, fencing, development of range water outside of woody draws, increased management of water access, and the creation of riparian exclosures/pastures.

The adaptive management options under Alternative 4 are the same as those in Alternatives 3 and 3A. The difference among these alternatives is associated with the rate of change. Because Alternative 4 initially takes more aggressive action through reductions in Authorized Use and fencing to address impacted woody draws and other resource concerns, less time would be needed to further improve affected woody draws if monitoring indicated additional management changes were needed.

CUMULATIVE EFFECTS

Cumulative effects result from the combination of effects resulting from past, present, and reasonably foreseeable actions plus the direct and indirect effects of the alternatives. A discussion of past and present actions, reasonably foreseeable actions, and a summary of the cumulative effects by alternative follows.

Past and Present Actions

The following past and present actions have contributed to the existing At-Risk and Unhealthy woody draws in the project area.

Livestock grazing has affected, and continues to affect, woody draws in the project area. In the past the effects of livestock grazing, in combination with climatic events (such as drought) and the homesteading use of the woody draws for building materials, fuel wood, and fodder, adversely affected many of the woody draws. The effects of the homesteading era have largely disappeared; however, the effects of livestock grazing, including trampling, trailing, lounging, browsing, etc., on woody draws continue. Livestock actions have adversely affected 49 percent of the surveyed woody draws in the project area.

Firewood harvest has been gradually increasing on the Medora Ranger District in recent years, with a currently reported annual harvest of about 400 cords (Felchle 2009). Only dead and down material is permitted for harvest, but some cutting of standing dead trees does occur (Forest Service botanist, personal observation). Removal of standing and down trees assists in opening woody draw sites, which potentially facilitates increased livestock access and removes safe sites for seedling/sapling establishment. Also, more sunlight reaches the woodland floor, increasing evapotranspiration, which can decrease the success of woody species establishment. However, these effects are unlikely to have had a large influence on woody draw conditions across the project area because of the limited amount of harvest.

Oil and gas development has, in the past, affected woody draws through construction of access roads or well pads. Under present oil and gas lease stipulations, construction of well pads in woody draws is prohibited. Construction of oil and gas access roads across or parallel to woody

draws occurs infrequently when necessary to access existing leases. Such construction is heavily mitigated.

Currently, oil and gas activity in the project area is primarily focused around maintenance of existing oil and gas facilities and maintenance of oil and gas roads. These activities still offer the opportunity to spread invasive species where roads cross or are located close to woody draws. These species affect woody draws by displacing native vegetation, and forming sod layers which hamper or prevent the establishment and survival of tree and shrub regeneration.

Wildfires have been actively suppressed on the LMNG and adjacent private and state lands for a century. Past and current wildfire suppression has allowed Rocky Mountain juniper to expand into adjacent grasslands, primarily in the Badlands. Review of historical aerial photography indicated that green ash woody draws have expanded by less than 5 percent since the 1930s, but have not established in previously unoccupied drainages. Where fire control has allowed some species to expand, it has also deprived woodlands of the benefits of fire, such as nutrient cycling, promoting a flush of new growth through resprouting, improvement of seed beds for seedling establishment, and disruption of disease and parasite cycles. Past and current suppression of wildfire still plays a role in the health and expansion of woody draws.

Noxious Weeds and Invasive Grasses. It is unknown when noxious weeds and invasive grasses first appeared in the project area. Some invasive species, such as crested wheatgrass, appeared in the 1930s when successfully used in the reclamation of sub marginal lands. The primary past, current, and future effect of these groups of plants is that they alter or replace native plant communities. In the case of woody draws, they reduce or prevent the establishment of tree and shrub seedlings by crowding out the seedlings or through development of sod layers and litter accumulation that impede seedling establishment. Treatment of noxious weeds in and near woody draws has resulted in the loss of some trees and shrubs.

Drought is a recurring natural event in western North Dakota. Woody draws are generally located in areas with a greater abundance of water, such as draws, north slopes, etc., so they are generally more resistant to the effects of drought than herbaceous vegetation. In the case of a severe drought, the 51 percent of woody draws rated as Healthy would be the least or last impacted by drought. The 49 percent of woody draws rated as At Risk or Unhealthy, however, would have a reduced ability to withstand the effects of drought due to reduced canopy, increased evaporation due to the loss of shading, and increased risk to parasites and disease due to reduced vigor and drought stress.

Reasonably Foreseeable Actions

Elkhorn Ranchlands. The recently purchased Elkhorn Ranchlands require that the Grasslands Plan be amended to establish management direction for the newly acquired lands. Approximately 800 acres of the 5,200 acre Elkhorn purchase are directly associated with five of the allotments in the North Billings project. Under the proposed amendment these lands would be managed in accordance with the adjacent management area, which is MA 3.65 Rangelands with Diverse Natural Appearing Landscapes. In the interim, as directed by 36 CFR 254.3(f)(2008), this

portion of the purchase is being managed in accordance with the adjacent MA 3.65. If the proposed action were selected and implemented there would be no change over the current situation.

The proposed Grasslands Plan amendment also includes establishing a special interest area (SIA) for the remaining 4,400 acres of the purchase and approximately 17,160 acres contained in grazing allotments 279 and 280, which were associated with the Elkhorn Ranchlands when they were privately owned. If implemented the SIA would establish a forage reserve on those acres. The reserve would provide a place to move livestock to in the event an allotment is burned out or if management actions, such as a prescribed fire or additional rest, were needed to help restore woody draws in an allotment.

Travel Management. An environmental assessment (EA) for travel management on the LMNG was released for comment in 2010. The proposed action for this EA would close all single-use oil and gas roads, unauthorized roads (i.e., two-tracks), and an additional 18 miles of system roads in the project area. The travel management plan is expected to have minimal effect to grazing permit holders unless single-use roads are blocked from access. If access were to be blocked, then additional two-track roads could be created as permittees can travel cross county to administer their permits. This may impact woody draws through the creation of two-track roads that cross or parallel woody draws, creating an inroad for livestock and an opportunity to spread invasive species or noxious weeds in the woody draws.

Oil and Gas Development. Currently there are five applications for permits to drill (APDs) for oil and gas wells in the project area. None of the well pads would be located in woody draws; however, three of the well pads would be located adjacent to them. One access road crosses a riparian area that supports trees. Some of these trees would be removed to accommodate the road crossing. Design criteria associated with the construction of these facilities would mitigate potential adverse effects on the woody draws associated with these proposed oil and gas wells.

Emerald ash borer (EAB) is a potential future threat to the green ash draws. This Asian beetle has no known natural enemies in the United States and no effective large-scale control has been developed to date. The emerald ash borer has been traveling from east to west, and in 2009 was found in Minneapolis, Minnesota. If the EAB becomes established in the green ash woody draws located in the western portion of North Dakota, they will likely eliminate the green ash from these draws. This may mean that this type of woody draw would, in the future, tend to be comprised primarily of tall shrubs such as chokecherry and service berry. This in turn would affect how this type of woody draw is managed and monitored in the future.

Cumulative Effects by Alternative

This section summarizes direct and indirect effects of the alternatives and the effects of reasonably foreseeable actions on woody draws. These effects in combination with past and present effects combine to create cumulative effects.

Alternative 1 provides the best opportunity of all the alternatives for the most rapid recovery of At Risk and Unhealthy woody draws. This is due primarily to the removal of disturbance

associated with livestock, which affords the best opportunity for maintenance or establishment of tree and shrub regeneration. However, invasive species would persist and possibly expand, thereby hampering the establishment and survival of tree and shrub regeneration through direct competition and accumulation of litter. If a travel management plan action is selected, it offers the potential to improve At Risk and Unhealthy woody draws through closure of roads that parallel or cross woody draws. Foreseeable oil and gas development includes three well pads, which would be located adjacent to woody draws. However, design criteria would minimize adverse impacts to the woody draws. The same is true of the one riparian crossing whose construction would result in the loss of some trees associated with the riparian area. If the EAB becomes established in the green ash woody draws, they will likely eliminate the green ash from these draws. This in turn would affect how this type of woody draw is managed and monitored in the future. Continued fire suppression would have positive effects on woody draws by decreasing the occurrence of intense and potentially adverse later summer fires, but would also impede the beneficial effects of cooler or low intensity fires.

Alternative 2 may see some improvement in the At-Risk or Unhealthy woody draws because of the potential effects of the Elkhorn Ranchlands Grasslands Plan amendment and Travel Management Plan. The Elkhorn Ranchlands Grasslands Plan amendment offers opportunities, through a forage reserve, to potentially hasten the rate of recovery of some At-Risk or Unhealthy woody draws by offering an alternate source of forage, thereby providing additional recovery time for affected woody draws. Reasonably foreseeable effects associated the travel management plan, oil and gas development, and EAB are the same as identified in Alternative 1. However, because this alternative maintains the existing Authorized Use levels, rotations, etc., the opportunity to achieve a cumulatively positive effect in At Risk and Unhealthy woody draws is the least of all the alternatives.

Alternative 3, initial actions are projected to improve At-Risk and Unhealthy woody draws in 12 allotments, and see a decline in health in six allotments, with the remaining 14 maintaining current conditions. Effects associated with reasonably foreseeable actions are the same as those identified in Alternatives 1 and 2. The proportion of Healthy woody draws is predicted to increase from 51 percent at current conditions to 55 percent with actions of Alternative 3.

Alternative 3A is the same as Alternative 3, except for addition or deletion of actions in 14 allotments. Under this alternative a total of 8 allotments would improve, 9 would decline, and 15 would maintain existing conditions. Alternative 3A has greater adverse cumulative effect then Alternative 3 because it would further reduce conditions in 4 additional allotments compared to Alternative 3. The potential cumulative effects of reasonably foreseeable actions are the same as those under Alternative 3.

Alternative 4, initial actions would improve woody draw health in 20 of the 32 allotments rated as At-Risk or Unhealthy. Four would experience decreasing health and 7 would maintain existing conditions. The proportion of Healthy woody draws is predicted to increase from 51percent at current conditions to 59 percent with actions of Alternative 4. The potential cumulative effects of reasonably foreseeable actions are the same as those described in Alternatives 1 and 2.

Adaptive Management, Implementation of adaptive management options under Alternatives 3, 3A, and 4, including actions identified in the tool box, would improve At Risk and Unhealthy woody draws not addressed by the initial actions. The greatest difference among these alternatives is the amount of time. In some cases, Alternatives 3 and 3A initiate more indirect actions (rotation changes, season of use change, etc.) to deal with woody draw concerns. Determining whether these actions are effective requires time, generally 3 to 5 years, so this time is lost if the actions are determined to be ineffective. However, Alternative 4 implements direct actions (fencing, reductions in Authorized Use, etc.) to reduce livestock disturbance; therefore, it could have a greater positive cumulative effect in a shorter timeframe.

Consistency with Grasslands Plan—Woody Draws

There are no standards in the Grasslands Plan that specifically address woody draws. There are, however, two guidelines that do address woody draws. They are as follows:

Design and implement livestock grazing strategies to provide for thick and brushy understories and multi-story and multi-age structure in riparian habitats, wooded draws, and woody thickets, contingent on local site potential. **Guideline** (Grasslands Plan, p. 1-13)

Alternative 1 would meet this guideline in the shortest period of time because it would remove the primary disturbance factor affecting At Risk and Unhealthy woody draws. Alternative 2 maintains the status quo, which is not conducive to meeting this guideline. Initial actions under Alternative 3 are projected to improve woody draws in 11 of the 32 allotments rated as At Risk or Unhealthy, but the proportion of Healthy sites would be unlikely to increase by more than 4 percent. Of the remaining 21 allotments 15 would maintain their current condition and 6 would experience a decrease in health. Under Alternative 3A, 8 allotments would improve, 15 would remain neutral, and 9 would experience a decrease in woody draw condition. Alternative 4 would improve At Risk and Unhealthy woody draws in 21 of the 32 allotments. Of the remaining 11 allotments, 7 would remain unchanged and 4 would decrease. The net effect of proposed actions is predicted to increase the proportion of Healthy woody draws from the current level of 51 percent to 59 percent

Alternatives 3, 3A, and 4 are all adaptive by design. If the initial proposed actions under these alternatives are not successful in moving At Risk and Unhealthy woody draws towards this guideline, then adaptive options and other tools contained in the tool box would be implemented to achieve this guideline.

Manage livestock grazing to maintain or improve riparian/woody draw areas. Implement the following practices:

• Avoid grazing activities, such as feeding, which concentrate livestock in riparian/woody draw areas. **Guideline** (Grasslands Plan, p. 1-19)

Feeding in woody draws is not allowed on any allotment in the project area. Annual Operating Instructions identify that feeding is not to be conducted in sensitive areas such as woody draws.

This guideline would not apply to Alternative 1 because livestock would be removed under the alternative. Alternative 2 maintains the status quo, so existing activities that are currently concentrating livestock in woody draws would continue unabated.

Livestock are attracted to woody draws for a number of reasons, the primary ones being water and shade. Alternatives 3, 3A, and 4 implement a variety of different initial management actions, such as relocating water developments, fencing, reducing Authorized Use, etc., to reduce the effects of livestock on woody draws. If initial actions were not successful in meeting this guideline, then adaptive options or other tools from the toolbox would be implemented under Alternative 3, 3A and 4 to achieve the guideline.

HERBACEOUS STRUCTURE

Introduction

Herbaceous structure refers to the height and density of herbaceous plants. Herbaceous plants are non-woody plants, i.e., grasses and forbs. The Northern Great Plains (NGP) Viability Report (2000) identified that under preEuro-American settlement conditions the primary ecological processes on the mixed grass prairie affecting herbaceous structure were (1) climate; (2) herbivory by large animals (bison, elk, and pronghorn) and small herbivores (the black-tailed prairie dog and grasshoppers); and (3) fire. These natural disturbance processes produced a diversity of herbaceous structure habitats occupied by a diversity of fauna.

Today, the primary influences on herbaceous structure in the project area are generally limited to climate and livestock herbivory. Formerly, herbivory by wide ranging bison herds was one of high intensity and short duration followed by a 2- to 3-year period of rest (Higgins 1986). In contrast, grazing by domestic livestock is characterized by high intensity over long duration followed by short lengths of rest, depending on the grazing system and management scenario (USDA 2000 NGP Viability Report). These two scenarios produce differing structure mosaics across the landscape.

The Grasslands Plan recognized the role of herbaceous structural diversity and its role in influencing the diversity and abundance of plants and animals, hydrology, and availability of forage for both domestic and wild grazing animals. This section looks at the existing structure in the project area and compares it to the Desired Condition for herbaceous structure as defined by the Grasslands Plan.

Spatial and Temporal Setting

The analysis area for the structure is the NFS lands located in the 43 grazing allotments located in northern Billings County, ND. As there are no other management factors influencing structure located outside of the area that would dictate a different analysis area, this is an appropriate analysis area for structure. The temporal setting is 10 to 15 years from the signing of the Final ROD for this project proposal.

Methodology

The Grasslands Plan identifies structure objectives. Specifically, in order to meet the structure objectives, there must be approximately 10-20 percent low vegetative structure, 50-70 percent moderate structure, and 20-30 percent high structure (Grassland Plan, Ch 2, pp. 2-13 and 2-21). These objectives are to be applied to biologically capable lands (2006 DPG Grazing ROD, p. 17). The Visual Obstruction Reading (VOR) methodology is used by the DPG and in this analysis to measure and quantify residual herbaceous cover, i.e., structure. The Grasslands Plan describes desired structure in terms of VOR. The VOR measurements associated with each structure class are: low structure at 0 to 1.49 inches, moderate structure at 1.5-3.5 inches, and high structure at greater than 3.5 inches (Ch.2, pp. 2-13, 2-21).

VOR is obtained through the use of a pole called a Robel pole. The pole is painted in one-inch, alternating white and gray bands. A 1-meter sight pole is attached to a graduated pole with a 4-meter string. The graduated pole contains a spike on the bottom end, which is used to anchor the pole when readings are taken. Once the graduated pole is anchored, the person taking the reading stretches out the 4-meter string and takes four readings at approximately 90-degree intervals (Figure 3.13). At each 90-degree interval the reading is taken at a 1-meter height and the lowest partially or wholly visible band is then recorded as the VOR value.

The four VORs at each station were averaged to get a mean for each station. A VOR transect consists of 20 stations located at approximately 10-meter or 5-pace (10-step) intervals along each transect. The overall mean for the transect was then calculated from the 20 station means.

Within the herbaceous communities, VORs were taken on areas that were "biologically capable" of producing high structure. For this analysis**,** habitat types were used to define those areas. This approach is in keeping with the DPG direction identified for SRT Recommendation I-3 in the DPG Final Response to the Scientific Review Team Report 2006. A habitat type is a unit of land that has similar soils, topography, aspect, climate, elevation, and potential vegetation. Habitat types identify, in terms of plant communities, what a particular area is capable of supporting, regardless of the existing plant community. The habitat types used to identify biologically capable areas were western wheatgrass/green needlegrass, western wheatgrass/green needlegrass/blue grama, western wheatgrass/needle-and-thread grass, silver sage/western wheatgrass, big sage/western wheatgrass**,** and western snowberry.

Figure 3.13 — Person reading a Robel pole to obtain VOR.

The western wheatgrass/green needlegrass/blue grama habitat

type was dropped from consideration because the few acres (252 acres) of this habitat type, distributed across the project area, could not be effectively sampled. The Grasslands Plan definition of biologically capable also included the needle and thread/sedge habitat type. There are 69 acres of this habitat type in the project area. It was dropped from the analysis for the same reason as the western wheatgrass/green needlegrass/blue grama habitat above. Sites dominated by crested wheatgrass were also considered biologically capable. Of the roughly 87,263 acres of NFS lands in the project area, 54,375 acres (Table 3.19) are identified as biologically capable of producing high structure.

Table 3.19 — Approximate acres of the biologically capable habitat types in the project area

Habitat Type (HT)	Acres
Western wheatgrass/green needlegrass	31,502
Western wheatgrass/green needlegrass/blue grama	252
Western wheatgrass/needle-and-thread grass	14,196
Needle and thread/sedge	69
Silver sage/western wheatgrass	4,412
Big sage/western wheatgrass	2,568
Western snowberry	1,377
Total acres	**54,375**

If transects located in the three grass/shrub habitat types were dominated or codominated by shrubs, they were separated in the analysis. This was done because it is generally considered inappropriate to analyze or lump shrubs and herbaceous dominated data together (Uresk, personal communication, 2009; Smith 2008).

The SRT recommended that the DPG summarize VOR transect data at the station level rather than by averaging together all the stations along a transect (SRT 2005. p. 14). The DPG response was that it will provide the data in both formats in the future (see Final Response to the SRT Reposts, Recommendation II–2). However, interpreting station averages requires a different definition for high structure in order to account for the actual nest site needs of sharp-tailed grouse and other ground nesting species, such as Baird's sparrow. It was recommended during the SRT process that a station average of 5.5 inches or greater would define High structure (see Final Response to the SRT Reposts, Recommendation II–2). This analysis adopted that recommendation.

During the SRT process, the focus of the station average versus transect average discussion was about High structure and whether one method would produce better information than the other. Apparently there was no discussion about the class sizes for Low and Moderate structure related to the station average approach. For the station average analysis, Low structure was defined as 0 to 1.49 inches and Moderate as 1.5 to 5.49 inches.

A detailed explanation of stratification, sampling, and data collection methodologies are located in Appendix B of the Wildlife Report (Project Record, Specialist Reports and Notes).

COOPERATIVE MONITORING DATA

The 2008 and 2009 VOR data collected through the cooperative effort between the Forest Service, NDSU, and the MGA was reviewed in light of this analysis. The VOR data collected by NDSU was taken from plots throughout the growing season. NDSU's objective in collecting VOR data in this manner was to determine if there is a correlation between VOR and graminoid production. This analysis collected VOR data along a transect in the fall of the year, when herbaceous growth and grazing are generally completed. The data were used to determine the amount of structure in allotments and across the landscape. The NDSU and Forest Service VOR data sets are not compatible because of differing objectives, design criteria, and methodologies; therefore, the 2008 and 2009 VOR data could not be used in this project analysis.

Affected Environment—Herbaceous Structure

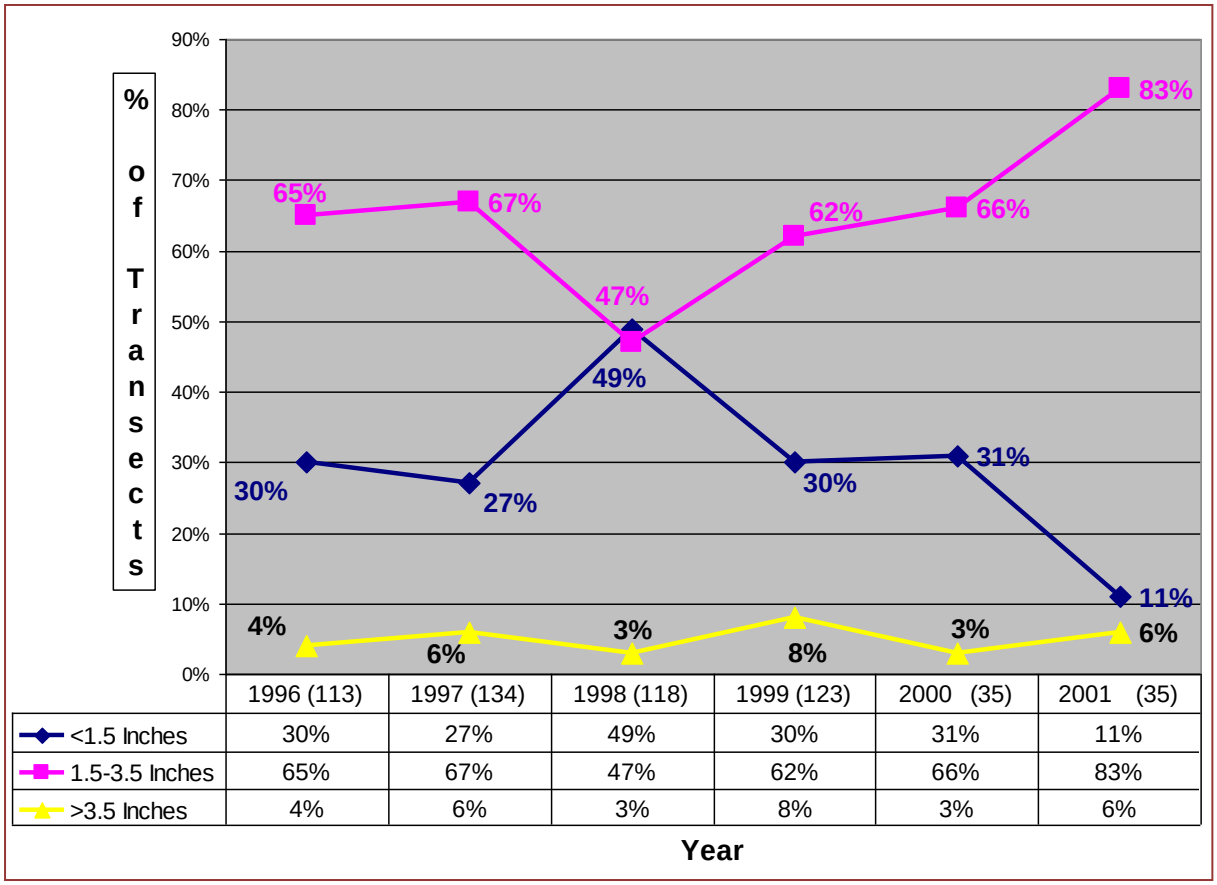
This section provides a general description of information related to herbaceous structure for the project area. A detailed description of the existing condition of herbaceous structure in each allotment is provided in Part 2 of this chapter.

EXISTING CONDITION

VOR measurements were used to describe the existing condition of herbaceous structure in the project area. The LMNG has been collecting VOR measurement since 1996. Between 1996 and 2001, structure data was collected on approximately 350 transects scattered across the LMNG. This broad-scale effort was used by the Northern Great Plains Land and Resource Management Plan Revision process to identify how structure was distributed across the landscape. In general, this information showed that grassland structure across much of the LMNG was strongly skewed towards the lower levels (NGP FEIS, pages 3 to188).

Transects located on NFS lands in Billings County were segregated from the above data set and analyzed. Figure 3.14 shows the range of High, Moderate, and Low structure from transects surveyed from 1996 through 2001 in Billings County.

Figure 3.14 shows that between 1996 and 2001, in Billings County, 3 to 8 percent of the surveyed transects had a VOR average greater than 3.5 inches (High structure), approximately 47 to 83 percent averaged a VOR rating of 1.5 to 3.5inches (Moderate structure), and roughly 11 to 49 percent had VOR ratings of less than 1.5 inches (Low structure). This transect information shows that herbaceous structure during that time period was skewed towards Low and Moderate classes with a minor amount of High structure.



	1996 (113)	1997 (134)	1998 (118)	1999 (123)	2000 (35)	2001 (35)
<1.5 Inches	30%	27%	49%	30%	31%	11%
1.5-3.5 Inches	65%	67%	47%	62%	66%	83%
>3.5 Inches	4%	6%	3%	8%	3%	6%

Figure 3.14 — 1996 to 2001 VOR transect data from NFS lands, Billings County, ND.

Of the 350 transects noted above, 42 are located within the project area. Figure 3.15 shows the distribution of VOR transects in terms of structure. For example, between 1996 and 1999, high structure varied from 4.8 percent to 20 percent of the surveyed transects. Moderate structure ranged from about 56 percent to 70 percent, and Low structure from roughly 23 to 36 percent during the same period. The figure shows that, in general, Moderate structure was meeting the Grasslands Plan objective, i.e., 50 to 70 percent. Low structure exceeded the high end (20 percent) of the Grasslands Plan objective by 3 to 16 percent. High structure ranged from about 5 to 20 percent. This means that in 1999 the High structure objective of 20 to 30 percent was met; however, in the preceding years the amount of High structure was significantly below the 20 to 30 percent High structure objective.

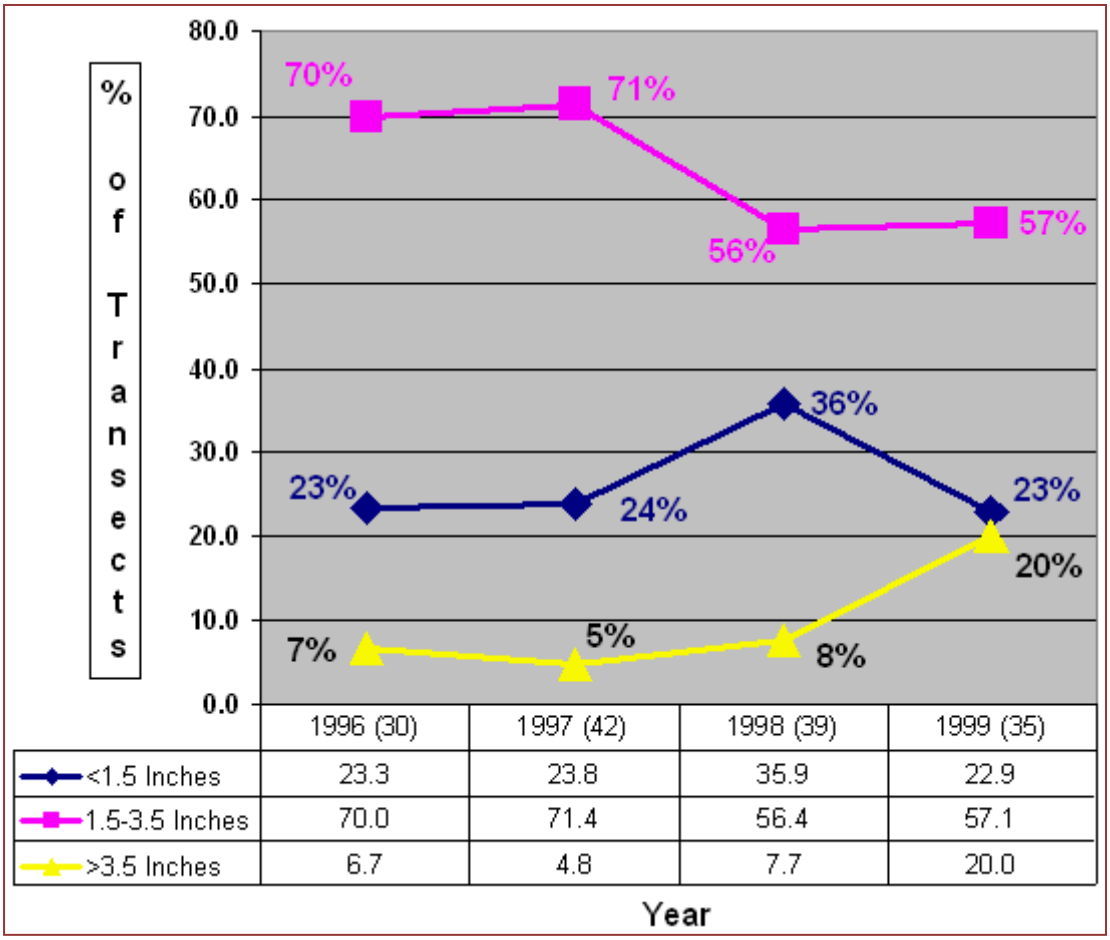


Figure 3.15 — 1996 to 1999 VOR transect distribution within project area. The numbers in parentheses are the number of transects sampled in that year.

In 2004, a total of 183 VOR transects were located in the project area. This represents a sampling intensity of approximately 1 transect per 320 acres of biologically capable habitat type. Of the 183 transects, 22 had shrubs (such as western snowberry or silver sage) listed as dominant or co-dominant vegetation on the data sheets. These transects were separated in the analysis because, as previously stated, it is thought to be generally inappropriate to analyze or lump shrubs and herbaceous dominated data together (Uresk, personal communication, 2009; Smith 2008).

The 2004 transect information (Figure 3.16) shows that approximately 53 percent of the transects were in the 1.0- to 1.49-inch class (Low structure), 47 percent in the 1.5- to 3.5-inch class (Moderate structure), and 1 percent in the greater than 3.5-inch class (High structure). This information shows that structure in the project area continued to be skewed to Low and Moderate structure, with insufficient High structure to meet Grasslands Plan objectives.

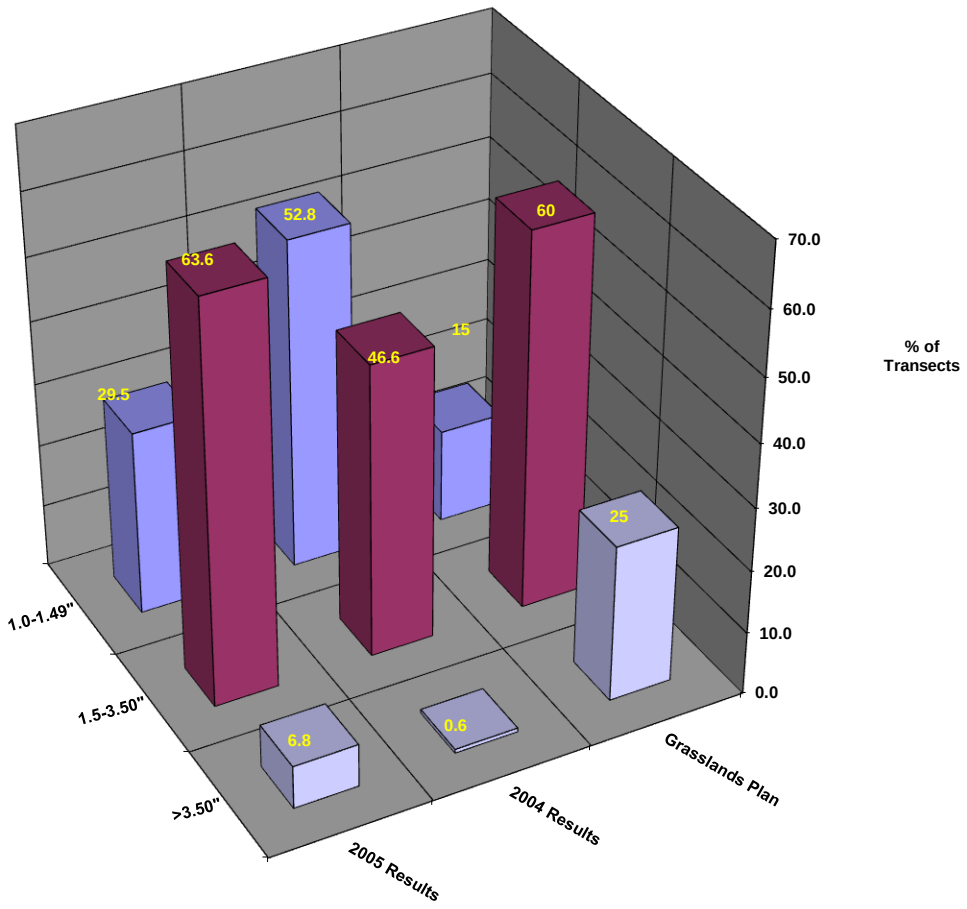


Figure 3.16 — Herbaceous dominated structure transect results expressed as percentages for the project area (2004 and 2005 results) and Grasslands Plan objectives.

It is important to put 2004 in context of what was happening climatically. According to the North Dakota Agricultural Weather Network (NDAWN), during the months of April through September 2004, precipitation in Billings County, ND, was approximately 50 to 75 percent of normal for the analysis area. The Grasslands Plan (p. G-15) defines drought as 75 percent or less of normal annual precipitation. There was some moisture recovery in September and October of 2004. In 2005, precipitation for April to September in Billings County was 25 to 50 percent above average annual precipitation. Given the climatic events in 2004, a reduction in High structure would be expected, but not to the 0.6 percent level.

The transect information from 2005 shows some recovery from the 2004 drought (Figure 3.16). High structure increased from less than 1 percent to almost 7 percent. Low structure decreased from about 53 percent to 29 percent, and Moderate structure increased from 47 to 64 percent. These results are likely the result of increased precipitation and a mandatory 20 percent animal

unit reduction put in place in 2005 as a result of the 2004 drought. In addition to the reduction in animal units, turnout onto crested wheatgrass and native pastures was delayed until May 15 and June 1, respectively.

Table 3.20 summarizes where each allotment falls in relation to Grasslands Plan structure objectives. Review of the 2004 transect data, field visitations (2006), and IDT discussion determined that structure objectives were being met on allotments 132A, 239, 241, 243, 248, 282, 287. A total of 12 allotments are not meeting Low or High structure but are meeting Moderate objectives. Twenty-one allotments are not meeting any of the objectives. Two allotments are meeting Low structure but not Moderate or High structure objectives. One allotment is a hay pasture.

Table 3.20 — Distribution of allotments in relation to Grasslands Plan structure objectives

Allotments	Meeting Structure Objectives		
	Low	Moderate	High
132A, 239, 241, 243, 248, 282, 287	Yes	Yes	Yes
126,128,131,132H, 133, 140,230, 240,256, 272,283,288	No	Yes	No
127,130,134,135,136/139,141,142, 158,220,221,237, 244,249,258, 278,286,289,300,301,302	No	No	No
126,277	Yes	No	No
133D5 Hay	N/A[1]		

[1]This is a small allotment (78 acres) with two permittees, half of the allotment (39 acres) is hayed every other year, and half (18 acres) of the remaining half is hayed annually.

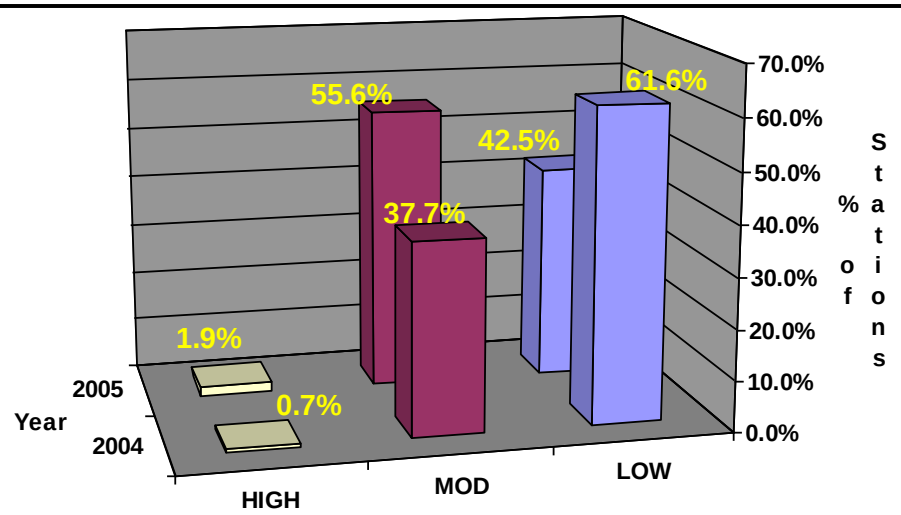
Field Visitations—2006

Results of the 2004 data collection were shared with the grazing permittees in the project area, who were then given the opportunity to challenge an issue if they felt their allotment was meeting Grasslands Plan objectives. Several permittees issued challenges related to the amount of High structure present on their allotments. The IDT revisited these allotments and several others in 2006 and ran additional VOR transects. The transect locations were purposely biased to survey areas of the highest structure that could be found. Allotments 126/128, 127, 129, 132A, 239, 272, 278, and 281 were revisited. Two allotments, 132A and 239, had at least 20 percent High structure, the remaining allotments did not meet the High structure objective.

VOR at the Station Scale

In the response to SRT Recommendation II-1, this analysis used both transects and stations to describe the existing structure distribution (USDA 2006) in future analyses. That information is provided in Figure 3.17 for 2004 and 2005. As described earlier in the Methodology section, station analysis requires new definitions for High, Moderate and Low structure classes because of the site-specific nature of stations. High structure for station averages is a VOR of 5.5 inches or greater (ibid.). The primary concern during the SRT process was with High structure; however, all three structure levels are provided in Figure 3.17, which summarizes the station data for herbaceous dominated transects within the project area.

The 2004 station data represented in Figure 3.17 shows that within the project area there was very little High structure present (0.7 percent), a high amount of Low structure (62 percent), and a low amount of Moderate structure (38 percent). Year 2005 shows a limited recovery of High structure (0.7 to 1.9 percent), a reduction in Low structure (43 percent), and Moderate structure (56 percent) nearing objectives



	2004	2005
LOW	61.6%	42.5%
MOD	37.7%	55.6%
HIGH	0.7%	1.9%

Figure 3.17 — 2004 and 2005 VOR distribution of stations within herbaceous dominated transects within the project area.

As previously noted, 2004 was a dry year, so an increase in Low structure and a decrease in High structure would be expected but not to the degree indicated by the data. The 2005 data show about a 1 percent recovery in High structure and approximately an 18 percent reduction in Low structure. These changes could be explained by increased precipitation and the mandatory 20 percent animal unit reductions and turnout restrictions put in place in early 2005.

A comparison of 2004 and 2005 VOR data for project-level transect averages and station average methods is presented in Table 3.21. Information in the table indicates that while there are some differences in the figures, they are minor in nature. Both methods of analyzing the VOR data show a skewed distribution of structure towards Low and Moderate structure classes and a minimal amount of High structure. As noted previously, High structure for the VOR transect average is a VOR reading of greater than 3.5 inches, and for the station average a VOR reading of greater than or equal to 5.5 inches.

Table 3.21 — Comparison of transect and station averages and Grasslands Plan structure objectives for 2004 and 2005 sample years

	TRANSECT AVE.		Grasslands Plan	STATION AVE.	
	2004	2005		2004	2005
High structure	0.6%	6.8%	20-30%	0.7%	1.9%
Mod structure	46.6%	63.6%	50-70%	37.7%	55.6%
Low structure	52.8%	29.5%	10-20%	61.6%	42.5%

Summary

A review of the LMNG, Billings County, project area, and allotment level VOR transect information from 1996 to 2005 shows a bias towards Low and Moderate structure classes and a scarcity of High structure. Overall, Grasslands Plan structure objectives for High and Low herbaceous structure are not being achieved in the project area.

Structure objectives are being met on allotments 132A, 239, 241, 243, 248, 282, 287. A total of 12 allotments are not meeting Low or High structure but are meeting Moderate objectives. Twenty-one allotments are not meeting any of the objectives. Two allotments are meeting Low structure but not Moderate or High structure objectives. One allotment is a hay pasture (see Table 3.20).

It is acknowledged that 2004 was a drought year and that structure would tend to shift towards Low and Moderate; however, the near total absence of High herbaceous structure (<1 percent) should not be expected or desired (Grasslands Plan, p. 1 to 13). Because of a lack of residual structure from 2004, herbaceous structure remained below structure objectives for 2005 despite moisture recovery, stocking reductions, and turn-out restrictions. Analyzing the allotment VOR data under the transect and station methodologies provided essentially the same results.

DESIRED CONDITION

The desired condition for herbaceous structure is identified in Chapters 1 and 2 of the Grasslands Plan. The following direction is provided by the Grasslands Plan:

Goal 1.c: Increase the amount of forests and grasslands restored to or maintained in a healthy condition with reduced risk and damage from disturbance processes, both natural and human-controlled (Grasslands Plan, p 1-3).

Objective: Within 10 years, implement management practices, including prescribed fire that will move landscapes toward desired vegetation composition and structure as described in Geographic Area direction" (Grasslands Plan, Ch 1, p 1-3).

Badlands and Rolling Prairie Geographic Areas: The project area contains Rolling Prairie and Badlands geographic areas. The identical structure objectives for both of these geographical areas are presented in Table 3.22 (Grasslands Plan pp. 2-13 and 2-21).

Table 3.22 — Grasslands Plan structure objectives for the Rolling Prairie and Badlands Geographic Areas

Structure Objectives		
Low	Moderate	High
10-20%	50-70%	20-30%

Capability

Some comments in response to the publication of the DEIS stated that there was no process to determine whether the land can produce the vegetation structure to meet the assigned VOR objectives. These comments revolve around the concern that biologically capable lands, as defined by the Forest Service, are not capable of producing high structure. The Grasslands Plan (Appendix H) defines High structure as a VOR transect average of greater than 3.50 inches. VOR transects conducted on the Medora Ranger District for various purposes from 1996 to 2009 show that the habitat types used to define biologically capable are capable of producing High structure. One hundred and nineteen VOR transects surveyed during that time measured VORs ranging from 3.5 to 7.96 inches. The VOR transects encompassed all the habitat types except for one (Table 3.23) included in the definition of biologically capable lands. VOR transects measured across the Medora Ranger District from 1996 to 2009 show that approximately 6 percent of these transects had VORs greater than 3.5 inches.

Table 3.23 — Summary of VOR transects supporting High structure by biologically capable habitat type on the Medora Ranger District

Habitat Type Name	HT Number	Number of High structure transects	[1]Percentage of the High structure transects
Western wheatgrass/needle and thread	6	21	18
Western wheatgrass/green needle	7	77	65
Silver sage/western wheatgrass	31	18	15
Big sage/western wheatgrass	42	1	1
Western snowberry	150	3	3
Needle and thread/sedge	147	0	0

[1] Percentages are rounded to nearest whole number.

The western wheatgrass/needle and thread (HT 6) and western wheatgrass/green needle (HT 7) habitat types account for 84 percent of the biologically capable lands in the project area (Table 3.19). The needle and thread/sedge (HT 147) accounts for less than 1 percent of the LMNG and has not been sampled. In the project area HT 147 accounted for less than 69 acres of this habitat type. Because of the small amount of this habitat type, it was not sampled.

Adjacent to the Medora Ranger District is the McKenzie Ranger District; together these two districts encompass the LMNG. The McKenzie District contains the same habitat types used in the definition of biologically capable lands as the Medora District. A review of VOR transects conducted during 2001 and 2002 for the 2006 Northeast McKenzie Allotment Management Plan Revisions FEIS (NE McKenzie FEIS) shows that high herbaceous structure is attainable on these habitat types. Within that project area, 46 VOR transects measured VORs of 3.51 or greater (Table 3.24).

Table 3.24 — Summary of VOR transects supporting High structure on biologically capable habitat types in the NE McKenzie FEIS project area

Habitat Type Name	HT Number	Number of High Structure Transects	[1]Percentage of the High Structure Transects
Western wheatgrass/needle and thread	6	8	17
Western wheatgrass/green needle	7	33	72
Silver sage/western wheatgrass	31	2	4
Big sage/western wheatgrass	42	0	0
Western snowberry	150	3	7
Needle and thread/sedge	147	0	0

[1] Percentages are rounded to nearest whole number.

Also on the McKenzie District, in the fall of 2009 in Pasture 10, three transects measured VORs ranging from 3.69 to 4.13 inches in HT7. These transects accounted for 9 percent of the transects measured in that pasture. Pasture 11 in the fall of 2008 had seven transects with VORs ranging from 3.51 to 6.15 inches; six were located in HT 7 and one in HT 31. Ten percent of the VOR transects in Pasture 11 measured High structure.

The above information shows that the habitat types used in the definition of biologically capable lands are capable of supporting High herbaceous structure as defined by the Grasslands Plan.

Environmental Consequences—Herbaceous Structure

Direct and Indirect Effects

Alternative 1

Under this alternative all livestock would be removed from the NFS lands 2 years after the MGA is notified of the decision in accordance with Forest Service handbook direction. All range structures and water developments would be removed other than those deemed necessary for other resource management objectives.

With no grazing pressure other than that resulting from wildlife there would be a shift in the structure mosaic across the project area. Moderate and High structure would increase and the amount of Low structure would decrease, meeting or exceeding structure objectives identified in the Grasslands Plan.

Vegetation species composition would be expected to improve, at least in the short term, towards a later seral state. However, without periodic disturbance, once later seral stages are reached the herbaceous community, particularly forbs, may start to decline and eventually stagnate. This would result in a shift to lower structure classes. Non-native invasive grasses such as smooth brome and Kentucky bluegrass may begin to dominate more sites within the project area reducing the native component of the plant communities. The "shifting mosaic" of vegetative structure identified in the Grasslands Plan (pp. 2-11, 2-18,), would not be addressed since there would be no periodic large-scale disturbance such as livestock grazing within the project area. Occasional wildfires and prescribed burns could provide some short-term habitat diversity, which would provide a mosaic of structure more consistent with Grasslands Plan structure objectives.

The effects of drought on High herbaceous structure would be lessened as no grazing would be permitted. High structure would remain available, though likely of lower quality, throughout the drought period. Given the increase in vegetation the opportunity for more wildfires of larger size and duration may increase.

Alternative 2

This alternative maintains exiting Authorized Use, grazing rotations, allotment arrangements, in short, the status quo. Current management direction for each allotment in the project area is located in Part 2 of this Chapter.

As this alternative would maintain current management direction, existing structure conditions will likely continue to reflect those identified in the Existing Condition section above. Essentially the skewed distribution towards Low and Moderate structure would continue, as would the continued shortfall in high structure.

Alternative 3

The initial actions of this alternative include establishing, changing, or maintaining rotational grazing systems; additional range improvements such as fencing, water development, range pipelines, etc, on approximately a third of the allotments; and range water management. Authorized Use would be Preference.

Grazing systems—The use of rotational systems to address structure concerns appears to be of limited benefit according to Briske (2008), Holechek (1999), Hart et al. (1993), Salo (2004), Van Poollen and Lacey (1979), and others. They identify that rotational grazing offers no perceived vegetative benefits over continuous grazing under similar stocking rates and that the general effect is towards even utilization of the forage base, which may result in the project area being skewed towards Moderate structure. Therefore, changing or maintaining grazing rotation systems while maintaining current Authorized Use levels appears to generally favor a continuation of the existing structure situation. Because rotation grazing systems influence the duration and time of pasture use, it is possible that some herbaceous structure improvement at the pasture scale may occur but the actual outcome is uncertain.

Infrastructure—Under this alternative, 17 of the 43 allotments would receive additional range infrastructure (i.e., range water, water pipelines, tanks, or fencing). The development or extension of existing water sources via pipelines affects livestock use patterns and, indirectly, structure. Managing access to water affords an opportunity for vegetation regrowth or reduced utilization by controlling the duration of grazing on a portion of the allotment or pasture. This provides a chance for some Low structure to recover into a higher structure class. However, according to the Northern Great Plans (NGP) FEIS (page 3-240), the effect of increased infrastructure such as water development, tends to increase the overall harvest efficiency by livestock. This means the forage base is utilized more evenly across the entire pasture, which under this alternative tends to favor Moderate or Low structure. It is possible that increasing water infrastructure may adversely affect High structure because formerly underutilized areas (i.e., secondary range) containing High structure may now be exposed to more intensive grazing pressure.

Fencing can have many of the same effects as water development. Reducing a larger area into smaller pastures favors increased herbaceous structure homogeneity (USDA 2001b) and increased harvest efficiency because livestock tend to utilize the forage in smaller areas more thoroughly. Also, existing high structure areas may receive more utilization resulting in a lower structure class. Conversely, creating a crested wheatgrass pasture, if feasible, may provide additional regrowth time to increase herbaceous structure levels.

Stocking Level—The Wildlife Report (Project Record, Specialist Reports and Notes) notes that Holechek et al. (1989), Reece (1991), Hart et al. (1993), Briske et al. (2008), and others, have identified that stocking is the most important variable in managing range vegetation. Derner and Hart (2007) and Holechek et al. (1989) also note that lighter stocking levels result in higher levels of standing crop, which equates to higher structure. Conversely, heavy grazing has the reverse effect. When Authorized Use exceeds carrying capacity there is greater utilization of the

existing forage, which results in a greater amount of Low to Moderate structure. If Authorized Use is at or below the carrying capacity, then high structure may increase to some degree; however, the level of increase would depend upon a variety of factors such as the time, intensity, and duration of livestock grazing and would be monitored to see if additional adjustments in Authorized Use or timing of grazing are warranted.

Given that grazing systems, infrastructure, and the existing Authorized Use levels tend to favor homogenous structure, it does not appear that under the initial actions of this alternative High structure objectives will be achieved. Adaptive management actions may be necessary to provide appreciable movement towards structure objectives, in particular High structure.

The Wildlife Report (Project Record, Specialist Reports and Notes) concludes that some Low structure may move to the Moderate category. However, the opportunity to increase the amount of High structure appears unlikely because of the homogenization effects of increased infrastructure and rotational grazing systems and the lack of Authorized Use adjustments.

Table 3.25 summarizes the predicted results of implementing initial actions under Alternative 3. The results are identified in terms of improving, no change, or a decrease in the amount of High structure and structure objectives in general.

Under this alternative 30 allotments are projected to have no change; however, six of these allotments are currently meeting structure objectives. Twelve allotments are projected to decrease High structure; of these allotments, one is currently meeting structure objectives. One allotment is hayed, and the structure objective is not applied to it.

Adaptive management under Alternative 3 includes all of the above-mentioned types of range management tools plus the ability to adjust Authorized Use. Adaptive management tools are identical to those of Alternative 4; the difference between the two alternatives in relation to adaptive management is the rate of expected change. See the adaptive management discussion under Alternative 4 below for more detail.

Table 3.25 — Summary of predicted effects on High structure and structure objectives in general, Alternative 3

Allot #	Improve	No Change	Decrease	Allot #	Improve	No Change	Decrease
126			X	240			X
127		X		[1]241		X	
128		X		[1]243			X
129			X	244		X	
130		X		[1]248		X	
131		X		249		X	
[1]132A		X		256		X	
132H		X		258			X
133		X		272			X

Allot #	Improve	No Change	Decrease	Allot #	Improve	No Change	Decrease
[2]133D-5		N/A		277			X
134		X		278		X	
135		X		281			X
136/139		X		[1]282		X	
140		X		283			X
141		X		286		X	
142		X		[1]287		X	
158		X		288		X	
220		X		289			X
221		X		300			X
230		X		301		X	
237			X	302		X	
[1]239		X					

[1]These allotments are currently meeting herbaceous structure objectives.
[2] This allotment is hayed.

Alternative 3A

This alternative is essentially the same as Alternative 3 with the exception of 16 different actions added or deleted from 14 allotments (see Chapter 2, Alternative 3A description). The added or deleted actions for the affected allotments will not appreciable affect structure on these allotments; therefore, the effects are the same as Alternative 3.

There are no changes in adaptive options between Alternative 3 and 3A with the exception of Allotment 135, which changed an adaptive action to an initial action. That action is addressed above. The effects of the adaptive actions are the same as those identified in under Alternative 3.

Alternative 4

Alternative 4 is similar to Alternative 3 in the use of management tools such as implementation or changes in rotations, but does not utilize range infrastructure to the extent Alternative 3 does. In addition to these actions, Alternative 4 includes Authorized Use based on carrying capacity with an adjustment for livestock weight. This alternative is also adaptive management based.

Table 3.26 summarizes the predicted results of implementing initial actions under Alternative 4. The results are identified in terms of improving, no change, or a decrease in the amount of High structure and structure objectives in general.

Table 3.26 — Summary of predicted effects on High structure and structure objectives in general, Alternative 4

Allot #	Improve	No Change	Decrease	Allot #	Improve	No Change	Decrease
126			X	240	X		

Allot #	Improve	No Change	Decrease	Allot #	Improve	No Change	Decrease
127	**X**			[1]241		**X**	
128	**X**			[1]243	**X**		
129	**X**			244	**X**		
130	**X**			[1]248	**X**		
131	**X**			249	**X**		
[1]132A		**X**		256		**X**	
132H	**X**			258		**X**	
133	**X**			272	**X**		
[2]133D-5		**N/A**		277		**X**	
134	**X**			278	**X**		
135	**X**			281	**X**		
136/139	**X**			[1]282	**X**		
140	**X**			283		**X**	
141	**X**			286		**X**	
142		**X**		[1]287	**X**		
158	**X**			288	**X**		
220	**X**			289		**X**	
221	**X**			300		**X**	
230	**X**			301	**X**		
237		**X**		302		**X**	
[1]239	**X**						

[1]These allotments are currently meeting herbaceous structure objectives.
[2] This allotment is hayed.

Under the initial actions of this alternative, 29 allotments are projected to move towards structure objectives. Seven of the 29 are currently meeting structure objectives; however, initial actions could further improve structure distribution in 5 of the allotments, and 2 would remain unchanged. No changes to the current structure distribution are projected for 12 allotments. One allotment would shift the structure distribution more towards Moderate and Low structure. One allotment is hayed, and the structure objective is not applied to it.

If monitoring shows that initial actions are not meeting or making acceptable progress towards structure objectives additional reductions in Authorized Use or other management actions may be needed. The adaptive options identified under this alternative in combination with the tool box offer an array of different tools that could be used to further address structure objectives. However, as pointed out under Alternative 1 above, stocking rate is the most import variable in managing range vegetation.

CUMULATIVE EFFECTS

Cumulative effects result from the combination of effects resulting from past, present, and reasonably foreseeable actions plus the direct and indirect effects of the alternatives. A discussion of past and present actions, reasonably foreseeable actions, and a summary of the cumulative effects by alternative follows.

Past and Present Actions

The following past and present actions have contributed to the existing array of herbaceous structure in the project area.

Livestock grazing has affected and continues to affect herbaceous structure in the project area. In the past, the effects of unregulated livestock led to overgrazing. On the LMNG, unregulated grazing has been replaced by managed grazing. Domestic livestock have replaced the large herbivores of the past and they are the primary factor affecting herbaceous structure across the LMNG and project area. Currently 12 allotments are not meeting Low or High structure objectives but are meeting Moderate objectives. Twenty-one allotments are not meeting any of the structure objectives. Two allotments are meeting Low structure but not Moderate or High structure objectives. One allotment is a hay pasture.

Oil and gas development has resulted in the creation of an extensive all-weather road system. The road system has provided new or improved access to some formerly inaccessible or seasonally accessible grazing areas known as secondary range. Secondary range can serve as a reserve for High structure herbaceous vegetation. Because of the road system, secondary range is now subject to increased grazing pressure, which directly affects High structure in those areas. Maintenance of existing oil and gas facilities and roads assures that access to secondary range will be maintained.

When *noxious weeds and invasive grasses* first appeared in the project area is unknown. Some invasive species such as crested wheatgrass appeared sometime the 1930s, when it was successfully used in the reclamation of sub-marginal lands. Oil and gas development and winter feeding of livestock have also introduced or spread noxious weeds and invasive grasses. The primary past, current, and future effect of these groups of plants is that they alter or replace native plant communities, which in turn affects the distribution of structure across the landscape. Despite the adverse effect on native species, invasive grasses such as annual brome, crested wheatgrass, and Kentucky bluegrass can supply High structure, which is the most limiting structure class in 36 of the 43 allotments in this project.

Wildfire once played an active role in the configuration of the herbaceous structure mosaic across the landscape. For more than a century wildfire has been actively suppressed on private, state, and federal lands. This has deprived the uplands of the beneficial effects of fire such as nutrient cycling, removal of excess litter, and promoting a flush of new growth. Fire also reduces shrubs such as western snowberry and plants such as club moss, often resulting in a flush of new grasses

such as western wheatgrass, green needle grass, etc., which are all capable of producing High structure. Another lost benefit may be the effect fire has on controlling or reducing the spread of invasive grass species.

Drought is a recurring natural event in western North Dakota that affects herbaceous structure, as demonstrated by the 2004 VOR data. The lack of moisture adversely affects plant growth, so the amount of High structure is naturally less. Livestock grazing during drought further reduces the amount of High structure.

Reasonably Foreseeable Actions

Elkhorn Ranchlands. The recently purchased Elkhorn Ranchlands require that the Grasslands Plan be amended to establish management direction for the newly acquired lands. Approximately 800 acres of the 5,200 acre Elkhorn purchase are directly associated with five of the allotments in the North Billings project. Under the proposed amendment these lands would be managed in accordance with the adjacent management area which is MA 3.65 Rangelands with Diverse Natural Appearing Landscapes. In the interim, as directed by 36 CFR 254.3(f)(2008), this portion of the purchase is being managed in accordance with the adjacent MA 3.65. If the proposed action is selected and implemented there would be no change over the current situation.

The proposed Grasslands Plan amendment also includes establishing a special interest area (SIA) for the remaining 4,400 acres of the purchase and approximately 17,160 acres contained in grazing allotments 279 and 280, which were associated with the Elkhorn Ranchlands. If implemented the SIA would establish a forage reserve on those acres. The reserve would provide a place to move livestock to in the event an allotment is burned out or if management actions such as a prescribed fire or additional rest were needed to help restore high structure an allotment(s).

Travel Management Plan. An environmental assessment (EA) for travel management on the LMNG was released for comment in 2010. The proposed action under this EA would close all single-use oil and gas roads, unauthorized roads (i.e., two-tracks), and an additional 18 miles of system roads in the project area. It is unlikely that this future action will significantly affect the structure mosaic because it will not have an effect on herbaceous vegetation in the project area.

Oil and Gas Development. The Forest Service has received five applications for permit to drill (APDs) on NFS lands in the project area. The APDs seek to drill oil and gas wells. The well pads associated with each well would be approximately 4 to 5 acres in size, encompassing about 22 acres total. Approximately 4,250 feet of access roads would be built on reclaimed or new road sites disturbing approximately 6 acres. These future actions would remove a total of 28 acres from forage production for the life of the wells. Some of the disturbed area may currently support or be capable of supporting high structure; however, the amount of disturbed area in total is so small it would not have a significant cumulative effect on achieving structure objectives.

Cumulative Effects by Alternative

This section summarizes direct and indirect effects of the alternatives and the effects of reasonably foreseeable actions on herbaceous structure. These effects in combination with past and present effects combine to create cumulative effects.

Alternative 1 provides the best opportunity of all the alternatives for meeting the High structure objectives in the shortest timeframe. This is due primarily to the removal of disturbance associated with livestock. However, in a relatively short time the distribution may become skewed to Moderate and High structure. However, without active management, which includes herbivory, the opportunity for the expansion of invasive grasses increases substantially, threatening recovery of impacted resources. Additionally, as litter increases it eventually shades out grasses, reducing the vigor of the system and the structure mosaic. Reasonably foreseeable actions would not affect the projected outcome of this alternative or result in a cumulative significant effect.

Alternative 2 could see some improvement in meeting or moving towards structure objectives due to the potential beneficial effects of the Elkhorn Ranchlands amendment as described under Reasonably Foreseeable discussion above. However, because this alternative maintains the existing Authorized Use levels, rotations, etc., the opportunity to achieve significant movement towards the structure objectives is the least of all the alternatives.

Alternatives 3 and 3A, initial actions are projected to move some Low structure into the Moderate structure category; however, there no projected improvement in the amount of High structure, which is the common factor among the 35 allotments that are not meeting structure objectives. The Elkhorn Plan Amendment, through the creation of a forage reserve, would provide additional forage opportunities. This increases management flexibility in moving towards or attaining structure objectives within the project area. Other reasonably foreseeable actions would not have a cumulative significant effect under these alternatives for the reasons described in the Reasonably Foreseeable discussion above.

Alternative 4, initial actions would improve High structure in 22 of the 35 allotments not meeting high structure objectives. Reasonably foreseeable actions would have the same effects as identified under Alternatives 2, 3, and 3A.

Adaptive Management. Implementation of adaptive management options under Alternatives 3, 3A, and 4—including actions identified in the tool box singularly or in combination—would meet or provide significant movement towards structure objectives within the timeframe of this project. The greatest difference among these alternatives when considering adaptive actions is the rate of improvement. Alternatives 3 and 3A initially utilize management actions other than adjusting Authorized Use. Determining whether these actions are effective requires time, generally 3 to 5 years, so this time is lost if the initial actions are determined to be ineffective. In

contrast, Alternative 4 initially adjusts Authorized Use to carrying capacity, among other actions. As identified above, stocking rate is the most important variable in managing range vegetation. So by addressing this variable initially Alternative 4 has potentially gained the 3 to 5 years over Alternatives 3 and 3A in the event additional adaptive management actions are needed.

Consistency with Grasslands Plan—Herbaceous Structure

There are no standards in the Grasslands Plan for structure; however, there is one guideline, which is presented below.

Apply vegetative structural and compositional objectives across all herbaceous community types (Grasslands Plan, p. 2-22). **Guideline**

Currently the project area is not meeting the structural objectives identified in the Grasslands Plan. In general there is there is an overabundance of Low structure and a scarcity of High structure. Alternative 1 would increase Moderate and High structure and decrease the amount of Low structure. However, eventually the Low structure objective may not be met because of the degree in the shift towards Moderate and High structure. Alternative 2 would maintain the current structure distribution and would not move towards the structure objectives. Initial actions under Alternatives 3 and 3A maintain Authorized Use at Preference. These alternatives are predicted to move some Low structure into the Moderate objective but will not increase the amount of High structure. Alternative 4 establishes Authorized Use at carrying capacity. This results in a reduction in Authorized Use, which the FEIS identifies as the most effective means of addressing the structural concerns in the project area.

Alternative 3, 3A, and 4 are adaptive-management-based, which means that other management actions may be implemented if monitoring shows that initial management actions are not producing desired results. Alternatives 3 and 3A would eventually meet the structure guideline. The difference among Alternatives 3, 3A, and 4 is the rate of improvement. Alternative 4, because of initial reductions in Authorized Use, provides for the most rapid improvement in structure compared to Alternatives 3 and 3A. This is also the case even if additional reductions in Authorized Use are required under Alternative 4.

SERAL STAGES

Introduction

The concept of seral stages is that, in the absence of disturbance, distinct plant communities develop and, over time, move along a linear path until a relatively stable climax plant community is attained. Seral stages are assemblages of relatively distinct plant species that occur along the path of succession. They are generally classified as early, mid, and late.

Early seral stages occur in heavily disturbed sites caused by intensive livestock or wildlife grazing, burrowing rodents, severe fire, extended drought, and natural erosion and deposition. In general, low-stature species such as blue grama and sedge dominate the early seral stages among

western wheatgrass/ needlegrass potential communities. Early seral stages can also have an abundance of annual forbs, annual grass, club moss (*Selaginella densa* Rydb.), and/or bare ground.

Mid seral stages contain a mixture of early and late seral species, with the latter involving mid and tall grasses such as western wheatgrass and needlegrass species in sites with loamy or finer textured soil, and little bluestem and prairie sandreed in sandy or less developed soil.

Late seral stages are attained with continued plant community development as the mid and tall height grasses gain dominance over short grass species. The greatest plant diversity often occurs among the early and mid seral stages, but late seral communities tend to exhibit the greatest plant production and structure.

The seral stage is important to consider for many reasons. In terms of range management, the assessment of plant composition is critical for determining forage production, carrying capacity, and for establishing appropriate stocking rates and seasons of use to maintain sustainable grazing systems (NRCS 2006) and achieve other resource objectives. Monitoring of species composition is required to quantify the effects of management and environmental influences, and to determine if desired goals and objectives for the rangeland resource are achieved, including the maintenance of natural ecosystems and biodiversity. The seral stage was estimated through measurements of the prominent grass species with respect to habitat types and ecological sites most commonly utilized by livestock.

Spatial and Temporal Setting

The NFS lands located within the project area boundary are the analysis area for the plant seral stage analysis. This is a sufficient analysis area for the seral stage analysis because these are the lands that will be directly affected by decisions made from the implemented alternative. The temporal scope of the analysis is 10 to 15 years.

Methodology

The data sampling methodologies used for the seral stage analysis are briefly presented below. A detailed discussion of the methodologies is located in the Botany Report (Project Record, Specialist Reports and Notes).

Forest Service 2005 Sere Plots

Fifty-three randomly selected sites were sampled during 2005 to assess plant composition and the proportion of early, mid, and late seral stages relative to western wheatgrass–green needlegrass and western wheatgrass–needle-and-thread climax communities or habitat types (HTs). The sample sites were later cross-referenced to NRCS ecological site (ES) maps developed from soil layers by the NRCS (2009). Based on vegetative and edaphic (soil) keys (Jensen et al. 1992), 41 of the sites occurred in the western wheatgrass/green needlegrass HT, while 12 sites occurred in the western wheatgrass/needle-and-thread HT. Areas adjacent to

fencelines, water tanks, roads, and prominent trails were buffered to avoid potential areas of high or concentrated disturbance.

Sampling protocol for the sere plots followed the Natural Resource Inventory System (NRIS) for terrestrial vegetation (USFS 2008), and sampling designs specific to this project are located in the Supporting Documentation – Seral Stages section of the Project Record. A 150 foot baseline was established for each macroplot. The azimuth of the baseline was recorded, and the baseline midpoint was recorded via Global Positioning System (GPS). Three 100-foot transects were established perpendicular to the baseline, with the first transect randomly established between 0 and 50 feet, and the second and third transects spaced at 50-foot intervals. Transect azimuths were recorded. Twenty 20- x 50-cm (1.1-ft^2) plot frames (microplots) were sampled every 5 feet along each transect, for a total of 60 microplots per sample. Key plant species primarily involving grasses and shrubs were chosen for measurement based on their significance in defining the habitat type and seral stage (Uresk 1990, 2006a). Percentage cover of plant basal area by species was recorded in each microplot utilizing seven Daubenmire cover classes (< 1 percent, 1-5 percent, 5-25 percent, 25-50 percent, 50-75 percent, 75-95 percent, 95-100 percent). Measurements of ground cover included total plant basal area, plant litter, bare ground, rock, moss, and lichen. Frequency values by species and ground components were determined by the proportion of the 60 microplots in which a respective measurement was recorded.

Forest Service 2006 to 2010 Sere Plots

Twenty-six sites were sampled in the project area from 2006 through 2008 and another 9 sites were sampled during 2009 and 2010. Allotments or pastures were chosen for sampling based on a lack of current plant composition data. Ten of the sample sites involved re-measurement of ecoplot samples originally measured from 1996 through 1999 for an inventory and characterization of habitat types across the LMNG. Ecoplot sampling methods involved ocular estimates of plant canopy cover within 0.1-acre circular plots. The ocular estimates were repeated during measurement of the sere plots, but the primary sample was collected with the NRIS sampling protocol as described above by roughly centering the 100-x150-foot macroplot over the ecoplot location. Percentage canopy cover by species was recorded in each microplot utilizing the seven Daubenmire cover classes identified above. Thirty-four of the 35 sample sites involved the western wheatgrass–green needlegrass HT, and one sample site occurred in the western wheatgrass–needle and thread HT. NRCS (2009) maps were referenced to determine the ES for 2006 samples, but field keys (NRCS 2007) were utilized to determine the ES at the time of sampling from 2007 through 2010.

As discussed below under Data Analysis, only species frequency was planned for measurement after 2005 because a seral stage model developed from the 2005 data indicated plant basal cover was not statistically significant (Uresk 2006b). However, plant canopy cover was included in the measurements because it provided additional information to estimate relative species composition. Thus, measurements of canopy cover replaced basal cover after 2005. Total plant basal area along with other ground components was measured within each microplot similar to

the 2005 measurements. As described in NRIS-Terra (USFS 2008), plant basal area was measured along a plane one inch above the ground surface.

Canopy cover measurements were adjusted slightly upwards when moderate defoliation of a particular species had occurred within a microplot, or when species were at an early stage of growth. Adjustments were confined to recording the next highest cover class when a grazed species occurred near the upper range of a cover class, and primarily involved mid and tall grass species rather than short grass species such as blue grama. For instance, 4 percent cover (cover class 1 (1-5 percent) of western wheatgrass was often recorded as cover class 2 (5-25 percent) if the plants showed significant levels of grazing. This concept is similar to reconstruction techniques recommended by NRCS (2006) to estimate actual annual production from early season measurements or partially grazed vegetation.

An important omission of the 2005 species sampling list involved species of sedge that were included among later sample measurements. The primary species involved threadleaf sedge (*Carex filifolia* Nutt.) and sun sedge (*Carex heliophila* Mack.), but all sedge species were collectively measured and recorded as sedge to avoid misidentification. Cover of buffalo grass (*Buchloe dactyloides* (Nutt.) Engelm.) was combined with blue grama. Canada bluegrass (*Poa compressa* L.) was common on several sites and cover measurements were combined with Kentucky bluegrass . The term bluegrass hereafter includes both Canada and Kentucky bluegrass. Similarly, cover of cheatgrass (*Bromus tectorum* L.) was combined with the more common Japanese brome, and the two species are referenced as annual brome. Other recorded species included increaser forbs and half-shrubs, particularly sage species (*Artemisia* spp*)*, dandelion, western yarrow (*Achillea millefolium* L.), and pussy-toes (*Antennaria* spp). Additional grass, forb, and half-shrub species were recorded as encountered on different sites if they were prominent or indicative of the seral stage or potential range trends.

NDSU 2008 TO 2009

Ninety-eight sites were sampled by NDSU during 2008 and 2009 and referenced to the dominant ecological site that was verified in the field with soil pits and NRCS keys. Sample locations were buffered 164 feet (50 meters) from roads and fencelines, and 656 feet (200 meters) from water developments.

During 2008, two transects extending 492 feet (150 meters) were established in a cross-wise fashion extending north-south and east-west. The transects were photographed and the intersection of these two transects was recorded by GPS. Plant basal cover by species was measured with 10 point pin frames every 16.4 feet (5 meters) along each transect. Species canopy cover was similarly measured from some of the sites. Percent frequency of grass species and density of forb species were measured every 32.8 feet (10 meters) along each transect with 2.69 ft^2 (0.25 m^2) plot frames. Biomass clippings were collected from most sites at four points spaced every 98 feet (30 meters) along the left side of each transect with a 1.92 ft^2 (0.18 m^2) clipping ring, with plant species grouped according to dominant life form or functional group of cool season native grasses, warm season grasses, invasive grasses, forbs, shrubs, and plant litter. Seventeen indicators of Rangeland Health were assessed within the area of each sample site.

Transect lengths were shortened to 246 feet (75 meters) during 2009 after determining that this length was sufficient to characterize the above parameters. The shorter transects had the advantage of decreasing the incidence of crossing over into different ecological sites that occurred during 2008. Plant basal cover by species, frequency of grass species, and density of forb species was measured every 16.4 feet (5 meters) along each transect as described above. Plant canopy cover was not measured during 2009. Biomass clippings were collected at three rather than four equally spaced locations along each transect, and the production of individual plant species was measured rather than grouping growth forms (grasses, shrubs, etc.) as was conducted during 2008.

ECOPLOT DATA

Eighty-seven 0.1 acre circular plots sampled from 1996 through 1999 within the project area were utilized as an additional source of baseline data to characterize general plant composition and estimate seral stage among the decade-old sample points. Ocular estimates of species canopy cover was estimated within each sample plot, but there was a moderate range in the number of species recorded based on differences in minimum cover values established for different sample subsets. Some of the sample sites were clustered within relatively small areas that had the potential to skew the results, but the clusters were usually established to characterize a gradient of conditions, such as those occurring with decreasing distance to a water source.

PACE TRANSECTS

Pace transects were conducted within several allotments in the project area from 1977 through 1980 to measure plant species frequency. Methodology associated with these transects involved recording the plant species or ground component that would fall within a ¾-inch loop consistently placed at the toe of a shoe or boot along a transect with 100 measurement stations (USDA Forest Service 1977). Measurement stations were usually spaced at intervals of one pace (equal to two steps), with a resulting transect length of about 600 feet. A few sample sites involved measurement intervals of two paces (four steps), for a transect length of about 1,200 feet. Twenty-eight samples with sufficient documentation of site locations and transect bearings were re-measured during 2009 and 2010. Photographs were taken to document existing conditions. Impediments to re-measurement of some sites included poorly documented sample locations or transect bearings, the addition of new fencelines adjacent to transects, or heavy grazing that increased the difficulty of species identification. Maps of dominant plant communities for several allotments or pastures were included with the 1977-80 transect data and these were utilized in the assessment of trends in plant composition.

BELT TRANSECTS

Ninety-three belt transects (Grant et al. 2004) were measured in the project area during 2004. The dominant functional group (warm season native short grass, cool season introduced mid grass, etc.) was identified every meter along a 25-meter transect. The two to three dominant grass

species were also identified along each transect, and the data provided generalized information of plant composition and production.

Robel Pole

Plant structure as measured with Robel poles (Project Record, Specialist Reports and Notes, Wildlife Report) included recording the dominant grass species at 20 stations along 300- to 400-foot long transects. One hundred eighty-four Robel transects were measured in the project area. The plant species data was used to supplement general plant composition characteristics within pastures.

Field Observations

Notes of general grassland composition were collected while traversing several pastures on foot during the course of woody draw and seral stage sampling. This information was used to supplement descriptions of general plant composition.

Broken Lands

Previously farmed and abandoned cropland, hereafter referenced as broken land, was identified from a GIS layer constructed from aerial photographs from the 1930s and 1950s. These lands were generally re-seeded to non-native crested wheatgrass and currently tend to support a mixture of crested wheatgrass, varying amounts of several native grasses, and invasive bluegrass, smooth brome (*Bromus inermis*), and annual brome. Other areas with high proportions of invasive grasses occurring outside of broken land were delineated during various fieldwork and pasture visits. An inventory of heavily invaded portions of the project area is incomplete but a partial map layer is included in Appendix A of the Botany Report (Project Record, Specialist Reports and Notes).

Data Analysis

The above data were utilized to estimate the distribution of seral stages in the project area. The sere plot data (2005; 2006 to 2010) were analyzed with respect to habitat types by comparing field measurements with quantitative descriptions of the habitat types (Jensen et al. 1992, 2002). These data were also evaluated with respect to the ecological sites by comparing species cover measurements with quantitative descriptions of the relative plant composition for the ecological site (NRCS 2006, 2009). Seral stage of the NDSU sample sites (2008 and2009) was estimated by comparing production and/or cover measurements with quantitative descriptions of the ecological site and associated state and transition models (NRCS 2006, 2009).

The state and transition models categorize plant composition into different vegetation states. Four states were used in this analysis—Reference State, Native Invaded, Invaded, and Other, which in this analysis is identified as planted broken lands. For further explanation of these categories see the Botany Report (Project Record, Specialist Reports and Notes).

Seral stage was estimated from the ecoplot data (1996-1999) by comparing measurements of plant canopy cover to habitat type descriptions. While these data are valuable, the sampling methodology used to collect the data was not as rigorous as the more current sere and NDSU data.

Measurements of species and ground component frequency obtained from the pace transects from 1978 through 1980 and 2009 through 2010 were compared to evaluate changes or trends in plant compositions.

A multivariate analysis of the 2005 sere data was also completed. This analysis identified frequency of western wheatgrass and blue grama as the only significant measured parameters. However, because field evaluation of the model indicated that species frequency was not an accurate indicator of existing seral conditions, this model was not used to determine seral stage analysis.

The Botany Report (Project Record, Specialist Reports and Notes) contains a detailed description of the above analyses.

Affected Environment—Seral Stages

This section provides a general description of the information related to seral stages for the project area. A detailed description of the existing condition of the seral stages in each allotment is provided in Part 2 of this chapter.

Existing Condition

The results of the sere analysis are displayed in Table 3.27. With regard to the collective sere plots sampled between 2005 and 2010, the seral stage proportions were similar when evaluated with respect to habitat types or ecological sites, with the major difference involving the classification of Invaded Grass States that were not assigned a seral stage when referenced to ecological sites and state and transition models.

The sere plots and NDSU plots measured from 2005 through 2010 provided the most current and accurate evaluation of plant composition and seral stages across the project area. The proportion of early, mid, and late seral stages of about 7, 72, and 5 percent, respectively, indicate a shortage of early and late seral stages compared to desired conditions. Sixteen percent of sites were at an Invaded Grass State (Table 3.27) and represent an undesired condition due to adverse effects on the maintenance of native plant communities, associated biodiversity, and the sustainability of current rangeland resources

The results identified in Table 3.27 for the 2005 and 2006 to 2010 data agree with general field observations (Project Record, Specialist Reports and Notes, Botany Report) that indicated a predominance of mid seral communities and relatively few areas of early and late seral communities among the primary areas of livestock use.

Analysis of the ecoplot data set from 1996 to 1999 suggest that seral stages were at 15, 64, and 21 percent of early, mid, and late seral stages, respectively, very close to seral objectives

identified under the current Grasslands Plan. This information, when compared to the sere plot analysis, is suggestive of a downward trend in late and early seral stages and an upward trend of mid seral stages during the past 10 to 14 years. However, because of differences in sample methodology, the ecoplot and sere plot data are not statistically comparable.

Table 3.27 — Seral stage percentages by methodology

	Early Seral Stage (%)	Mid Seral Stage (%)	Late Seral Stage (%)	Invaded Grass State (%)
Grasslands Plan seral stage objectives	10-15	65-75	15-20	NA
Ecoplot data(1996-1999) compared to habitat types descriptions	15	64	21	NA
Sere data (2005; 2006-2010 compared to habitat type descriptions	8	85	7	NA
Sere data (2005; 2006-2010) compared to ecological site descriptions)	7	76	5	13
Sere data (2005; 2006-2010) + NDSU data compared to ecological site descriptions and state and transition models	7	72	5	16

Current data provide evidence that invasive grasses are spreading and increasing throughout upland grass communities in the project area. This is of greater concern than the proportion of seral stages because of the adverse effect of invasive grasses on the maintenance of native plant communities and diversity. Remeasurement of the 28 pace transects with the same methodology and site locations provided strong evidence of an increase in invasive grasses, with the average relative frequency of all invasive grasses increasing from 21 to 37 percent, and Kentucky/Canada bluegrass increasing several fold, from 4 to 20 percent between 1980 and 2010.

The sere and NDSU data (185 plots) also indicate that invasive grass species are affecting the project area. Analysis of the plots found that 16 percent of the plots were at an Invaded Grass State where invasive grasses comprised greater than 40 percent of the relative grass cover among sere plots, or more than 30 percent of the total plant biomass with less than 40 percent native grass production among NDSU plots with species production data.

Of the 155 sites not at an Invaded Grass State, 15 or 10 percent were identified at a Native Invaded State (or a Planted Invaded State for broken land). Invasive grasses constituted 25 to 40 percent of the relative grass cover among sere plots at this phase, or up to 30 percent of the total forage biomass among NDSU plots with species production data when native grasses constituted more than 40 percent of the total production. These sites are at a high risk of transitioning to an Invaded Grass State without intensive management targeted to reversing the trend of increasing invasive grasses (NRCS, 2009).

Of the 155 sites not at an Invaded State, 128 or 83 percent were at Native Invaded or Planted Invaded States, with invasive grasses constituting up to about 25 percent of the total forage production as measured in the NDSU plots, or 25 percent of the relative grass cover as measured in the sere plots or NDSU plots where production data was not collected. Only 13 or about 8 percent of the 155 sites were at a Native Vegetation State with no or only minor traces (0.2 percent). A detailed description of the state and transition model and its results are contained in the Botany Report (Project Record, Specialist Reports and Notes).

There are several invasive grasses including Kentucky and Canadian bluegrass, smooth brome, Japanese brome, and cheatgrass located in the project area. Of these grasses, Kentucky/Canadian bluegrass are of greatest concern because they are the most aggressive and persistent of the species. They are able to colonize a wide range of plant communities and habitats and do not necessarily require a high degree of disturbance to invade a site.

A fundamental principle of range management involves a change in species composition as a result of selective utilization of certain plant species that confers a competitive disadvantage and allows other plant species to increase in dominance (Belsky and Gelbard 2000, Briske et al. 2008, Dyksterhuis 1949, Holechek et al. 1999, Lewis et al. 1956, NRCS 1997, Trammel and Butler 1995). Although Kentucky bluegrass can provide quality forage early in the grazing season, nutrient quality and palatability sharply decrease during and after seed production that occurs by early to mid June (NRCS 2009). Thus, a significant portion of the available forage is likely to be surrendered when Kentucky bluegrass constitutes a prominent portion of the plant composition and grazing is initiated after late spring or early summer, when palatability and utilization of the species decreases. Mid and late summer grazing periods among mixed invasive-native grass pastures are likely to result in excessive utilization of the native component because grazing extent and production has been decreased in proportion to the extent of invasive grasses. Increased utilization of the native grass component therefore confers a competitive disadvantage to these species and establishes positive feedback for additional invasive grass expansion. Poor coordination of the grazing season with invasive grass palatability is referenced as a composition-timing conflict in table summaries and effects analysis that follow.

Desired Condition

Plant communities are desired to be dynamic, with the continuum of seral stages shifting across the landscape over time. The desired proportion of seral stages for grassland habitat types among both the Badlands and Rolling Prairie Geographic Areas is 10-15 percent Early, 65-75 percent Mid, and 15-20 Late (Grasslands Plan, pp. 2-11, 2-19). A full spectrum of cool- and warm-season grass species and communities is desired to maintain or perpetuate inherent diversity of the system (Grasslands Plan, pp. 2-10, 2-17).

Environmental Consequences—Seral Stages

Intensity, frequency, and timing of disturbance on native species communities, and how these affect trends towards seral objectives, collectively constitute one of the indicators used to address

seral stages. As intensity and frequency associated with livestock grazing increases, plant composition shifts towards early seral stages. As disturbance associated with livestock grazing decreases, plant composition shifts toward late seral stage. Changes in the timing of livestock grazing disturbances can also affect seral stages by changing the species that are selected; therefore, those species are competitively disadvantaged.

Intensity, frequency, and timing of disturbance also affect trends in invasive grasses that reduce the areas ability to provide the desired proportion of seral stages; therefore, the analysis also uses trends of invasive grasses. A decreasing trend of invasive grasses will increase the potential for achieving desired seral stage objectives. Increasing trends in invasive grasses decreases the potential for achieving desired seral stages objectives.

Direct and Indirect Effects

Alternative 1

Research on the Northern Great Plains (NGP) has shown that long-term moderate and high stocking levels similar to those occurring in most allotments of the project area result in increased dominance of early seral species, with corresponding decreases in late seral species (Barker and Whitman 1989, Biondini and Manske 1996, Brand and Goetz 1986, Holechek et al. 1999, Jensen et al. 1992, Lauenroth et al. 1994, NRCS 2009, Rauzi 1963, Sims et al. 1978, Whitman and Wali 1975, Willms et al. 2002). Thus, removal of current livestock grazing pressure would create conditions favorable for a shift of grassland communities towards late seral stages and potential climax communities. A shift towards late seral stages would likely result in decreased plant diversity or species abundance (Milchunas and Lauenroth 1993) involving early and mid seral grasses and forbs. The greatest decrease would occur in the abundance of early seral species, but they would persist on sites of poorly developed soil or areas of primary and secondary succession such as residual buttes and parent material outcrops, sites of natural erosion/deposition, and prairie dog towns or other sites heavily disturbed by wildlife.

However, invasive grasses complicate typical paths of succession in much of the project area. Invasive grasses have a high potential to continue spreading, even if livestock grazing is removed due to inherent competitive abilities and as assisted by increasing plant litter that increases moisture conservation. Decreased plant diversity results with increased dominance of invasive grasses (Sedivec 2006). Populations of invasive sweet clover may assist invasive grasses by increasing nitrogen availability (NRCS 2009, but see Van Riper and Larson 2009), and removal of livestock that selectively graze sweet clover could assist greater seed production and prominence of the species, thereby assisting further invasive grass expansion.

Less invasive crested wheatgrass would persist at present locations that principally involve broken land and other highly disturbed sites where it was seeded. Expansion of crested wheatgrass into heavily grazed or disturbed sites would decrease, and native grass species intermixed with crested wheatgrass would possibly increase with the removal of selective grazing pressure that these species presently experience among several broken land pastures. Increased expression of native grasses would contribute to community development and later

seral stages, but invasive grasses are also invading areas of broken land and have the potential to continue increasing.

In summary, removal of livestock grazing would contribute to potential shifts in plant species composition towards late seral stages, with a decrease of early and mid seral stages and species. Thus, Grasslands Plan Desired Conditions for seral stages would not be met. However, invasive grasses already present in the system have a high potential to continue increasing with or without livestock grazing, and would likely impede the development or long-term maintenance of late seral native plant communities. Furthermore, native plant diversity or abundance would decrease with increased invasive grass dominance. Natural dispersal of invasive grasses and noxious weeds would continue and be assisted through vectors of oil and gas development, road maintenance, recreation, and wildlife.

Alternative 2

Current management actions and stocking levels would continue under this alternative. Existing seral stage distribution would likely be maintained for a time; however, the apparent trend of increasing invasive grasses would be expected to continue under Alternative 2 and would be assisted by the current management practices outlined below.

- Moderate to high stocking levels - Moderate to heavy seasonal or seasonlong stocking rates repeated on an annual basis can facilitate the spread of bluegrass and other invasive grasses when they are present in the system (Belsky and Gelbard 2000, Briske et el. 2008, NRCS 2009, NRPH 1997, Trammel and Butler 1995, Uchytil 1993). Many pastures in the project area have been grazed seasonlong or are affected by repeated grazing rotations during a single year. The average weight of most modern cow breeds has significantly increased since the late 1940s (Carter 2008, Dhuyvetter 1995, Hancock 2006). Larger cows eat more forage, which isn't adjusted for under this alternative.
- Composition-Timing Conflicts - Determination of stocking rates based on the production of key species and key areas of utilization is a standard range management practice (Hancock 2006; NRCS 2006, 1997; Brisket et al. 2008; KSU 1994), but there is a general lack of prescribed grazing that incorporates optimum periods of palatability and utilization of invasive grasses, including crested wheatgrass. A significant portion of the available forage is unused or underutilized when grazing is initiated after the period in which invasive species are likely to be most utilized. The result is likely to be excessive utilization of the more palatable native grass component, which improves conditions for additional invasive grass expansion. This situation is referenced as a *composition-timing conflict* and affects about 70 percent of the allotments to varying degrees.
- Hay feeding - Most hay is fed in the winter and is often composed of a variety of grasses including crested wheatgrass; more aggressive invasive species of sweet clover, smooth brome, bluegrass, and annual brome have also been observed. High livestock densities in hay feeding areas can result in high levels of trampling, often compounded by moist soil conditions. The native grass component is grazed during hay feeding periods during relatively open winters and early spring, potentially contributing to excessive use and low

production the following year. The resulting levels of winter use and the introduction of invasive grass seed through the hay likely assists the establishment of these species by improving seed-soil contacts and decreasing the competitive ability of native grasses.

Invasive species have increased under the current grazing management and would continue. Alternative 2 would move further away from Grasslands Plan seral stage objectives.

Alternative 3

A summary of the effects of initial actions by allotment is presented in the Table 3.28. A detailed discussion of each allotment is contained in Part 2 of this chapter.

Table 3.28 — Effects of proposed actions on current trends of plant composition under Alternative 3

Allotment Number	Effect of Initial Actions	Rationale
126	Neutral	Similar management complicated by multiple livestock herds twelve month use, and mixed native/invasive grass pastures.
127	Neutral	Slightly delayed turn-in. AU 37% > CC but recently reported use close to CC.
128	Neutral	Slightly delayed turn-in but similar management. AU 56% > CC and 17-58% > reported use.
129	Neutral	Positive and negative effects of riparian pasture and replacement of water sources. Hay feeding introduced to pasture 2 (now part of A-131). AU 17% < CC and 7-31% > reported use including winter use.
130	Negative	Hay feeding introduced to new pasture and persistent CT conflicts. AU 8% > CC, and < to > reported us including winter use.
131	Neutral	Positive and negative effects of exchanging pastures with Allotment 129. Increasing pasture size could increase secondary range but adverse effects of hay feeding in new pasture. AU 41% < CC but reported use 27-54% > AU not including additional winter use.
132A	Neutral	Similar management with CT conflicts, AU 27% > CC, 5% < to 23% > reported use.
132H	Neutral	Decrease of pasture size and increase of pasture deferment would benefit litter management but intensify CT conflicts and reduce secondary range. AU 5% > CC and 15% < to 24% > reported use.
133	Neutral	Similar management with increasing invasive grasses. AU and reported use 58% > CC.
133D5	Neutral	Same management with increasing invasive grasses.

Allotment Number	Effect of Initial Actions	Rationale
134	Neutral	Switching from 3 times through to a twice through rotation would not change CT conflicts. AU 33% > CC and 19-26% > reported use.
135	Slightly positive	Juniper control. 3 rather than 2 pasture rotation (P 8, 9, 10). Delayed turn-in 2 of 3 years would benefit P8 but adversely affect winter pastures. AU 16% < CC and > to < reported use not including additional winter use.
136/139	Slightly positive	Benefit in 2 of 4 pastures proposed for early season use but increasing CT conflicts persist in remaining 2 pastures. Increased disturbance with needed water tank. AU 46% > CC and 9-36% > reported use.
140	Negative	Increasing CT conflicts in 1 pasture and partially increased in another. AU 36% > CC and 0-39% > reported use.
141	Neutral	Same management. AU 81% > CC and = reported use
142	Negative	Continued CT conflicts in P1 and creation of CT conflict in P2. AU 50% > CC and 17-92% > reported use.
158	Neutral	Delayed turn-in 2 of 3 years in individual pastures but otherwise similar management. AU 18% > CC and much > reported use not including additional winter use.
220	Neutral	Similar management. AU 64% > CC, 0-22% > reported use.
221	Slightly positive	CT conflicts slightly reduced in P2 and P3 but persist in P6. AU 63% > CC and about 5% > reported use.
230	Slightly positive	Improved grazing system in P1, CT conflicts persist in P2, winter use/ hay feeding potentially halted in P3 but uncertain long-term management and effects. Delayed turn-in. AU 17% > CC and 30% > typically reported use not including winter use.
237	Neutral	Positive and negative effects of new tank in P1, but persistent CT conflicts. AU 32% > CC and 40-55 > reported use.
239	Neutral	Persistent CT conflicts with trend of increasing bluegrass, AU 64% > CC and 32-85% > typically reported use.
240	Neutral	Remove livestock from P4 by March 15 but varying levels of persistent or increasing CT conflicts in most pastures. Reported use 2-32% > AU and additional winter use.

Allotment Number	Effect of Initial Actions	Rationale
241	Neutral	Same management with increasing invasive grasses. Reported use much < AU but high levels of additional winter use in P1.
243	Neutral	Positive and negative effects of new water tank, halt twice-over grazing but persistent CT conflict. Reported use = or slightly> AU that is 24% > CC.
244	Slightly positive	Split out crested wheatgrass pasture but CT conflicts in remaining two pastures. Reported use similar to AU that is 12% > CC.
248	Neutral	Same management with CT conflicts and invasive grasses dominating much of allotment. AU 38% > CC. Reported use usually close to AU but as much as 23% <.
249	Slightly positive	Staggered 3.5 month season of use. AU and reported use 21% > CC.
256	Slightly positive	Creation of large riparian pasture, 4-pasture deferred rotation with P2, delayed turn-in. AU 9% > CC, reported use usually < AU but ranges from 17% > to 65% <.
258	Slightly negative	Delayed turn but new tank would increase the evenness of utilization. AU 41% > CC and at least 45% > reported use.
272	Neutral	Persistent CT conflicts and minimal benefit of new water tanks. AU 15% > CC and close to reported use.
277	Neutral	Similar management with CT conflicts in P1 and P5. AU 4% > CC and 5 > to 7%<> reported use including winter use.
278	Positive	Switch to early season use of all three pastures. AU 36% > CC and 10-27% > reported use.
281	Neutral	Similar management with CT conflicts in all pastures. AU 25% > CC.
282	Neutral	Similar management. Positive and negative effects of reducing sagebrush in P5 & P6. AU 15% < CC and 10-30%% > reported use including winter use.
283	Neutral	Similar management. Increased level of concentrated disturbance associated with new water tank. AU equals CC but additional winter use.
286	Neutral	Implement 3-pasture deferred rotation but varying levels of CT in each pasture. AU 36% > CC and 55-127% > reported use.

Allotment Number	Effect of Initial Actions	Rationale
287	Neutral	Strive for greater pasture deferment but ineffective pasture fencelines/barriers. AU 15% > CC and 17-25% > typically reported use.
288	Slightly positive	Benefits of a deferred rotation and water management but CT conflicts. AU 43% > CC and 23-29% > recently reported use.
289	Negative	Adverse effects of new water tank in P3, positive and negative effects of splitting pasture 2 but potential for adverse effects to other pastures. AU 10% > CC and 67% > to 7% < reported use not counting additional winter use.
300	Neutral	Positive and negative effects of new water tank but would effect a small area. AU > 7% CC and 4-15% > recently reported use.
301	Slightly positive	Water management of two springs, delayed turn-in but CT conflicts in P3 and increasing in other pastures. Potential switch to once-over rotation but not stipulated. AU 10% > CC and 0-20% > reported use.
302	Slightly positive	Manage access to 3 reservoirs. Potentially combine herds and switch to deferred rotation, delayed turn-in but CT conflicts due to 30% and 18% broken lands in the two pastures. AU 14% > CC and 0-66% > recently reported use.

AU= Authorized Use, CC= carrying capacity, CT=composition-timing conflict, wheatgrass, P=Pasture, > = greater than, < = less than.

Collective initial actions under Alternative 3 would improve plant composition in 11 of the 43 allotments. Of the 11 allotments, 10 are projected to show slight improvement and one 1 would show marked improvement. Of the remaining 32 allotments, 26 would experience no change in the current trend of plant composition and would remain neutral, and 6 allotments are projected to experience a decreasing trend in seral conditions as a result of the proposed actions.

The trend of increasing invasive grasses is likely to continue under Alternative 3. The main practices contributing to this outcome involve the persistence of varying levels of composition-timing conflicts in about 70 percent of allotments with high amounts of invasive grasses. Adverse effects associated with hay feeding would continue. These factors would likely result in downward trends of late seral stages and adverse effects on the maintenance of native plant communities.

Change in grazing strategies that have the potential to result in varying levels of decreased composition-timing conflicts would occur in a small portion of invasive grass infested allotments.

The proposed action of delaying turn-in dates until June 1 or after sufficient growth is attained in native-dominated pastures has the potential to assist plant health and community development among all affected pastures compared to premature grazing that often occurs at present (Manske

2001, Peck et al. 1994, Cook and Child 1971). Early May and occasionally late April turn-in into crested wheatgrass or invasive pastures is appropriate for coordinating grazing with periods of high palatability for these species. Efforts to shift grazing periods towards early use of invasive grasses is proposed among relatively few affected allotments.

Managing water sources would likely improve livestock distribution and decrease levels of excessive utilization in some pastures. The addition of new water sources has the potential to result in similar benefits. However, increased distribution has the potential to result in decreased secondary range and a decrease in seral stages and high structure. Disturbances associated with new water developments are likely to facilitate local spread of invasive grasses.

Across the project area, continued levels of apparent overstocking and composition-timing conflicts are likely to facilitate current trends of increasing invasive grasses and shifts towards early seral and/or invaded grass states.

If monitoring reveals that initial actions are not resulting in the desired outcome, then additional adaptive management actions would be implemented. The primary effect under this alternative is that the timeline to meet the seral objectives would be extended beyond the 10- to 15-year timeframe associated with this project.

Alternative 3A

Alternative 3A differs from Alternative 3 in 14 of the allotments, which are identified in Table 3.29. Initial actions proposed in 10 of these allotments (126, 127, 129, 142, 240, 243, 258, 272, 278, 300) are not expected to affect seral stage / plant composition any differently than Alternative 3. Of the remaining 4 allotments (135, 244, 287, 301), all would experience a shift away from the Grasslands Plan seral stage objectives.

The effects of adaptive management actions are the same as identified under Alternative 3.

Table 3.29 — Effects of proposed initial actions on plant composition under Alternative 3A

Allotment Number	Effect of Initial Actions	Rationale
126	Neutral	Minimal effect of not fencing spring in pasture 4. Otherwise similar management complicated by multiple livestock herds, 12-month use, and mixed native/invasive grass pastures.
127	Neutral	Increased use around existing developed spring would be countered by decreased use of other water sources. Slightly delayed turn-in. AU 37% > CC but reported use close to CC.
129	negative	Increased disturbance around additional water tank. Positive and negative effects of riparian pasture and replacement of water sources. Hay feeding introduced to pasture 2 (now part of A-131). AU 17% < CC and 7-31% > reported use including winter use.

Allotment Number	Effect of Initial Actions	Rationale
135	Neutral	New tank would be developed in current high use area with no change in livestock distribution. Juniper control. 3 rather than 2 pasture rotation (P 8, 9, 10). Delayed turn-in 2 of 3 years would benefit P8 but could adversely affect winter pastures. AU 16% < CC and > to < reported use not including additional winter use.
142	Negative	Increased CT conflicts with deferred rotation and increased pasture number but potentially forced use of invasive grasses with increased livestock density. AU 50% > CC and 17-92% > reported use.
240	Neutral	Persistent or increasing CT conflicts in P1 regardless of potential fencing of two reservoirs. Some benefit of removing livestock from P4 by March 15. Reported use 2-37% > AU and additional winter use.
243	Neutral	Development of spring on west side of pasture would not change livestock distribution. Positive and negative effects of other new water tank but persistent CT conflict. Reported use = or slightly > AU that is 24% > CC.
244	Neutral	Not fencing stand of crested wheatgrass for early season use would forgo half of the pasture forage with persistent high use of unbroken land. Reported use similar to AU that is 12% > CC.
258	Negative	Continued premature grazing of native grasses would impede plant development and production and increase opportunities for invasive grass spreading. New tank would increase the evenness of utilization. AU 41% > CC and at least 45% > reported use.
272	Neutral	Development of spring would minimally influence livestock distribution in the small area of pasture 2. Persistent CT conflicts and minimal benefit of new water tanks in P1. AU 15% > CC and close to reported use.
278	Positive	Not reclaiming reservoir would not affect livestock distribution or plant composition due to an adjacent water well and tank. Switch to early season use of all three pastures. AU 36% > CC and 10-27% > reported use.
287	Negative	Additional water tank in secondary range would decrease mosaic of grazing pressure and seral stages. Strive for greater pasture deferment but ineffective pasture fencelines/barriers. AU 15% > CC and 17-25% > typically reported use.
300	Neutral	Not fencing or reclaiming developed spring would have minimal effect on livestock distribution due to relatively close proximity of new water tank. AU > 7% CC and 4-15% > recently reported use.

Allotment Number	Effect of Initial Actions	Rationale
301	Neutral	Not fencing spring developments and reconstructing plumbing systems would prohibit control of livestock distribution. Potentially switch to once-over rotation, delayed turn-in but CT conflicts in P3 and increasing in other pastures AU 10% > CC and 0-20% > reported use.

AU= Authorized Use, CC= carrying capacity, CT=composition-timing conflict,
P=Pasture, > = greater than, < = less than.

Alternative 4

A summary of the effects of initial actions by allotment is presented in Table 3.30. Also provided is a short synopsis of the reasoning for the effects determination. A detailed discussion of each allotment is contained in Part 2 of this chapter.

Table 3.30 — Effects of proposed actions on current trends of plant composition under Alternative 4

Allotment Number	Effect of Initial Actions	Rationale
126	Negative	AU increased 42% = CC, 36-107% > reported use not including additional winter use. Positive change in grazing system by adding to A128 and implementing 7-pasture deferred rotation, but complicated by winter versus early-season pastures and CT conflicts in other pastures.
127	Slightly positive	Delayed turn in, AU decreased 27% = CC, 3% > to 16% < reported use.
128	Positive	Combined with A126 and switch to once through deferred rotation with delayed turn-in. AU decreased 36%, 0-25% < reported use.
129	Neutral	Replace reservoir with water tank would increase disturbance in secondary range. AU decreased 13%, 7% < to 14% > reported use including winter use. Increased summer use in new pasture. Increased upland use with riparian pastures and adjustments needed for change in acreage after pasture exchange.
130	Neutral	Increased early season use of crested wheatgrass in P8 and P9, but persistent CT conflicts in other pastures. Winter use/introduced to new pasture. AU decreased 7% < reported use including winter use.
131	Negative	Hay feeding introduced to pasture 129-2 that would become part of allotment 131. Continued predominance of winter use and associated impacts throughout allotment. AU decreased 13% but reported use 27-41% > AU and additional winter use.
132A	Neutral	Similar management with pronounced CT conflicts throughout allotment. Maintain AU 27% > CC and 5% < to 45% > typically reported use.
132H	Neutral	Similar management focused on early-season use. Increased pasture deferment increases potential for CT conflicts but may be impeded by unreliable water sources. AU decreased 5%, 19% < to 18% > reported use.
133	Neutral	Same grazing system with strong apparent trend of increasing invasive grasses. AU decreased 37% but high CT conflicts.
133D5	Neutral	Same management of cutting invasive grass hay.
134	Neutral	Switching from 3 times through to a twice times through rotation would not change CT conflicts. AU decreased 25%, 5-11% < typically reported use.

Allotment Number	Effect of Initial Actions	Rationale
135	Positive	Combine herds and switch to 5-pasture deferred rotation with delayed turn-in 2 of 3 years, but potentially increased impacts in 2 winter pastures. Control juniper. AU decreased 13%, 10% > to 27% < reported use and additional winter use.
136/139	Slightly positive	Positive effect in 2 of 4 pastures proposed for early season use but increasing invasive grasses and CT conflicts in remaining 2 pastures. Increased disturbance around needed water tank. AU decreased 32%, 7-25% < reported use, but CT conflicts.
140	Slightly negative	Increased CT conflicts in 1 pasture and partially increased in another pasture. AU decreased 27%, 0-28% < reported use.
141	Neutral	Same grazing system with high CT conflicts in both pastures. AU decreased 44% but may further assist invasive grasses.
142	Negative	Increased CT conflicts with deferred rotation. AU decreased 33%, 22% < to 28% > typically reported use.
158	Neutral	Delayed turn-in but several winter pastures with hay feeding and potential premature grazing. AU decreased 15%, 21-65% > reported use but additional winter use.
220	Slightly positive	Same grazing system with AU decreased 39%, 26-40% < reported use, but may facilitate the increase of bluegrass.
221	Slightly negative	AU decreased 38%, about 35% < reported use, but persistent or increased CT conflicts with 3-pasture deferred rotation.
230	Slightly positive	Improved grazing system in P1, CT conflicts persist in P2, use shifted from winter to spring and late fall in pasture 3 with increased invasive grass utilization . AU decreased 14%, 11% > typically reported use not counting varying levels of current winter use.
237	Neutral	Low or decreasing coordination of grazing seasons with invasive grass palatability. Positive and negative effects of new water tank in P1. AU decreased 24%, but 6-17% > reported use.
239	Neutral	Persistent CT conflicts. AU decreased 39%, 19% < to 13% > typically reported use.
240	Neutral	Potential shift from twice through to once through rotation but similar effects with persistent CT conflicts. AU decreased 6% but reported use often > AU not including additional winter use.
241	Neutral	Similar management with CT conflicts in P3 and P6, increasing in P7. AU decreased 14% but > currently reported use due to a large portion of use occurring in P1 during the winter.
243	Neutral	Switching from modified twice over rotation to deferred rotation but persistent CT conflicts in both pastures. AU decreased 20%.
244	Slightly positive	AU decreased 11% and CT conflict corrected in east half of P2, but persistent or increasing in remaining two pastures.
248	Neutral	Two-week earlier turn-in and 2-pasture deferred rotation but similar effects with predominance of Invaded Grass States and CT conflicts. AU 38% > CC and 0-23% > reported use.
249	Positive	AU decreased 17%, staggered season of annual use.

Allotment Number	Effect of Initial Actions	Rationale
256	Slightly positive	Delayed turn-in. Potentially improved conditions in P2 (& 2a) with creation of riparian pasture and 4-pasture deferred rotation with other allotment, but increased disturbance of 2 new water tanks. AU decreased 8%, but > currently reported use for most years.
258	Neutral	Delayed turn-in. Increased disturbance and decreased grazing mosaic with new water tank. AU decreased 29%, but 3-55% > reported use.
258	Neutral	Delayed turn-in. Increased disturbance and decreased grazing mosaic with new water tank. AU decreased 29%, but 3-55% > reported use.
272	Neutral	AU decreased 13% but increasing invasive grasses and CT conflicts in main summer pasture. Positive & negative effects of two new water tanks.
277	Neutral	AU decreased 4%, 4-11% < total annual use including winter use. CT conflicts in P1 & P5. Halt thrice-over grazing but complicated by 12-month permit. Increased disturbance around new water tank.
278	Positive	Switch to early season use of all three crested wheatgrass pastures. AU decreased 26%, 7-19% < reported use, but may facilitate increased litter and invasive grasses.
281	Neutral	Delayed Turn-in for P1, but significant invasive component. Adverse effects of new water tank in P1. AU decreased 20% but persistent CT conflicts.
282	Neutral	Similar grazing system. Sagebrush control would increase forage production but may assist invasive grasses. Increased grazing at north boundary of P5/P6. Delayed turn-in complicated by 12-month permit. AU decreased 13%, 13% > to 4% < than total annual use including winter.
283	Neutral	Increased disturbance associated with new water tank. No change in management or AU. Poor record of use but AU much > reported summer use and much < total use including winter use.
286	Neutral	Persistent or increasing CT conflicts in all three pastures with deferred rotation. AU decreased 26% but 15-67% > typically reported use.
287	Slightly positive	Switch to deferred rotation (but only partially effective pasture fence/natural barriers). AU decreased 13%, 1-8% > typically reported use.
288	Positive	AU decreased 30%, 9-14% < recently reported. Switch from seasonlong to compressed season and deferred rotation. Water management. Persistent CT conflicts in almost 1/4 of 640-acre pasture.
289	Negative	AU decreased 9%, 9% > to 15% < reported use not including additional winter use. Adverse effects of two new tanks and splitting pastures. Persistent CT conflicts in P6, 7, 8.
300	Neutral	Increased disturbance associated with new tank but located in broken land. AU decreased 6%, 2% < to 8% > typically reported use. CT conflicts associated with 18% broken land. Positive and negative effects of adding alleyway to pasture.
301	Slightly positive	AU decreased 9%, 9% > to 10% < typically reported use. Water management of 2 springs. Switch from 3 to 4 pasture deferred rotation would increase ue of secondary range in new pasture. Delayed turn-in but CT conflicts in P3 & other pastures.

Allotment Number	Effect of Initial Actions	Rationale
302	Slightly positive	Fence and graze some crested wheatgrass early 1 of 3 years, but persistent CT conflicts with 31% and 18% broken land in 2 pastures. Potentially combine 2 herds and switch to deferred rotation. Fence and control access to 3 reservoirs & 1 water tank in P2. AU decreased 14%, 45% > to 12% less than typically reported use.

AU= Authorized Use, CC= carrying capacity, CT=composition-timing conflict, P=Pasture, > = greater than, < = less than.

Collective initial actions under Alternative 4 would increase the potential for achieving seral stage objectives in 14 of the 43 allotments. Of the 14 allotments, 9 are projected to show slight improvement and 5 would show marked improvement. Of the remaining 29 allotments, 23 would experience no change in current trends and would remain neutral; however, communities with high amounts of invasive grasses would have the potential to transition to invaded grass states. Six allotments are projected to experience a shift away from Grasslands Plan seral stage objectives. Five of the 6 allotments would be adversely affected by an increase in composition-timing conflicts and one of the allotments would be additionally impacted by splitting pastures and adding water tanks. The sixth allotment is also affected by composition-timing conflicts and would be additionally affected by a 42 percent increase in Authorized Use.

The adaptive management tools available under Alternative 4 are the same as Alternatives 3 and 3A. The difference between these alternatives is time. Because Alternative 4 initially improves more allotments in the project area the amount of time to improve the remaining areas is less than that of the other two alternatives.

CUMULATIVE EFFECTS

Cumulative effects result from the combination of effects resulting from past, present, and reasonably foreseeable actions plus the direct and indirect effects of the alternatives. A discussion of past and present actions, reasonably foreseeable actions, and a summary of the cumulative effects by alternative follows.

Past and Present Actions

The following past and present actions have contributed to the existing array of seral stages in the project area.

Livestock Grazing. Moderate to high livestock stocking levels, composition-timing conflicts, and winter hay feeding have affected and continue to affect the seral stage mosaic in the project area. Stocking levels have resulted in excess use of native species in some areas. Composition timing conflicts have resulted in native species being more heavily utilized than accompanying invasive grass components because grazing occurs when the invasives are less palatable then the native grasses. Winter hay feeding introduces or spreads invasive grasses because they are part of the hay. These actions singularly or in combination have affected plant composition and hence the seral stages mosaic in the project area.

Oil and Gas Development. The development of oil and gas has, in the past, affected plant composition through soil and vegetation disturbances associated with the development of well pads, access roads, utility corridors, etc. Until the 1980s, disturbed soils resulting from these activities were often reseeded with crested wheatgrass and other invasive species. Since that time, however, only native grasses and forbs species are used to revegetate disturbed areas. These early activities have assisted the spread of invasive grasses along the majority of access roads, utility corridors, and well pads (Washington and Gildar, 2004) and have adversely affected seral stages.

Existing oil and gas facilities and access roads continue to receive annual maintenance. Maintenance activities such as road grading and ditch maintenance still present opportunities to spread invasive species as does vehicle traffic.

Wildfire can have both beneficial and adverse effects on plant composition. Beneficially, fire provides a flush of nutrients, removes accumulated litter, and promotes a flush of new growth, all of which improve grassland vigor and dynamics. Wildfire also plays a role in the distribution of seral stages across the landscape. Conversely, wildfire is often succeeded by flushes of various invasive and noxious weeds that could increase their current extent. Wildfire control activities such as fireline construction can also offer opportunities for establishment or spreading of invasive species. Wildfire and fire suppression both have the potential to be contributing agents affecting seral stage distribution in the project area. However, given the high priority placed on fire suppression, the possibility of wildfire being a major contributor effecting seral distribution under any of the alternatives appears remote in comparison to fire suppression.

Noxious Weeds /Invasive Species. It is unknown when noxious weeds and invasive grasses first appeared in the project area. Some invasive species, such as crested wheatgrass, appeared in the 1930s when successfully used in the reclamation of sub marginal lands. The primary past, current, and future effect of these groups of plants is that they alter or replace native plant communities which affects the distribution of native seral stages across the LMNG and the project area.

Drought is a recurring natural event in western North Dakota. The effects of drought combined with livestock grazing can, in a prolonged drought, results in a shift towards earlier seral stages.

Reasonably Foreseeable Actions

Elkhorn Ranchlands. The recently purchased Elkhorn Ranchlands require that the Grasslands Plan be amended to establish management direction for the newly acquired lands. Approximately 800 acres of the 5,200 acre Elkhorn purchase are directly associated with five of the allotments in the North Billings project. Under the proposed amendment these lands would be managed in accordance with the adjacent management area, which is MA 3.65 Rangelands with Diverse Natural Appearing Landscapes. In the interim, as directed by 36 CFR 254.3(f)(2008), this portion of the purchase is being managed in accordance with the adjacent MA 3.65. If the proposed action were selected and implemented there would be no change over the current situation.

The proposed Grasslands Plan amendment also includes establishing a special interest area (SIA) for the remaining 4,400 acres of the purchase and approximately 17,160 acres contained in grazing allotments 279 and 280, which were associated with the Elkhorn Ranchlands when they were owned privately. If implemented the SIA would establish a forage reserve on those acres. The reserve would provide a place to move livestock to in the event an allotment is burned or if management actions, such as a prescribed fire or additional rest, were needed to help restore seral stages in an allotment or decrease composition timing conflicts.

Travel Management Plan. An environmental assessment (EA) for travel management on the LMNG was released for comment in 2010. The proposed action under this EA would close all single use oil and gas roads, unauthorized roads (i.e., two tracks), and an additional 18 miles of system roads in the project area. The travel management plan is expected to have minimal effect on grazing permit holders unless single-use roads are blocked from access. If access were to be blocked, then additional two-track roads could be created as permittees can travel cross county to administer their permits. Closing or reducing use on roads removes or reduces the number of vectors spreading invasive species, which reduces the adverse effects on plant composition and hence seral stages. The potential creation of new two-tracks may result in the spread of invasive species, which if they become sufficiently established could adversely affect plant composition and the distribution of seral stages.

Oil and Gas Development. The Forest Service has received five applications for permit to drill (APDs) on NFS lands in the project area. The APDs seek to drill oil and gas wells. The well pads associated with each well would be approximately 4 to 5 acres in size, encompassing about 22 acres total. Approximately 4,250 feet of roads would be built to access the well sites. The well pads would be surfaced with scoria or gravel and kept free of vegetation, so there is little opportunity to encourage the spread of invasive grasses. The access roads provide an opportunity for establishment/spread of invasive grasses That increases their potential for spreading into adjacent rangeland.

Cumulative Effects by Alternative

This section summarizes direct and indirect effects of the alternatives and the effects of reasonably foreseeable actions on seral stages. These effects in combination with past and present effects combine to create cumulative effects.

Alternative 1 may slow the spread of invasive grasses, but they are likely to continue expanding through natural competitive advantages and other vectors of dispersal. Although native-dominated grass communities would have the potential to progress towards later seral stages and climax communities with the removal of grazing, the potential expansion of invasive grasses would likely lead to Invaded Grass States in a high portion of the project area. Also, increased herbaceous litter accumulation is likely to occur with the removal of livestock grazing and would assist the expansion of some invasive grasses (NRCS 2009, 2006) through increased shading and moisture conservation and decreased vigor of the native plant community. As native plant communities change, so too would the distribution of seral stages away from that desired by the Grasslands Plan. Future oil and gas development has the potential to introduce or spread invasive species, which adversely affects the maintenance of native plant communities and the potential achievement of seral stage objectives. The proposed travel management plan closes or reduces use on roads and would remove or reduce the number of vectors spreading invasive species, which reduces the adverse effects on plant composition and hence seral stages. However, these reasonably foreseeable actions are unlikely to affect a large enough area to have a cumulatively significant affect on the distribution of seral stages in the project area.

Alternative 2 may see some improvement in the mosaic of seral stages because of the potential beneficial opportunities of the forage reserve that is part of Elkhorn Ranchlands amendment. The travel management plan would help by reducing the numbers of vectors that spread invasive species along closed roads, but potentially increased off-road use would decrease the level of positive effect. However, because this alternative maintains the existing Authorized Use levels, rotations, etc., it will maintain current conditions and trends in plant composition. For these reasons this alternative has the least opportunity to achieve a significant improvement in late seral stage of all the alternatives.

Alternative 3, initial actions are projected to increase the potential for achieving seral stage objectives in 11 allotments, maintain current condition in 26 allotments, and experience a decreased potential to achieve seral objectives in 6 allotments. The effects of reasonably foreseeable actions are the same as those identified under Alternatives 1 and 2.

Alternative 3A, initial actions would improve conditions in one allotment, maintain existing conditions in nine allotments, and decrease conditions in four allotments. The potential cumulative effects of reasonably foreseeable actions are the same as those under Alternatives 1 and 2.

Alternative 4 would increase the potential for achieving seral stage objectives in 14 of allotments, maintain existing conditions in 23 allotments, and decrease conditions in 6 allotments. The potential cumulative effects of reasonably foreseeable actions are the same as those under Alternatives 1 and 2.

Adaptive Management. Implementation of adaptive management options under Alternatives 3, 3A, and 4, including actions identified in the tool box, would improve the distribution of seral stages. The greatest difference among these alternatives is the rate of response. Alternatives 3 and 3A are projected to improve fewer allotments than Alternative 4. The amount of time needed to improve allotments not addressed under initial actions will be greater for Alternative 3 and 3A than for Alternative 4, which addresses more allotments than Alternative 3 and 3A.

Consistency with Grasslands Plan—Seral Stages

There are no standards for seral stages in the Grasslands Plan; however, there is the following guideline:

Apply vegetative structural and compositional objectives across all herbaceous community types.
Guideline

Initial actions under Alternatives 3, 3A, and 4 would, to differing degrees, move plant composition (i.e., seral stages) towards objectives identified in the plan. Where monitoring shows initial actions to be insufficient, adaptive management actions would be implemented to help move areas towards objectives.

SHARP-TAILED GROUSE

Introduction

The plains sharp-tailed grouse *(Tympanuchus phasianellus jamesii)* is the management indicator species (MIS) for the biological community associated with grasslands that contain scattered shrubs and diverse vegetative structure (Appendix H USDA 2001a). An important feature to this community is the availability of high-structure vegetation (such as herbaceous dominated grassland). Such habitat benefits nesting sharp-tailed grouse and some other ground-nesting avian species.

Spatial and Temporal Setting

The analysis area for sharp-tailed grouse is associated with the potential occurrence of quality nesting and brooding habitat within 1 mile (Grasslands Plan 1-14, #17) of their leks (dancing grounds). Surveys in 2004 and 2005 (Knowles) identified 37 sharp-tailed grouse leks located in or adjacent to the project area. The analysis area for the sharp-tailed grouse includes the project area plus an additional mile buffer to account for the leks identified outside the project area. The temporal context for the analysis is 10-15 years from present.

Methodology

Two different methodologies were used to provide data for the sharp-tailed grouse analysis. First, visual obstruction reading (VOR) information was used to determine the amount of High structure, which is an important component of grouse habitat. Sharp-tailed grouse require high herbaceous structure for nesting, brooding, and hiding cover. High structure grassland for the LMNG is defined as areas with average VOR transect readings greater than 3.5 inches. The VOR methodology and analysis is described under the Herbaceous Structure section in earlier in this chapter.

Second, Forest Service and contract (Knowles 2005) surveys were conducted to determine the number and location of sharp-tailed grouse leks (dancing grounds) in the project area. From mid April to early May, leks were observed and documented. In 2007 the DPG established a series of long-term lek monitoring blocks on each ranger district to monitor sharp-tailed grouse population trend. In these blocks lek locations and number of male sharp-tailed grouse are documented.

Affected Environment—Sharp-tailed Grouse

This section provides a general description of the information related to seral stages for the project area. A detailed description of the existing condition of the seral stages in each allotment is provided in Chapter 3 Part 2.

EXISTING CONDITION

Lek surveys conducted in 2005 (Knowles 2005; Warm 2004, 2005) identified 37 leks throughout the project area, with the majority located in the eastern half of the project area. Some of the 37 leks may be “satellite” leks. Satellite leks are defined as those leks that are typically used for 2 years or less (Haukos and Smith, 1999); typically less than 0.6 miles from an established lek (Washington Department of Fish and Wildlife, 2002); and/or are attended by a low number of males. Additional satellite leks likely exist in the project area; however, given their dynamic nature and typically small size, they are difficult to detect. Most established leks are relatively stable over time but do move on occasion.

The known leks occur in both the Rolling Prairie and Badlands Geographic Areas (GA). However, within the project area the interface between the two geographic areas contains the highest density of leks, with 16 known leks within 1 mile and 24 within 2 miles of the interface between the two GAs.

The 2001 Northern Great Plans FEIS (p. 239) states that “livestock grazing is the most significant and widespread activity affecting grassland structure.” Baseline grassland VOR transect data, collected in 2004 and 2005 within the project area, indicates that High structure grassland habitat is under represented, whereas Low and Moderate structure habitats are overly represented. Using the individual station data from the VOR transect information provides the same overall picture as the transect average. When analyzing by stations, High structure is defined as equal to or greater than 5.5 inches, in accordance with the DPG response to SRT

recommendation II-2. Structure data are collected in the fall after most grazing is complete. Tables 3.31 and 3.32 provide summaries of project area transect and station structure distribution data from 2004 and 2005.

Table 3.31 — (Left) 2004 and 2005 transect herbaceous structure distribution within the project area

Table 3.32 — (Right) 2004 and 2005 station herbaceous structure distribution within the project area

	VOR TRANSECTS		
	LOW 0-1.49”	MODERATE 1.5-3.5”	HIGH >3.5”
2004	53%	47%	<1%
2005	29%	64%	7%

	VOR by STATION		
	LOW 0-1.49"	MODERATE 1.5 – 5.49"	HIGH >5.5 "
2004	59%	38%	3%
2005	42%	56%	2%

The year 2004 was dry and met drought criteria under the Grasslands Plan definition. There currently is not a drought strategy for the DPG; however, as identified in Chapter 1, a modification of the NE McKenzie FEIS (page 22) is being used as an interim policy. Under this direction there is a transect structure objective of at least 10 percent High structure and at least 40 percent Moderate structure during drought. The VOR information provided above indicates that the project area contained low amounts of High structure, which is an important component of quality sharp-tailed grouse habitat.

The Grasslands Plan (page 1-14) identifies the need to emphasize quality nesting and brooding habitat, consistent with GA objectives, within 1 mile of active sharp-tailed grouse leks. The lek site is the hub of nesting and other annual activities for sharp-tailed grouse (Connelly et al. 1998, Prose 1987). One mile buffering of the known leks within the analysis area accounts for approximately 42 percent of the NFS lands in the project area. Table 3.33 shows that for 2004 and 2005 the herbaceous structure distribution within the buffered lek areas is similar to the overall project area. Because sharp-tailed grouse utilize a combination of grasslands and shrubs, the shrub dominated or co-dominated transects were included in determining structure distribution identified in Table 3.33.

Sharp-tailed grouse utilize a variety of habitats including green ash woody draws. These woodlands provide forage, cover, and roosting sites and may be important in harsh winters (Prose 1987). The quality of the green ash woody draw habitat varies from healthy to unhealthy; however, because of the number of woody draws within the project area, the woody draws do not appear to be a limiting factor for the sharp-tailed grouse.

Table 3.33 — 2004 and 2005 VOR structure distribution within 1 mile of leks within the project area

Year	Low 0-1.49”	Moderate 1.5-3.5”	High >3.5”
2004	46.6%	50.0%	3.4%
2005	29.6%	63.0 %	7.4%

There are areas within some allotments that are either not grazed or are very lightly grazed. These static long-term “rested” areas occur primarily in the Badlands, where topography may limit access and/or the forage base. However, densities of sharp-tailed grouse in the Badlands are typically low and, within the Badlands, these rested areas do not provide appreciable amounts of potential habitat for grouse or other ground-nesting species that prefer high-structure habitats.

In summary, sharp-tailed grouse occur in the project area as demonstrated by the presence of the 37 leks. However, project area structure information provided above and in the Herbaceous Structure section of this chapter indicates that the amount of High structure is well below Grasslands Plan structure objectives and interim drought structure objectives. High herbaceous structure is an important feature of quality sharp-tailed grouse habitat because it provides nesting and brooding habitat. The lack of good quality nesting and brooding habitat is thought to be a limiting factor throughout the range of sharp-tailed grouse (Hillman and Jackson 1973, in Prose 1987). Prose assumes that between 5 to 20 percent good cover is required for minimal population levels. The existing level of quality habitat may have adverse long-term affects to the sharp-tailed grouse population.

Sharp-tailed Grouse Population

The plains sharp-tailed grouse (grouse) occurs over a broad geographic area, in a nearly contiguous manner, ranging from eastern North Dakota, west to the Continual Divide, south to New Mexico, and north to central Alberta, Canada. The grouse has experienced population declines in many parts of its range due primarily to habitat loss, notably from conversion of habitat to agriculture uses (Connelly et al. 1998). The Nature Conservancy (2000), summarizing the North American Breeding Bird Survey information, found no significant grouse population trend for the period from 1966 to 1995. The Nature Conservancy, however, notes 7 and 8 percent declines for Canada and the western U.S., respectively, and about an 8 percent increase for North Dakota. According to the Nature Conservancy, sharp-tailed grouse populations in eastern Montana, North Dakota, South Dakota, Nebraska, and southern Canada are more secure than other populations.

The NDGF has been surveying sharp-tailed grouse using a block survey method. One of their survey blocks, the Gorham Census Area, is located in the project area. NDGF has been surveying this area since 1966. Their 1966 to 2009 data show a stable to slightly increasing sharp-tailed grouse population in that block.

The DPG also monitors sharp-tailed grouse unit-wide through a system of monitoring blocks. One of these blocks lies within the project area. Survey information from 2007 to 2010 showed that the number of male grouse peaked at 59 males in 2008. In 2010, the number of counted males had dropped to 20. In 2008 the survey block contained five leks and in 2010 there were three leks. Two consecutive harsh winters, 2008 through 2010, likely contributed to the decline in numbers. However, these data cover a very short time period for a highly variable population and it would not be valid to determine population trend based solely on this information.

The population of sharp-tailed grouse in the project area is unknown, and predicting populations in a finite area such as the project area is difficult without extensive, long-term field data. However, surrogate information, including lek survey information from the project area and information contained in North Dakota Game and Fish (NDGF) monitoring reports (from 1998 to 2006), was used to model the grouse population within the project area (Project Record, Specialist Reports and Notes, Wildlife Report). The estimated number of grouse in the project area is identified at between 473 and 659 grouse.

When discussing populations of a wide-ranging species such as the sharp-tailed grouse, it is important to note that focusing on project scale populations is incorrect since it is out of spatial and temporal contexts. Sharp-tailed grouse populations are highly variable and can experience significant annual fluctuations in population numbers due to climate and habitat changes and other influences. Therefore, separating the individuals within the project area (a very small portion of the larger range) from the larger population would not be consistent with most viability analyses (Ruggiero et al. 1994).

Desired Condition

The desired condition is to provide diverse and quality nesting, brooding, and wintering habitat at levels that, in combination with habitat on adjoining lands, help support stable to increasing sharp-tailed grouse populations within 10 to 15 years (Grasslands Plan, p. 2-14, 2-21).

Environmental Consequences—Sharp-tailed Grouse

Direct and Indirect Effects

This section provides a summarization of direct and indirect effects for the 43 allotments in the project area. Detailed effects information is presented in Part 2 of this chapter.

Alternative 1

With no livestock grazing, a significant increase in Moderate and High structure would be expected, resulting in increased nesting opportunities for ground-nesting species requiring or preferring High structure. It is uncertain how much High structure could be produced; however, the 2001 Northern Great Plains FEIS (Alt. 4, page 3-319) analysis projects that a minimum of 46 percent High structure on the landscape may be produced under a no-grazing scenario. Given a lack of other large-scale disturbances (such as fire), biologically capable sites would be strongly

biased towards High structure, which provides important nesting and brooding habitat for sharp-tailed grouse. Additionally, there would be no potential for nest destruction resulting from livestock trampling and there would be reduced incidences of collisions with fences.

The occurrence of drought may affect grouse habitat and, therefore, populations under this alternative. However, because of the substantial increase in High structure and absence of livestock influence, the effects on the sharp-tailed grouse population would be mitigated. Ultimately, under this alternative sharp-tailed grouse nesting and brooding habitat would increase, nests lost due to livestock would decrease, and sharp-tailed grouse populations would increase, barring some unforeseen natural calamity.

Alternative 2

Alternative 2 proposes to continue current management; therefore, the existing conditions would likely continue relatively unchanged as described in the Affected Environment section above. The existing low levels of quality brooding and nesting sharp-tailed grouse habitat would be maintained.

The occurrence of drought generally tends to reduce the amount of High structure, which is further impacted by livestock grazing. Given the low amount of existing High structure, drought, in combination with livestock grazing, has the potential to adversely affect sharp-tailed grouse habitat and, therefore, population dynamics.

Alternative 3

The initial actions of this alternative include establishing, changing, or maintaining rotational grazing systems, additional range improvements, fencing, water development, range pipelines, and range water management. Authorized Use would be maintained at current levels. Table 3.34 summarizes the effects of proposed initial actions to sharp-tailed grouse nesting and brooding habitat.

As identified in the Herbaceous Structure section of this chapter, the use of grazing rotations and additional range infrastructure without Authorized Use/AUM adjustments is likely to result in the continued homogenization of herbaceous structure. Some Low structure may move to Moderate. However, there may also be a loss of existing High structure as rangelands are more efficiently utilized by livestock because of smaller pastures and more water sources. Because the amount of High structure is not projected to increase, sharp-tailed grouse nesting and brooding habitat in18 of the allotments would remain neutral, that is, exiting habitat conditions within a mile of known sharp-tailed grouse leks would be maintained. Nesting and brooding habitat would decrease in 13 allotments because of increased number of water sources, smaller pastures, and absence of changes in Authorized Use. Twelve allotments had no known sharp-tailed grouse leks (Table 3.34) within a mile of the allotment.

Table 3.34 — Summary of projected effects, by allotment, for Alternative 3 initial actions on the nesting and brooding habitat of sharp-tailed grouse

Allot #	Improve	Neutral	Decrease	No Lek[1]	Allot #	Improve	Neutral	Decrease	No Lek
126			X		240			X	
127				X	241		X		
128		X			243			X	
129		X			244		X		
130		X			248				X
131		X			249		X		
132A				X	256		X		
132H				X	258			X	
133				X	272			X	
133D5				X	277			X	
134		X			278		X		
135				X	281				X
136/139		X			282			X	
140		X			283			X	
141				X	286				X
142		X			287		X		
158		X			288		X		
220				X	289			X	
221			X		300			X	
230		X			301			X	
237			X		302		X		
239				X					

[1]No known leks in or within one mile of the allotment.

Under this alternative an interim drought strategy has been identified until the pending DPG drought strategy in completed. As identified in Chapter 2, the interim drought strategy is a modification of the one adopted by the McKenzie Ranger District 2006 NE McKenzie Allotment Management Plan Revisions FEIS. The structure guidelines (≥10 percent high structure and ≥ 40 percent moderate structure) set under this strategy would reduce impacts to nesting and brooding habitat but would not eliminate the effects of drought.

Implementation of adaptive management actions, including reductions in Authorized Use and implementation of rest, would improve sharp-tailed grouse habitat. This is because both of these actions are key in improving herbaceous structure (Briske et al. 2008, Rice and Carter 1984), which in turn provides quality nesting and brooding habitat.

Alternative 3A

The affects of Alternative 3A are the same as those of Alternative 3, with the exception of allotment 287. Under Alternative 3A an additional water source would be installed in what is now secondary range. Installation of the water, with no change in Authorized Use, would even out livestock distribution and homogenize the structure distribution within the allotment, resulting in a decrease in nesting and brooding habitat.

Alternative 4

Alternative 4 is similar to Alternative 3; however, it would rely less on structural improvements and would set Authorized Use at levels below Preference. Under this alternative, adjustments for cow size would also be implemented. Of the 31 allotments that contained leks, 23 (Table 3.35) would see improved nesting and breeding cover, 7 would remain unchanged, and 1 would decrease. The primary reason the 23 allotments would improve is because of reductions in Authorized Use, which would potentially provide for increased High structure. Also, fewer range improvements are proposed under this alternative than under Alternative 3. This may lead to fewer impacts to existing secondary range, which potentially carries more High structure. Continued monitoring of herbaceous structure and the grouse survey blocks would determine if the Authorized Use set under this alternative is sufficient or if additional actions, such as additional reductions in Authorized Use, are needed. The seven allotments projected not to change from existing conditions are those that are proposed for an increase in water distribution, smaller pastures, and/or the change in Authorized Use does not account for existing levels of permitted use.

The allotment that is projected to see a decrease under this alternative would do so because of a projected 24 percent increase in Authorized Use, which would result in less residual cover, which adversely affects the amount of nesting and brooding habitat.

Because stocking levels are key to improving grouse nesting and brooding habitat (Reece et al. 2001), this alternative would improve grouse habitat faster than Alternatives 2, 3, or 3A.

Adaptive management actions for Alternative 4 are the same as those for Alternative 3 and 3A and would have the same effects; that is, they would improve grouse habitat. The primary difference between this alternative and Alternatives 3 and 3A is the rate of improvement of nesting and brooding habitat. Because Alternative 4 starts out with Authorized Use below Preference, faster improvement is predicted then under Alternatives 3 or 3A. If additional adjustments in Authorized Use were required, the time needed to reach desired objectives would be less than Alternatives 2, 3, or 3A.

Table 3.35 — Summary of Alternative 4 effects on sharp-tailed grouse nesting and brooding habitat within 1 mile of known leks

Allot #	Improve	Neutral	Decrease	No Lek[1]	Allot #	Improve	Neutral	Decrease	No Lek
126			X		240	X			

Allot #	Improve	Neutral	Decrease	No Lek[1]	Allot #	Improve	Neutral	Decrease	No Lek
127				X	241		X		
128	X				243	X			
129	X				244	X			
130	X				248				X
131	X				249	X			
132A				X	256	X			
132H				X	258		X		
133				X	272		X		
133D5				X	277		X		
134	X				278	X			
135				X	281				X
136/139		X			282		X		
140		X			283		X		
141				X	286				X
142	X				287	X			
158	X				288	X			
220				X	289		X		
221	X				300	X			
230	X				301	X			
237	X				302	X			
239				X					

[1]No known leks in or within one mile of the allotment.

CUMULATIVE EFFECTS

Cumulative effects result from the combination of effects resulting from past, present, and reasonably foreseeable actions plus the direct and indirect effects of the alternatives. A discussion of past and present actions, reasonably foreseeable actions, and a summary of the cumulative effects by alternative follows.

Past and Present Actions

The following past and present actions have contributed to the low amount of High structure, which has affected nesting and brooding habitat for sharp-tailed grouse in the project area.

Livestock grazing has affected, and continues to affect, quality sharp-tailed grouse habitat in the project area. Livestock grazing reduces the amount of high herbaceous vegetation, which serves as important nesting and brood habitat for sharp-tailed grouse.

Oil and Gas. Oil and gas development has resulted in road development, which has fragmented sharp-tailed grouse habitat to a limited degree and may have introduced some incidental mortality due to collisions with oil field traffic and infrastructure. Historical oil and gas

development probably displaced some grouse leks, however, avoidance is now used if this conflict arises. Past oil and gas development also resulted in the creation of an all-weather road system, which created or improved access for livestock into formerly inaccessible or seasonally accessible areas. In some areas this has resulted in secondary range containing High structure becoming primary range with a corresponding reduction in High herbaceous structure. Currently, oil and gas activity in the project area is primarily focused around maintenance of existing oil and gas facilities and maintenance of oil and gas roads, which has little effect on sharp-tailed grouse other then direct mortality caused by collisions with vehicles.

Noxious Weeds/Invasive Grasses. It is unknown when noxious weeds and invasive grasses first appeared in the project area. Some invasive species appeared sometime in the 1930s, such as crested wheatgrass, when it was successfully used in the reclamation of sub-marginal lands. The primary past, current, and future effect of these groups of plants is that they alter or replace native plant communities. While this is not a preferred situation, sharp-tailed grouse will utilize some of the invasive grass species (such as crested wheatgrass) for nesting and brooding cover where they produce high structure in sufficient amounts. One exception to this is Kentucky bluegrass which does not provide spring nesting cover.

Wildfire, a natural historical disturbance factor, has been actively suppressed on the LMNG and adjacent private and state lands for about a century. The result has been an increase in some tree and shrub communities and possibly in invasive species, as well as a reduction or loss of vigor in plant communities where fire plays a role in maintaining the health of those systems. Fire initially removes vegetative structure and built-up litter; however, this is a short-term effect that is offset by the regenerative effects of fire, such as fertilization. Fire also plays a role in altering the mosaic of vegetation structure and composition across the landscape, affecting sharp-tailed grouse habitat. Due to an aggressive fire control policy over the past several decades, wildfire has burnt fewer than 4,500 acres, annually, on the LMNG and Grand River National Grasslands combined. While this may seem to be a significant number of acres, it represents less than 0.5 percent of these grasslands. Wildfire may have some localized effect on grouse habitat but overall it is considered to be minor because of the small amount of acreage annually burned.

Drought, a recurring natural event in western North Dakota, limits available soil moisture, which in turn affects vegetative production and in turn the availability of nesting and brooding habitat for sharp-tailed grouse.

Farming. In the past, cultivation of crops occurred within the project area on what are now NFS lands. Farming is no longer conducted on the LMNG; however, it does occur on the intermingled private lands within and adjacent to the project area. Farming outside the project area on private lands has resulted in the loss and/or fragmentation of sharp-tailed grouse habitat and, indirectly, grouse numbers. This has had an effect on the overall grouse population; however, that effect is more historical in context. Because of a lack of data on private lands, it is not possible to determine the effect of current farming activities on the sharp-tailed grouse populations in the project area or on the LMNG.

Reasonably Foreseeable Actions

Elkhorn Ranchlands. The recently purchased Elkhorn Ranchlands require that the Grasslands Plan be amended to establish management direction for the newly acquired lands. Approximately 800 acres of the 5,200-acre Elkhorn purchase are directly associated with five of the allotments in the North Billings project. Under the proposed amendment, these lands would be managed in accordance with the adjacent management area, which is MA 3.65 Rangelands with Diverse Natural Appearing Landscapes. In the interim, as directed by 36 CFR 254.3(f)(2008), these portions of the purchase are being managed in accordance with the adjacent MA 3.65.

The proposed Plan amendment for the Elkhorn Ranchlands also includes establishing a special interest area (SIA) for the remaining 4,400 acres of the purchase and the approximately 17,160 acres contained in grazing allotments 279 and 280, which were associated with the Elkhorn Ranchlands when they were owned privately. If implemented, the SIA would establish a forage reserve on those acres.

Travel Management. An environmental assessment (EA) for travel management on the LMNG was released for comment in 2010. The proposed action under this EA would close all single-use oil and gas roads, unauthorized roads (i.e., two-tracks), and an additional 18 miles of system roads in the project area. It is unlikely that this future action will significantly affect sharp-tailed grouse because it will not have an effect on herbaceous vegetation in the project area.

Oil and Gas Development. The Forest Service has received five applications for permit to drill (APDs) on NFS lands in the project area. The APDs seek to drill oil and gas wells. The well pads associated with each well would be approximately 4 to 5 acres in size, encompassing about 22 acres total. Approximately 4,250 feet of roads would be built to access the well sites. The well pads would be surfaced with scoria or gravel and kept free of vegetation, so there is little opportunity to encourage the spread of invasive grasses. One of the proposed wells is located with a mile of a known sharp-tailed grouse lek the others are not.

Cumulative Effects by Alternative

This section summarizes direct and indirect effects of the alternatives and the effects of reasonably foreseeable actions on sharp-tailed grouse. These effects in combination with past and present effects combine to create cumulative effects.

Alternative 1 provides the best opportunity of all the alternatives for improving sharp-tailed nesting and brooding habitat in the short term. This is primarily due to the removal of disturbance associated with livestock grazing, which affords the best opportunity for the recovery of High structure. Mortality resulting from nest destruction caused by livestock would cease, and, as most fences would be removed under this alternative, collisions with fences and resultant mortality would decrease. Additionally, travel management may result in slightly less

direct mortality as the result of potential road closures but is not expected to affect sharp-tailed nesting and brooding habitat. Potential oil and gas development is not expected to have any significant affect on sharp-tailed grouse habitat despite one proposed oil well being located within a mile of a sharp-tailed grouse lek. The Elkhorn Grasslands Plan amendment would have no effect as livestock grazing would be prohibited under this alternative.

Alternative 2 would maintain current sharp-tailed grouse habitat but would not increase the amount of quality nesting and brooding habitat. The Elkhorn Ranchlands Grasslands Plan amendment would establish a forage reserve on those acres. The reserve would provide an alternate source of forage, providing management flexibility to meet resource needs, such as increasing the amount of sharp-tailed grouse brooding and nesting habitat. The effects of the remaining reasonably foreseeable actions are the same as those identified under Alternative 1.

Alternative 3, initial actions under this alternative sharp-tailed grouse nesting and brooding habitat in18 of the allotments would be maintained and 13 allotments would experience a decrease in habitat conditions. Twelve allotments had no known sharp-tailed grouse leks (Table 3.34) within a mile of the allotment. The effects of the Elkhorn Grasslands Plan amendment would be the same as those identified under Alternative 2. The effects of travel management and foreseeable oil and gas developments are the same as those identified in Alternative 1.

Alternative 3A, initial actions would have the same effects as Alternative 3. The one exception is Allotment 287, where the quality of grouse habitat is expected to decrease because of increased water availability. The effects of reasonably foreseeable actions are also the same as Alternative 3.

Alternative 4, initial actions would improve grouse habitat within a mile of known leks associated with 23 of the allotments, remain unchanged for 9 allotments, and would decline in 1 allotment. The potential cumulative effects of reasonably foreseeable actions are the same as in Alternatives 3 and 3A. The remaining 13 allotments had no known sharp-tailed grouse leks (Table 3.35) within a mile of the allotment.

Adaptive Management. Implementation of adaptive management options under Alternatives 3, 3A, and 4, including actions identified in the tool box, would be sufficient to improve nesting and brooding grouse habitat, even if initial management actions are determined through monitoring to be insufficient. In terms of adaptive management, the greatest difference between these alternatives is the rate of change. Alternative 4 would result in initial reductions in Authorized Use, whereas Alternatives 3 and 3A maintain Authorized Use at Preference. The analysis has identified that reductions in stocking is the most effective way of influencing structure and, hence, nesting and brooding habitat. Therefore, a reduction in Authorized Use as an adaptive action under Alternatives 3 and 3A would lag behind Alternative 4.

Consistency with Grasslands Plan—Sharp-tailed Grouse

The following Grasslands Plan standards are associated with the management of sharp-tailed grouse on the LMNG.

1. Manage for native forb abundance and diversity to provide foraging habitat for big game, grassland birds, and other grassland wildlife. **Guideline**

Alternative 1, through the removal of cattle, would initially result in an increase in native forb diversity, but over time there would be an overall loss in forb diversity because ungrazed grasses would eventually shade out many forbs, thus reducing their diversity.

Alternative 2, by maintaining current management, would maintain the current levels of forb diversity.

Alternatives 3 and 3A, by increasing management intensity (implementing/changing rotations and infrastructure improvements) while retaining current Authorized Use, would initially maintain the existing forb diversity.

Alternative 4, by increasing management intensity (implementing/changing rotations and infrastructure improvements) while adjusting current Authorized Use and accounting for livestock weight, would generally result in an increase in forb diversity.

2. Use the following criteria at the project level to help determine where to manage for high structure habitat in as large of blocks as possible in upland areas for waterfowl, prairie grouse, and other ground-nesting birds: **Guideline**

a. Presence of moderate to highly productive soils.

b. Dominance of mid to tall grass species.

c. Proximity to waterfowl pairing ponds and/or prairie grouse display grounds.

d. Proximity to wetlands with well-developed emergent vegetation.

Currently there is a stable to slightly increasing trend in sharp-tailed grouse; therefore, no specific blocks have been identified for increasing High structure habitat. Alternatives 1, 2, and 4 would maintain or increase the amount of sharp-tailed grouse nesting and brooding habitat. Alternatives 3 and 3A have the potential to reduce the amount of habitat because of more intensive management actions. If Alternatives 3 or 3A were selected, and monitoring of initial actions showed a decrease in quality sharp-tailed grouse habitat, then this guideline would be implemented to improve grouse habitat. Waterfowl were not an issue for this analysis.

3. Manage for high vegetative structure in areas where it would enhance nesting habitat for sharp-tailed grouse. Emphasize areas characterized by:

- Presence of moderate to highly productive soils and range sites.
- Plant composition dominated by mid and/or tall grasses.
- Proximity to sharp-tailed grouse display grounds.
- Proximity to shrub habitats, private croplands, and other sharp-tailed grouse foraging habitats. **Guideline**

This guideline is essentially the same as the preceding guideline, with the exception of the last sub-point. As previously identified, there are no designated areas identified to be managed for High structure. If Alternatives 3 or 3A were selected, and monitoring of initial actions showed a

decrease in quality sharp-tailed habitat, then this guideline would be implemented to improve grouse habitat.

4. Limit construction or placement of non-oil and gas structures or facilities within 1/4-mile of active prairie grouse display ground if structures are likely to adversely affect reproductive success of these species. Project-level analysis should consider the type, source, frequency, and duration of the potential disruption, as well as the affected species and presence of screening vegetation or topography. **Guideline**

Prior to construction of any range facility identified under any of the alternatives, facility site locations would be reviewed by the wildlife biologist.

5. Emphasize quality nesting and brooding habitat, consistent with Geographic Area objectives, within 1.0 mile of active greater prairie chicken and sharp-tailed grouse display grounds and 3.0 miles of active sage grouse display grounds. Consult Appendix H for a description of quality habitat for prairie grouse. **Guideline**

No specific areas were identified under any of the alternatives as special management areas for sharp-tailed grouse, as populations are currently being maintained. Alternatives 1 and 4 would enhance the quality of sharp-tailed grouse habitat. Alternative 2 would maintain the current level of sharp-tailed grouse habitat. Initial actions of Alternatives 3 and 3A would have the potential to reduce quality habitat on a number of allotments in the project area.

There are no known greater prairie chickens on the LMNG. They do occur on the Sheyenne National Grassland in eastern North Dakota.

6. Limit activities within 1.0 mile of active greater prairie chicken and sharp-tailed grouse display grounds and 2.0 miles from active sage grouse display grounds from March 1 to June 15 if they are likely to adversely affect the reproductive success of these species. Project-level analysis should consider the type, source, frequency, and duration of the potential disruption, as well as the affected species and presence of screening vegetation or topography. **Guideline**

Herbivory is a natural activity of sharp-tailed grouse natural history. Impacts from herbivory, or related actions from the animal such as temporarily disrupting a lek or trampling a nest, may impact the reproductive success of individuals but not the species as a whole. Alternative 1 would remove all livestock; therefore, disturbance to leks or nests would not occur.

Though two oil and gas wells are proposed in the project area, they are not within a mile of any known lek and are not projected to have an effect on sharp-tailed grouse.

There are no known greater prairie chickens on the LMNG. They do occur on the Sheyenne National Grassland in eastern North Dakota.

7. Delay livestock grazing until after June 15 in areas being managed to provide upland gamebird nesting cover for the current year. **Guideline**

There are no designated areas specially managed for upland gamebird nesting cover under this project.

8. Manage prairie grouse display ground viewing activities to reduce disturbances and adverse impacts to the birds on the display grounds. **Guideline**

There are no organized sharp-tail grouse viewing activities on the Medora Ranger District. Lek surveys conducted by the district wildlife biologist are designed and conducted in a manner that minimizes potential disturbance.

9. Manage for high plant species diversity, including forbs, in areas where it would enhance sharp-tailed grouse brooding habitat quality. Emphasize areas in proximity to nesting habitat. **Guideline**

This guideline is addressed in points 3 and 4 above.

10. In areas used by wintering sharp-tailed grouse, maintain and enhance shrub patches and shrub components in wooded draws and riparian habitats. **Guideline**

There are no shrub patches specifically identified for wintering habitat for sharp-tailed grouse. Woody draws and other shrubby species (e.g., buffalo berry) provide important winter habitat. Though varying amounts of woody draws, specifically green ash woody draws, have been affected by livestock grazing, the number of woody draws is sufficient to provide needed winter cover. Woody draws and shrubby species are not limiting sharp-tailed grouse populations within the project area under any of the alternatives.

11. Meet rest objectives based on, but not limited to, the following desired conditions:

- Where high structure is required for plant and animal communities and reproductive success for Management Indicator Species (see Geographic Area direction).
- Where ungrazed areas are desired for biological diversity. **Guideline**

There are no specific areas under this project identified as needing rest or requiring ungrazed areas for the reproductive success of MIS species.

ECONOMICS

Introduction

The social and economic implications of grassland resource management are of interest to local residents in Billings County, ND, and other areas surrounding the LMNG; visitors to the grasslands; and some people from other parts of North Dakota and throughout the United States. Residents in Billings County, ND, would be most likely to experience the direct social and economic impacts of the North Billings project. Ranchers who graze livestock on NFS lands in the project area may be affected, either positively or negatively, depending on alternative selection.

The economic impacts of the alternatives described in the North Billings project were evaluated in two different fashions. The first analysis used IMPLAN Pro software (MIG 2003) to support an input-output analysis method to estimate regional employment and labor income impacts. Input-output analysis is a way to examine relationships within an economy both between

businesses and between businesses and final consumers. It captures all monetary market transactions for consumption in a given year. This economic impact analysis examines the effect of a change in one or several economic activities on an entire economy when all else is held constant.

In the second analysis, North Dakota State University (NDSU) evaluated how allotment management alternatives proposed for the project area by the Medora Ranger District would affect individual ranch operations in the Little Missouri Grasslands. These economists have provided a report disclosing their best projections of impacts using enterprise analysis and debt payment capacity based on information collected from North Dakota Farm and Ranch Business Management (NDFRBM) and interviews of lending institutions.

Neither the regional economic impact analysis described above nor the NDSU analysis are based directly on financial information specific to the MGA permittees that will be directly affected by selection of an alternative. These two methods of portraying economic impacts are very different, but, as each has its own strengths and weaknesses, the results of both analyses will be shown in this document.

This section also contains information related to the social setting and briefly explores the effects of the different alternatives on relationships between the Forest Service and ranchers with grazing permits on NFS lands.

After the DEIS was completed, new vegetation production information from the NRCS ecological site descriptions became available. The new information changed Authorized Use numbers under Alternative 4. Approximately half of the allotments would see less of a reduction in Authorized Use and about half would remain unchanged. As a result of these changes, the projected negative impacts to cattle ranching are reduced. These reduced impacts are still combined with the small positive agricultural support services impacts from additional annual spending on cattle ranching infrastructure improvements (in Alternatives, 3, 3A, and 4) to estimate total impacts.

Forest Service analysis output dates were advanced 1 year in the SDEIS (for example, from 2010 to 2014 became from 2011 to 2015), reflecting later implementation dates than expected during the DEIS.

Spatial and Temporal Setting

The geographic scope of the economic analysis includes: Billings, Bowman, Dunn, Golden Valley, McKenzie, Slope, Stark, and Williams Counties, ND; and Dawson, Fallon, Richland, and Wibaux Counties, MT. This economic impact area is an appropriate scope of analysis because, even though the project would occur in Billings County, ND, these adjoining counties provide important inputs to the cattle ranching operations and serve as markets for beef cattle produced in the project area. The temporal scope of the analysis is 10 to 15 years.

Methodology

Following are descriptions of the various methodologies used by the Forest Service and NDSU in determining the economic effects of the different alternatives contained in the proposed North Billings project.

Government Revenues and Payments to Counties

For each alternative, anticipated changes in revenue to the government and the impact on payments to counties are projected based on the current fees and legislation governing payments to states.

Forest Service Regional Economic Contributions and Impacts

The MGA provided grazing permits for the allotments in the project area for 2005 through 2007. An average from this 3-year period was used to portray current conditions. This analysis compares the pace of authorized AM reductions for each of the alternatives. The anticipated changes under each alternative were determined by range specialists calculating the number of AMs authorized for each alternative based on information obtained from grazing association issued grazing permits, grazing association Preference numbers, or estimating livestock carrying capacity numbers. Using the expected AMs under each alternative, economic impacts are estimated as direct, indirect, and induced employment (full- and part-time jobs) and labor income generated by (1) the foraging of cattle on NFS lands, and (2) the marketing of all cattle that rely on national grassland forage as part of their growth requirements. The true economic contribution and impacts associated with each of the alternatives likely falls within the ranges of estimates generated using these two techniques.

The existing condition is calculated by first determining the portion of total North Dakota cash receipts for cows and calves that are produced from NFS lands located in the 43 allotments in the project area. To calculate the percentage contribution that the NFS lands in the project area make to state cash receipts, the number of authorized AMs are divided by the number of AMs for all cows and calves marketed across North Dakota (2007 National Agricultural Statistical Service data). The 2007 data were the latest available at the time the analysis was conducted and were paired with the 2005-2007 average. Using more recent NASS data would not be technically correct because it would not match the time period for the MGA data.

Since marketed cows and calves spend roughly 12 and 8 months, respectively, foraging before they are marketed, the total number of marketed cows is multiplied by 12 and the total number of marketed calves across the state is multiplied by 8. These are then added together and used to estimate the total number of AMs required to bring animals to market and sell them for cash receipts. The 2005 through 2007 average authorized AMs are then divided by this number to calculate the portion of state total attributable to federal forage on the allotments. When this portion is multiplied by the 2007 cash receipts, the cash receipts for each year are calculated for the project area. It is important to acknowledge that when the portion of North Dakota marketings is calculated this way, it likely overestimates the portion because not all cows and

calves feeding on grasslands are indeed marketed each year. The true percentage marketed likely varies each year as many relevant markets change. Since we have no data describing this percentage, the portion of the statewide marketings estimated for the allotments is presented as a maximum percentage of statewide marketed animals directly attributable to federal forage in the project area.

Some cattle ranchers who have cows and calves that spend time on national grasslands in the project area rely on these lands to feed cattle away from base ranches so that they can produce feed to winter the cattle when they are not feeding on national grasslands. Since these ranchers rely on having their cows and calves off the ranch, the existing situation needs to also consider the current contribution that all of the cattle spending any time on national grasslands make to state marketings. By taking the 2005-2007 3-year average of cows, calves, and yearlings (no bulls, sheep, or horses), an estimate of the number of cows and calves relying on grassland forage is produced. This estimate is then compared directly to the sum of cows and calves marketed across the state (2007 National Agricultural Statistics Service). It is important to again acknowledge that when the portion of North Dakota marketings is calculated this way, it likely overestimates the portion because not all cows and calves foraging on NFS lands are indeed marketed each year. The true percentage marketed likely varies each year as many relevant markets change. Since we have no data pertaining to this percentage, this estimate is presented as a maximum percentage of statewide marketed cows and calves attributable to the project area.

This analysis used IMPLAN Pro software (MIG 2003) to support an input-output analysis method, to estimate employment and labor income impacts. Input-output analysis is a way to examine relationships within an economy both between businesses and between businesses and final consumers. It captures all monetary market transactions for consumption in a given year. The economic contribution and impact analyses examine how a change in one or several economic activities affect an entire economy when all else is held constant. IMPLAN translates changes in the final demand for goods and services into changes in economic effects, such as labor income and employment of the affected area's economy.

The IMPLAN modeling system allows the building of regional economic models of one or more counties for a particular year. The regional model for this analysis used 2007 IMPLAN data for Billings, Bowman, Dunn, Golden Valley, McKenzie, Slope, Stark, and Williams Counties, ND; and Dawson, Fallon, Richland and Wibaux Counties, MT, the economic impact area for the North Billings project on the DPG.

Economic impacts are used to evaluate potential direct, indirect, and induced effects on the economy. The direct employment and labor income benefit employees and their families and, therefore, directly affect the local economy. The direct response coefficients represent the number of jobs and the amount of labor income that are a direct impact to the cattle ranching and farming, and the agriculture support activity economic sectors in the IMPLAN model. Additional indirect and induced multiplier effects (ripple effects) are generated by the direct activities.

Indirect jobs represent the additional circulation of money to purchase inputs for cattle ranching and farming and inputs for the agriculture support sector. These jobs and this labor income are

distributed among the various economic sectors that exist in the 12-county area in North Dakota and Montana. Workers and proprietors working and earning money from direct and indirect impacts spend their earnings. Some of the money that is spent circulates in the local economy; much of the money leaks out to other parts of the country. The amount that remains local contributes additional jobs and labor income in a diverse group of economic sectors. This portion of the project area contribution to the economic impact area is called induced economic impacts.

Potential future expenditures by the Forest Service and permittees associated with range improvements on the allotments under alternatives 3, 3A, and 4 are multiplied by estimates of direct, indirect, and induced effects for the agricultural support services IMPLAN sector and are combined with the cattle ranching impacts in the analysis. The sum of direct, indirect, and induced effects for both the cattle ranching and farming and the agricultural support services sectors is labeled total economic impacts.

Potential limitations of these estimates are the time lag in IMPLAN data, the structural changes to the economy that have happened since autumn 2008, and the accuracy of the methodology for calculating the portions of total cash receipts attributable to federal forage and all the cattle that spend some of the year grazing within the project area. As noted above, the lack of data regarding the percentage of annually marketed animals that are using the allotments is also a limitation. In this case, that has been dealt with by assuming all animals are marketed. Because of these limitations and assumptions, the best use of the economic impact modeling is to reveal relative differences in economic impacts between the alternatives.

NDSU Enterprise and Debt Repayment Capacity

Billings County, a cooperating agency, asked Dr. Larry Leistritz, Distinguished Professor of Agricultural Economics-NDSU, and Dean Bangsund, Agricultural Economist-NDSU, to evaluate how the alternatives proposed for the North Billings project would affect individual ranch operations. These economists have provided a report disclosing their best projections of impacts using enterprise analysis and debt payment capacity analysis. Their full report and appendices are located in the Cooperating Agency section of the Project Record.

Below is a detailed description of their methods that describes their data and how they were used to evaluate potential impacts. These data and methods are intended to consider the baseline scenario (no change in NFS grazing), as well as three possible immediate AM reduction levels (10, 20, and 40 percent) and how they could impact local ranching enterprises of three size classes (150, 250, and 350 head). It then shows how changes in enterprise net margins would affect the debt repayment capacity for the three herd size operations in the next 10 years, following implementation of Alternative 4.

There are several assumptions used by these economists that differ from those used by the Forest Service economist. The following is a list of assumptions in the NDSU report that either do not exactly match the alternatives or which could be considered possible interpretations of likely outcomes of Forest Service alternatives.

Neither the regional economic impact analysis described above nor the NDSU impact analysis is based directly on financial information specific to the MGA permittees that will be directly affected by selection of an alternative. This is because the permittee ranch-specific financial data describing ranches in the project area were not made available to either the Forest Service or the NDSU economists. However, both the regional economic impact analysis and the NDSU analysis do rely on actual economic data for larger areas that encompass the study area.

Data obtained from the MGA by NDSU indicate that 49 ranches would be affected by grazing cuts to the allotments in Billings County (Project Record, Cooperating Agency). Fifteen operations have 201 to 500 cow-herds, 9 operations were sized 101 to 200 cow-herds, and 11 operations had 50 to 100 cow-herds. Fourteen operations were estimated to have fewer than 50 cows. This breakdown does not match the herd sizes used in this NDSU analysis exactly, and the number of operations facing potential 10, 20, or 40 percent cuts was not provided as part of this NDSU analysis. While this information is not provided in the NDSU report, the Forest Service estimated the percentage AM reductions for each allotment in the Range section of Chapter 3 of this FEIS.

AM reductions in the main NDSU study are all modeled to occur in the first year and persist for the remainder of the 10-year study period. This matches only those allotments under Alternative 4 that have a 10 percent reduction proposed for Authorized Use. This is because, under the Forest Service proposal for Alternative 4, 10 percent reduction is the annual reduction limit for any one allotment. Therefore, a 20 percent reduction would take a minimum of 2 years, and a 40 percent reduction would take a minimum of 4 years, to implement. This extra time can be important in providing a ranch operator with herd management options, and slightly changes the results. In the Billings County Economics Report (Project Record, Cooperating Agency), the NDSU economists have added some useful analysis describing how results change when reductions are phased in at a maximum of 10 percent per year.

In the NDSU study, AM reductions on NFS lands are assumed to lead to the same percentage reduction in herd size for all cattle run by a rancher. For example, a 20 percent reduction in NFS AMs used by a rancher is assumed to lead to a 20 percent reduction in overall herd size for a rancher. This is based on a belief that no substitute forage or other transition options would be viable.

Herd size reductions are not accounted for in the main NDSU study financial calculations. Accounting for the one-time sale of livestock to reduce herd size would be a logical step given the two assumptions above. The NDSU economists have added some useful estimation for these one-time revenue sources (Project Record, Cooperating Agency).

Methods and results assume that 90 percent of all ranch revenues are derived from cow-calf operations. The exact percentage is not known for the individual ranch operations in the LMNG affected by the North Billings project. However, 25 of the ranches in the project area have 100 or fewer head of cattle, suggesting that less than 90 percent of all ranch revenue comes from cow-calf operations on many of the ranches.

The NDSU study suggests that reductions in sales values will be proportionally greater than herd size reductions. The report states, "Since fixed expenses cannot be easily changed in the short run, fixed costs were treated to be independent of grazing reductions. Fewer cows would be available to cover the same level of fixed expenses thereby reducing per-cow net margins compared to baseline conditions." Next, it stated that, "The overall effect was decreased net revenues that were disproportionately greater than the level of grazing reductions. For example, a 10 percent reduction in grazing capacities produced 16 to 19 percent reductions in total net revenues over the 2010-2019 period." However, it is hard to make the case that all fixed costs (hired labor, building and machinery depreciation, farm insurance, property taxes, interest on term debt, and miscellaneous items [such as dues, subscriptions, and membership contributions]) would remain the same with a smaller herd size over the 10-year analysis period

NDSU Methods - Extracted from Bangsund and Leistritz (2010)

To provide insights on how cuts in grazing capacities might affect typical ranch operations, an analytical framework was developed to track anticipated changes in several key economic measures over a 10-year period. A baseline scenario was developed along with several herd-reduction scenarios to provide context to how impacts from grazing cuts compare to anticipated future operations without grazing cuts.

Data for the analysis came primarily from the NDFRBM program. Ranches enrolled in the program that are located in western North Dakota provided the basis for financial data for this assessment.

A baseline scenario containing anticipated gross revenues (i.e., livestock sales), variable expenses, fixed expenses, and net margins was estimated for each cow-calf herd size for the 2010-2019 period. Similar economic measures were also estimated based on grazing cuts of 10 percent, 20 percent, and 40 percent for each of the three herd sizes. Grazing reductions were modeled to occur in year one of the 10-year period.

A baseline scenario was developed for estimating debt repayment capacity. Within that assessment, future estimates of family living withdrawals, off-farm income, and cow-calf net margins were included.

Enterprise Analysis

Projected livestock sales and net margins were based solely on average profitability measures for cow-calf production coefficients (e.g., calves sold per cow) and key measures for expenses (e.g., direct expenses per cow). The effects of grazing cuts on producers who are less profitable than average and those who are more profitable than average are likely to differ from the effects described in the NDSU report.

The analysis focused on tracking changes in gross revenues and net revenues from cow-calf operations and evaluating debt repayment capacities for ranch operations. Net revenues were defined to be gross revenues less variable and fixed expenses. To identify differences in financial performance associated with enterprise size, three cow-calf operations were modeled: 150-cow

herd, 250-cow herd, and a 350-cow herd. Those herd sizes approximated the delineation of enterprise data from the NDFRBM program and match typical operations in northern Billings County. Data obtained from the MGA indicates that 49 ranches would be affected by grazing cuts to the allotments in Billings County (Project Record, Cooperating Agency). Fifteen operations have 201 to 500 cow-herds, 9 operations were sized between 101 to 200 cow-herds, and 11 operations had 50 to 100 cow-herds. Fourteen operations were estimated to have fewer than 50 cows.

A 10-year period was chosen to evaluate the effects of grazing reductions on cow-calf ranches. Consistent with analysis periods used by the Forest Service, a 10-year period was assumed sufficient to observe anticipated changes in selected financial measures associated with cow-calf production. Also, a 10-year period is generally consistent with historical cattle cycles (Anderson et al. 2002, Petry 2009). Cattle cycles result from producer responses to anticipated price changes that affect industry-wide decisions on herd expansion and contraction. Those industry-wide inventory changes lead to corresponding changes in average seasonal prices over the length of the cattle cycle (Anderson et al. 2002). As a result, the analysis period should cover both price-increasing and price-decreasing phases of the cattle cycle.

Trends in key enterprise and ranch-level measures are contained in NDSU Report - Appendixes A and B. The annual rate of change in the statistically significant trends was used to make projections over the 10-year evaluation period. In situations where trends were not statistically significant, average values for 3-year, 5-year, and 7-year periods were used as static values in the projections. Future livestock prices were based on projections made by NDSU Extension Service and conversations with NDSU Extension Specialists (Haugen et al. 2009, Petry 2009).

The analytical framework first assigns starting values for production coefficients (e.g., calf selling weights, calf production per cow, cull weights, death loss, cow culling percentages). Also assigned are starting values for key financial measures (e.g., variable expenses per cow, fixed expenses per cow).

Net margins over the period were based on the same techniques for estimating per- cow variable expenses in the baseline analysis (i.e., per head expenses increased but total expenses were tied to number of head). However, fixed expenses in the herd reduction scenarios were based on the level of fixed expense estimated in the baseline analysis. Since an operation’s fixed expenses cannot be easily changed in the short run, this assessment treated fixed costs to be independent of grazing cuts. In the grazing reduction scenarios, fewer cows are available to cover the same level of fixed expenses, thereby reducing net margins over time when compared to baseline conditions.

Variable or direct expenses in cow-calf enterprises consisted of feed supplements (e.g., protein, mineral, vitamin); purchased rations; primary feed stuffs (e.g., aftermath grazing, silage, hay); grazing or pasture; miscellaneous feed stuffs; breeding fees; veterinary; supplies; fuel and oil; repairs; livestock leases; marketing; and operating interest. Fixed or indirect expenses consisted of hired labor, building and machinery depreciation, farm insurance, property taxes, interest on term debt, and miscellaneous items (e.g., dues, subscriptions, membership contributions).

When grazing cuts were expressed as one-time reduction, grazing reductions were expressed as a percentage change in herd size, since a loss of grazing capacity was expected to result in a proportional loss of herd size. For example, a loss of one-third of available summer grazing capacity would translate into a one-third reduction in the cow-calf herd. In the analyses performed in this study, grazing cuts were assigned in year 1 of the 10-year period. A separate section is included that discusses the differences between a phased-in grazing reduction versus a one- time grazing reduction.

DEBT REPAYMENT CAPACITY

A reduction in the debt repayment capacity, all things equal, is generally a negative development for a ranch. Debt repayment measures enable borrowers and lenders to evaluate if a farm or ranch has the funds necessary to repay debts with maturity dates longer than 1 year (Ellinger 1998). The measure assumes that credit obtained from current-year operating expenses is paid within 1 year as a normal conversion of agricultural production to cash assets.

The definition of the debt repayment capacity measure used by the NDFRBM program is consistent with the recommendations of the Farm Financial Standards Council (1995). Financial resources available for debt coverage for a farm business are defined as net farm income plus depreciation plus interest on term debt.

Net farm income is derived by subtracting expenses from gross revenues. Depreciation and interest on term debt are subtracted from gross revenues as part of the calculation of net farm income. Principal on term debt is not considered an expense and therefore is not subtracted from revenues as part of the calculation for net farm income.

Ranches in Billings County were treated as owner-operator entities. As owner- operator entities, the definition of debt repayment capacity is adjusted to include non-farm income, family living withdrawals, and income taxes paid (Farm Financial Standards Council 1995).

The principal component of intermediate and long-term debt is not included as an expense in net farm income; however, interest expense on intermediate and long-term debt is counted as a fixed expense. Therefore, net farm income by itself is not sufficient to determine if a ranch can meet its debt obligations since only the interest component of principal and interest payments on intermediate and long-term debt are covered in the estimate of net farm income. Therefore it is necessary to estimate farm-level changes in financial measures other than net farm income to address debt repayment capacity. Payments for personal debt were ignored in the analysis as NDFRBM records showed those payments to be negligible.

Debt repayment capacities were estimated for both baseline and herd-reduction scenarios. Trends in farm-level depreciation, income taxes paid, family living withdrawals, and off-farm income were evaluated (NDSU Report - Appendix B). Trends in those values were combined with changes in net farm income to estimate debt repayment capacities over the 10-year period.

LENDER INTERVIEWS

Phone interviews were conducted with agricultural lenders in western North Dakota to obtain their perspectives on how grazing reductions might affect ranches operating in the LMNG.

Affected Environment—Economics

EXISTING CONDITION

Medora, ND, with approximately 100 residents, is the closest town to the project area. Nearby, Dickinson, ND, is the closest full-service city, with roughly 16,000 residents. To provide context and comparisons, some of the demographic and background economic information is summarized for Billings County, some for the 12-county economic impact area and some for North Dakota.

Demographic Information

During the past 35 years, the population of the 12-county area peaked during the early 1980s at roughly 105,000 people. The population then declined fairly rapidly during the 1980s before the loss began to slow through the 1990s. Even at this slower rate of decrease, the 12-county area shrank by 6 percent between the 1990 and 2000 censuses. The population has leveled off during the past few years, 2003 through 2007 (BEA REIS 2005).

Table 3.36 depicts general census demographic information for Billings County as compared to all of North Dakota. Billings County is very rural, with just under one person per square mile. As is the case in much of the rural West, both the Billings County and the North Dakota populations declined over recent years. While the overall North Dakota population declined slightly between 1990 and 2000, the population in Billings County declined by just over 10 percent (Bureau of Census 2000). Although a portion of the Fort Berthold Indian Reservation lies adjacent to part of the economic impact area, it is not inside Billings County.

Total employment in the 12-county economic impact area also peaked during the early 1980s; however, after falling with the population decrease during the mid 1980s, total employment has since grown and was at 57,261 jobs during 2005. About 80 percent of job growth from 1970 to 2005 was in wage and salary employment. Much of this job growth has been focused in the various parts of the service sector. This growth in services has occurred in most parts of the country. State and local government job growth also explains some of total employment growth. By 2005, 15 percent of all employment in the 12-county area was in government jobs, with federal civilian and military jobs accounting for small percentages of the total. Retail trade has fallen as a percent of total employment. (BEA REIS 2005). Tables 3.37 and 3.38 provide a snapshot of employment in North Dakota and Billings County, ND, as of the 2000 Census.

Table 3.36 — Demographic overview for North Dakota and Billings County, ND

	North Dakota	Billings County, North Dakota
2000 population total	642,200	888
2007 population estimate	639,715	798
Population, % change, April 1, 2000 to July 1, 2007	-0.4%	-10.1%
Persons under 5 years old, % 2007	6.3%	4.1%
Persons under 18 years old, % 2007	22.3%	18.0%
Persons 65 years old and over, % 2007	14.6%	16.4%
Female persons, % 2007	49.8%	47.1%
Male persons, % 2007	50.2%	52.9%
Black persons, % 2007	1.0%	0.0%
American Indian, % 2007	5.4%	0.1%
Asian, % 2007	0.8%	0.1%
Hispanic or Latino, % 2007	1.9%	0.4%
Other, % 2007	1.0%	1.5%
White, % 2007	89.9%	97.9%
Living in same house in 1995 and 2000, % age 5+, 2000	56.8%	72.9%
Households, 2000	257,152	366
Median household income, 2007	$43,936	$44,819
Per capita money income, 1999	$17,769	$16,186
Persons below poverty, % 2007	11.8%	11.4%
Land area, 2000 (square miles)	68,976	1,151
Persons per square mile, 2000	9.3	0.8

Source: U.S. Census Bureau, from State and County QuickFacts
http://quickfacts.census.gov/qfd/states/38/38007.html

Table 3.37 — Summary of occupations in North Dakota and Billings County, ND, 2000

Occupation	North Dakota	Percent of Total	Billings County	Percent of Total
Management professions and related occupations	105,314	33.3	173	38.7
Service occupations	52,942	16.7	60	13.4
Sales and office occupations	82,726	26.1	102	22.8
Farming, fishing, and forestry occupations	5,299	1.7	24	5.4
Construction, extraction, and maintenance occupations	30,935	9.8	50	11.2
Production, transportation and material moving occupations	39,416	12.4	38	8.5
Employed civilian population 16 years and over	**316,632**	**100**	**447**	**100**

Source: U.S. Census Bureau, Census 2000 Summary File 3.

Table 3.38 — Summary of industries in North Dakota and Billings County, ND, 2000

Industry	North Dakota	Percent of Total	Billings County	Percent of Total
Agriculture, forestry, fishing and hunting, and mining	25,914	8.2	166	37.1
Construction	19,707	6.2	41	9.2
Manufacturing	22,471	7.1	8	1.8
Wholesale trade	11,764	3.7	15	3.4
Retail trade	40,154	12.7	27	6
Transportation and warehousing, and utilities	18,203	5.7	12	2.7
Information	7,438	2.3	8	1.8
Finance, insurance, real estate, and rental and leasing	18,779	5.9	5	1.1
Professional, scientific, management, administrative, and waste management services	19,001	6	7	1.6
Educational, health and social services	76,698	24.2	39	8.7
Arts, entertainment, recreation, accommodation and food services	25,813	8.2	60	13.4
Other services (except public administration)	15,588	4.9	21	4.7
Public administration	15,102	4.8	38	8.5
Employed civilian population 16 years and over	**316,632**	**100**	**447**	**100**

With the exception of two short periods, the 12-county area had very low average annual unemployment since the early 1980s. During 2005 this rate was estimated at 2.6 percent. Seasonal fluctuations in the unemployment rate occur in this area, with winter months typically showing higher unemployment rates than the rest of the year. With the boom in oil and gas, even the 2006 winter rate was low, staying below 3 percent (BLS 2006).

Total personal income across the 12 counties has varied more year to year than population or total employment and has climbed from 1988 to 2005 ($1,139,000,000), with substantial increases occurring since 2000. Proprietors' income, which was 43 percent of total income during 1970, fell to 20 percent by 2005. Much of this can be explained by the decrease in farm proprietors' income, which fell from 25 percent of the total during 1970 to 6 percent during 2005 (BEA REIS 2005).

Aggregate average earnings per job in the 12 counties were lower than state and national averages. After adjusting wages for inflation, it is notable that average wages per job were also lower in 2005 ($30,248) than during 1970 ($30,988). Inflation-adjusted per capita personal income, however, was higher during 2005 ($29,151) than during 1970 ($16,683). Much of the explanation lies in the increase in non-labor income. Like most areas in the country, non-labor income has grown to a larger portion of total income in the last few decades. In the 12-county area, this reached a maximum of roughly 45 percent during the early 1990s. By 2005, it had fallen back to approximately 34 percent of total income. Welfare payments remained a small portion of non-labor income. Consistent growth in age-related non labor income explains some of this change, but the major changes in dividends, interest, and rent (investments) explain the overall trend in non-labor income growth (BEA REIS 2005).

Forest Service Regional Economic Contributions and Impacts

The methods and tools described in the methodology section above were used to estimate the contribution that forage from NFS lands located in the North Billings project area makes to the local economy, as well as the contribution that all cows and calves using the NFS lands associated with the allotments make to the local economy. In 2007, there were 874,000 cows and 139,500 calves marketed in North Dakota. The number of cows is multiplied by 12 months, and the number of calves by 8 months (March 1 through October 31). When these are then added together, the result is 11,604,000 AMs for marketed cows and calves across the state. The authorized AMs are divided by this number. The result of the division shows that 0.00251 of the state cash receipts were produced on average from the federal portion of the allotments each year from 2005 through 2007. When this portion is multiplied by the 2007 cash receipts ($741,066,000), the result is that the NFS lands within the project area produce up to $1.86 million dollars worth of cash receipts each year. To consider the contribution of all the animals that rely on the allotments for some part of the year, the estimated number of cows and calves that rely on the allotments for some forage (5,013) is divided by the total of marketed cows and calves for the state during 2007. This becomes the portion (0.00495) of the state cash receipts (already noted) that relied, at some point in the year, on the allotments. This leads to an estimate of $3.67 million in cash receipts each year.

Table 3.39 shows the annual direct, indirect, and induced contribution, and total part and full-time jobs contribution based on the 3-year average from 2005 through 2007. During 2005, drought conditions reduced authorized grazing below Preference. The 2007 IMPLAN model for the 12-county area reveals an employment multiplier of 2.07, meaning that for each direct job there was approximately one more indirect/induced job contributed—or roughly two total jobs in

the economy. While this is lower than often suggested, it is based on economic data for this area when using a 100 percent regional purchasing coefficient in IMPLAN. Considering the contribution of cash receipts from just the federal forage in the project area, 9 direct and 20 total part- and full-time jobs are contributed annually. When all cows, yearlings, and calves spending time on the allotments are considered, these direct and total part- and full-time job estimates increase to 20 and 39, respectively. As noted in the Northern Great Plains FEIS (USDA FS 2001, p. 3-10), these contributions, though small compared to either national cattle production or the total cattle production of the 37 Northern Great Plains national grassland counties, are a valuable component of the local economy. They are especially important to the permittees who have developed operations based on grazing NFS lands. This range of estimates forms the basis of jobs comparisons for all alternatives in the environmental consequences section.

The jobs presented in Table 3.39 represent the range of part and full-time jobs (20 to 39) contributed from the North Billings project area each year. Considering that several permittees operate more than one allotment and that there are 37 individuals (including spouses, hired hands, and children) listed on the 60 permits in the project area, these modeled numbers appear reasonable.

Similar to job estimates, a range of labor income estimates attributable to the allotments is provided in Table 3.40. The total labor income contributed by NFS forage, and which is a result of cows and calves in the allotments being marketed each year, represents roughly $359,497 each year. Considering the contribution of cash receipts from all the cows, yearlings, and calves that rely on the allotments for a portion of the year, total labor income is estimated at roughly $708,453 per year. These estimates form the basis of jobs and labor income comparisons for all alternatives in the environmental consequences section.

Table 3.39 — Annual part- and full-time employment contribution* from the North Billings project area

Existing Condition	Part- and Full-Time Jobs Contributed Per Year (2005-2007 Average) from Federal Forage (29,125 AMs)	Part- and Full Time Jobs Contributed Per Year for All Cows and Calves That Rely on the Project Area at Some Point in the Year (5,013 Head)
Direct	9	19
Indirect and induced	10	20
Total**	**20**	**39**

*Based on federal forage only, and all cows, calves, and yearlings spending any time on NFS lands in the project area.
**Totals reflect the sum rounded estimates.

Table 3.40 — Annual labor income contribution* from the North Billings project area

Existing Condition	Labor Income Contributed Per Year (2005-2007 Average) from Federal Forage (29,125 AMs)	Labor Income Contributed Per Year for All Cows and Calves That Rely on the Project Area at Some Point in the Year
Direct	$88,676	$174,752
Indirect and Induced	$270,821	$533,701
Total**	**$359,497**	**$708,453**

*Based on federal forage only, and all cows, calves, and yearlings spending any time on NFS lands in the project area.
**Totals reflect the sum rounded estimates.

NDSU Enterprise Analysis

Based on Bansgund and Leistritz (2010) analysis of NDFRBM data, a 150-cow herd was projected to generate nearly $1 million in gross livestock sales from 2010-2019 (10-year study period) based on average productivity coefficients and expected future livestock prices (NDSU Table 1). Over that period, after accounting for expected changes (i.e., based on analysis of trends in those values) in variable expenses and fixed expenses, that operation would likely generate a cumulative net margin over $220,000, translating to an annual net margin of $22,000. (NDSU Report, Table 1). Likewise, a 250-herd operation would likely generate net margins of $307,894, or roughly $31,000 per year, and a 350-herd operation would generate net margins of $432,254 or $43,000 per year. Net margins represent returns to operator labor, management, and equity; however, net margins do not necessarily equate to strict accounting measures of profit. Note that projected livestock sales and net margins were based solely on average profitability measures for cow-calf production coefficients (e.g., calves sold per cow) and key measures for expenses (e.g., direct expenses per cow). The cumulative effects of grazing cuts on producers who are less profitable than average and those who are more profitable than average are likely to differ from the effects described in this report.

NDSU Debt Repayment Capacity

Trends in farm-level depreciation, income taxes paid, family living withdrawals, and off-farm income were evaluated (NDSU Report - Appendix B). Trends in those values were combined with changes in net margins to estimate debt repayment capacities over the 10-year period.

Non-farm income was expected to average over $28,000 annually for the 150-cow herd analysis and was projected to increase by about 33 percent over the period. Family living withdrawals for ranches with 150-cow herds were projected to average about $43,900 per year, and increased by 38 percent over the period. Initial values and trends in both factors were obtained from NDFRBM data (NDSU Report - Appendix B). Trends in the rate of change for income taxes and term interest were not statistically significant with the NDFRBM data, so values for those variables were not modeled to increase over the period. By contrast, deprecation (i.e., non-cash

expense associated with buildings and machinery) was expected to increase by nearly 20 percent over the period. Combined with changes in the above variables and changes to net margins for the 150-cow herd, annual debt repayment capacities were expected to decrease over the period in the baseline scenario.

Under the baseline situation for a 150-cow herd, the average annual debt repayment capacity was about $14,300. Cumulatively, debt repayment capacity in the baseline scenario was estimated to be over $143,000 for the study period (NDSU Report - Table 4).

Non-farm income was expected to average more than $42,000 annually for the 250-cow herd analysis and was projected to increase by 33 percent over the period. Family living withdrawals for ranches with 250-cow herds were projected to average about $40,000 per year, and increased by 38 percent over the period. Trends in the rate of change for income taxes and term interest were not statistically significant within the NDFRBM data, so values for those variables were not modeled to increase over the period. By contrast, deprecation (i.e., non-cash expense associated with buildings and machinery) was expected to increase by nearly 28 percent over the period. Combined with changes in the above variables and changes to net margins for the 250-cow herd, annual debt repayment capacities were expected to decrease over the period.

Under the baseline situation for a 250-cow herd, the average annual debt repayment capacity was about $41,200. Cumulatively, debt repayment capacity in the baseline scenario was estimated to be nearly $412,000 for the study period (NDSU Report — Table 4).

The NDFRBM data did not delineate separate values between 250-cow and 350-cow herds for non-farm income and family living withdrawals. Therefore, the same values and rates of change used for the 250-cow herd was used with the 350-cow herd. Depreciation (i.e., non-cash expense associated with buildings and machinery) was expected to increase by nearly 28 percent over the period, which is the same rate of change found with the 250-cow herd. However, per-cow values were greater for the 350-cow herd. Combined with changes in the above variables and changes to net margins for the 350-cow herd, annual debt repayment capacities generally declined over the period.

Under the baseline situation for a 350-cow herd, the average annual debt repayment capacity was about $58,800. Cumulatively, debt repayment capacity in the baseline scenario was estimated to be nearly $588,000 for the study period (NDSU Report — Table 4).

Bankhead-Jones Payments and Conservation Practice Funds

Historically, a percentage of revenue received from grazing fees has been distributed to Billings and Golden Valley Counties from the Bankhead-Jones Farm Tenant Act Fund (Payment Act of July 22, 1937). Under this Act, 25 percent of net receipts from grazing fees are given to the counties (USDA FS 2001, p. 3-24), 25 percent are returned to the U.S. Treasury, and the remaining 50 percent is available for Conservation Practice (CP) projects. Recent grazing rates, set by the U.S. Congress, are $1.35/head month. The MGA permittees also pay additional spread charges to the MGA for each AM grazed on federal lands. Table 3.41 displays estimates of the average annual receipts collected by the federal government from grazing fees for livestock run

on NFS lands in the North Billings project area over the past 3 years, the average payment made to Billings and Golden Valley Counties, ND, and the MGA receipts from Bankhead-Jones Act payments. Given that a grazing association can petition to obtain the county's payment for use in administration and CP funds, up to 75 percent of gross Bankhead-Jones receipts can be used for administration and CP (such as water developments, fences, noxious weed control, and cultural resource surveys) purposes on the NFS unit from which they were collected (USDA Forest Service 2001, p. 3-26). In comparison, Billings County received $101,686 from the Payment in Lieu of Taxes program during 2008.

Table 3.41 — Average annual receipts and payments returned to project area county

Counties	Average Annual Receipts, 2005-2007	Average Bankhead Jones Act Payments to Billings and Golden Valley Counties, 2005-2007	Average Grazing Receipts Held by the Medora GA, 2005-2007
Billings and Golden Valley Counties, ND	$39,319	$9,830	$19,659

Source: Forest Service INFRA Database.

EXISTING SOCIAL CONDITIONS

Land Base Overview and Settlement History

The project area is located almost entirely within Billings County, ND, with a small area located in Golden Valley County. Pages 3-49 through 3-51 of the FEIS for the Dakota Prairie Grasslands Plan (USDA Forest Service 2001), and pages 3-162 through 3-191 of the LMNG Rangeland Assessment (USDA Forest Service 2002) provide a good history and overview of the social and economic setting of communities in western North Dakota, including Billings and Stark Counties. A summary from those documents is provided here.

From 10,000 B.C. until the early to mid-1800s, human use in the area was primarily hunting and gathering, with some agriculture, by Native Americans. In the early 1700s, the arrival of European traders and the introduction of the horse started a chain of events that significantly changed historic human use of the plains. Bison were hunted nearly to extinction and were replaced with large herds of cattle. Homesteads and communities were established. By the mid to late 1870s, most tribal peoples were forced onto reservations, while European settlers became established in the area. Farm and ranch operations significantly altered the once intact prairie grassland ecosystem.

The federal government encouraged homesteading on the Great Plains through the 1862 Homestead Act and similar laws; however, the soils and climate of the region made productive farming difficult. Western North Dakota reached its peak population in the 1920s, but by the end of that decade many people had left. The 1930s drought exacerbated the problems of farming in the arid west.

Environmental and economic devastation led to federal action to assist people and communities in the Great Plains. Through several acts, the federal government repurchased land and relocated families. This effort to purchase lands was called the Land Utilization Program (LUP). The program culminated with passage of the Bankhead-Jones Farm Tenant Act in 1937, which provided management direction for the purchased lands. As part of the LUP in western North Dakota, grazing associations were formed to integrate management of the purchased lands with private ranch and farm operations.

In 1954, administration of the LUP was transferred from the Soil Conservation Service to the Forest Service. In 1960, the USDA created 19 national grasslands, including the Little Missouri National Grassland (LMNG). These grasslands were to be administered under Title III of the Bankhead-Jones Act. The grassland grazing permits would be managed by the Forest Service through the already established grazing associations to help maintain and improve the national grasslands. The same year, the Multiple-Use Sustained-Yield Act of 1960 was passed, which applies to national grasslands as well as national forests, calling for multiple-use management on these lands.

Livestock production from NFS lands on the Northern Great Plains is very important to the people who hold grazing permits. Overall, though, the national grasslands and forests of the Northern Great Plains play a minor role in the total production of cattle and sheep. Total

production from the 37 counties in the area of influence (those counties containing or adjacent to NFS lands in the Northern Great Plains planning area) is approximately 2.2 percent of the national cattle herd size. Of the 37-county cattle production total, less than 4 percent of the 2.2 percent contribution to the national cattle herd is derived from the national grasslands and forests on the Northern Great Plains (Census of Agriculture 1992, Forest Service grazing records).

Nonetheless, local ranchers with grazing permits have an interdependent relationship with the national grasslands and forests. The public lands grazed, under inventory permits, provide up to 12 months of grazing while turn-in permits provide livestock forage for part of the year, with the permittee providing forage for the remainder of the year. Therefore, any increase or decrease in forage provided from public lands may cause adjustments in herd sizes or other factors related to permittees' livestock operations and affect efficient grazing use of their own lands.

Cooperative Livestock Grazing Management

Since the national grasslands were established, the Forest Service and the MGA have cooperatively managed livestock grazing on the LMNG in Billings and Golden Valley Counties. This cooperative management is outlined in a Grazing Agreement between the FS and the MGA. The Grazing Agreement acts as the permit for livestock grazing on NFS lands within the county, and spells out the terms and conditions under which the MGA administers permits for individual permittees to graze livestock within an allotment. Grazing allotments can be, and usually are, made up of a combination of NFS, private, and state lands.

Ranchers live throughout the project area on private property surrounded and interspersed with NFS lands. A grazing association grazing permit to graze NFS lands is attached to what is referred to as base property. Base property is historically designated property on which a grazing Preference was established when original members came into the MGA. A person must own or lease the base property to qualify for a grazing association grazing permit on NFS lands.

According to government policy, a grazing permit is an instrument that grants the permittee the privilege of grazing on federal lands. It carries no rights or value, and it can’t be bought, sold, or used as collateral. Nevertheless, banks and real estate markets do associate real property values with federal grazing permits. Base property with a federal grazing permit sells for considerably more per acre than similar property without such a permit (USDA FS 2002, p. 3-181, 3-182).

Ranching Lifestyles

Billings County is very rural, and farming and ranching are important components of the economic base of the county. Additionally, farming and ranching lifestyles are an important and traditional culture of the county. Even people who are not directly involved in farming and ranching are usually indirectly involved or affected through their business and social lives. A general flavor of western heritage is obvious in Billings County, from the merchandise available in local stores to community activities such as rodeos, 4-H, Future Farmers of America, and spring brandings.

This western heritage and culture is partly due to the expansive ranch operations in the county, which include operations on NFS lands. Large fenced allotments in the North Billings project area, and other parts of the county are conducive to maintaining a ranching lifestyle where a cowboy on horseback is still sometimes the best way to check or move cattle. Depending on the allotment, these large federal allotments can be grazed by one or several permittees running their livestock together. Such intermingled land and livestock ownership requires ranchers to work closely together as well as with the Forest Service.

Desired Economic and Social Condition

The desired economic condition is to provide for long-term sustainable management on the DPG; to build a common vision for national grassland resources; and to demonstrate sound and practical management of grassland ecosystems for the multiple benefits of grassland agriculture, local communities, and the rural economy and the public.

The desired social condition evolves from Goals 1 and 2 of the Grasslands Plan (pages 1-2 and 1-4). These goals point out that by taking care of the ecosystem the grasslands will be able to provide a sustained supply of goods and services, which, in turn, positively affects social well-being.

Paraphrased, these goals identify that, by ensuring sustainable ecosystems through promoting ecosystem health and conservation using a collaborative approach, the grasslands will be able to provide multiple benefits to people by providing a variety of uses, values, products, and services for present and future generations.

Environmental Consequences—Economics

Direct and Indirect Effects

Alternative 1

Alternative 1 would prohibit livestock grazing on NFS lands in the project area. According to Forest Service Handbook (FSH) 2209.13, Section 16.24, this alternative could not be implemented until 2 years after the notification of each affected permittee (36CFR 222.4(4)(1)). Regular grazing would persist for two seasons following selection of this alternative. After that, all grazing on the allotments would cease as of 2013. Table 3.42 shows that the number of authorized AMs, revenue, and jobs would fall to zero on NFS lands.

Revenues (Table 3.41, above) generated from grazing fees would drop to zero, thus there would be no returns to the U.S. Treasury and no funds available for Bankhead-Jones Payments or Conservation Practice.

The social impacts of terminating grazing may include changes of lifestyles for some permittees currently running cattle operations. The ranchers and local communities that could be affected by selection of this alternative hold cattle ranching culture in high esteem and do not wish to lose this cultural identity and preferred lifestyle. There may be a loss of leisure time as loss of access

to graze local national grasslands may mean more time is required to transport livestock to distant pastures. Although an increase in social problems associated with unemployment is possible, the extremely low average annual unemployment rate in the area indicates that other work would likely be available. The growth of oil and gas production and its likely continued growth, means that outdoor work is available in this area; this could potentially moderate or negate any negative social impacts that could result from loss of a few cattle operations.

Table 3.42 — Proposed reduction schedule for authorized federal AMs

Alternative 1	2011	2012	2013 and Each Year in the Future
Federal AMs	29,125	29,125	0
Total part and full-time jobs contributed per year	20 to 39	20 to 39	0
Total labor income contributed per year	$359,497 - $708,453	$359,497 - $708,453	0

Another social impact would be the relationship between the cattle ranching community and the Forest Service. The long tradition of grazing NFS lands would likely be perceived as degrading. Even if resource conditions were to improve following implementation of no grazing, and even if this spurred additional economic activity in the agriculture support services and recreation and tourism related sectors (such as hunting and bird watching), the net effect would likely be a negative perception of federal lands management.

Alternative 2

Alternative 2 represents the current grazing occurring on the 43 allotments. No changes are anticipated in federally authorized AMs. Under this alternative, current contribution levels would persist for 10 years. This means the current economic contributions from the project area would continue, thus there would be no economic impacts and no change to collected receipts expected from federal actions. However, under this alternative, market factors and individual management decisions might cause small economic impacts. All information in the affected environment discussion applies to this alternative.

The NDSU ranch viability analysis describes baseline conditions and associated 10-year enterprise conditions as total and annual net margins and annual and total debt repayment capacity. Since this alternative would not change grazing levels in the project area, these baseline observations would persist and there would be no impacts, defined as changes from existing.

Perhaps the largest social impacts would be the relationship between the cattle ranching community and the Forest Service. This long tradition of grazing NFS lands may be perceived by permittees as enduring successfully.

Alternative 3

Under this alternative there may be a small increase in economic activity in the agriculture support sector, possibly leading to one or two additional jobs per year in the 12-county area. These jobs would be based on continued funding for range improvement (such as drilling water wells, installing pipeline, fencing, etc.). The projected annual level of investments in grazing infrastructure coming from Conservation Practice funds, permittees, and Forest Service watershed and wildlife funds are estimated at $47,917. This money is multiplied with the response coefficients for the agriculture support activities sector in the twelve-county area. Table 3.43 shows that, in general, economic and job impacts from this increased investment in new management practices described in this alternative are expected to be small increases above current NFS forage and total contribution levels.

Table 3.43 — Annual part- and full-time employment and labor income contributions from federal forage, Alternative 3*

Alternative 3	2011	2012	2013 and Each Year in the Future
Direct part and full-time jobs contributed per year	11 (+2)	11 (+2)	11 (+2)
Indirect and induced part and full-time jobs contributed per year	11 (+1)	11 (+1)	11 (+1)
Total** part and full-time jobs contributed per year	22 (+2)	22 (+2)	22 (+2)
Direct labor income contributed per year	$136,943 (+$48,267)	$136,943 (+$48,267)	$136,943 (+$48,267)
Indirect and induced labor income contributed per year	$277,958 (+$7,139)	$277,958 (+$7,139)	$277,958 (+$7,139)
Total* labor income contributed per year	$414,902 (+$55,405)	$414,902 (+$55,405)	$414,902 (+$55,405)

* Changes or impacts from the current contributions are indicated in parentheses.
**Totals reflect the sum of rounded estimates.

Table 3.44 — The economic impacts of alternative 3, considering the economic contribution of all cows, yearlings, and calves that spend time in the project area at some point in the year*

Alternative 3	2011	2012	2013 and Each Year in the Future
Direct part and full-time jobs contributed per year	20 (+1)	20 (+1)	20 (+1)
Indirect and induced part and full-time jobs contributed per year	20 (0)	20 (0)	20 (0)
Total** part and full-time jobs contributed per year	41 (+2)	41 (+2)	41 (+2)
Direct labor income contributed per year	$223,018 (+$48,266)	$223,018 (+$48,266)	$223,018 (+$48,266)
Indirect and induced labor income contributed per year	$540,840 (+$7,143)	$540,840 (+$7,143)	$540,840 (+$7,143)
Total* labor income contributed per year	$763,858 (+$55,405)	$763,858 (+$55,405)	$763,858 (+$55,405)

* Changes from the current contributions are indicated in parentheses.
**Totals reflect the sum of rounded estimates.

If reductions in authorized AMs were necessary based on monitoring, there may be negative impacts. Further AM adjustments would reduce receipts to the U.S. Treasury, counties. and grazing associations. However, because it is unknown if, when, or what those adjustments might be, it is not possible to predict what those economic effects may be on jobs and income.

The grazing fees revenue generated by this alternative would be same as the existing condition; thus, funds available for Bankhead-Jones payments, conservation practices, and the return to the U.S. Treasury would be the same.

Social impacts expected with this alternative are that current relationships between the Forest Service and the MGA and its permittees would be maintained. If monitoring results in the need for reductions in Authorized Use it could result in a shift of some livestock grazing from federal to private lands, and a possible reduction in herd sizes if the federal graze can’t be made up for by private graze and /or feeding. This may lead to a new configuration of cattle ranching operations in the economic impact area. In other cases, the increased cost of renting private graze and/or feed for the current herd size could possibly lead to a smaller number of cattle ranching operations. Therefore, these impacts could mean that some people may retire or change to other professions. However, these potential effects would depend on the percentage of reduction, the ability of the ranching operation to absorb reductions, etc., which are unknown at this point in time.

Alternative 3A

Alternative 3A was created by including applicable actions identified in the MGA Exhibit 2 that the MGA recommended be added to Alternative 3 and excluding some actions identified in Alternative 3 with which the MGA did not agree. Tables 2.5 and 2.6 in this FEIS summarize the changes made. The economic consequences of implementing Alternative 3A would be identical to those described for Alternate 3. Although additional infrastructure improvements have been identified, the funding limitations identified by the Medora District mean that the there is no difference in the effects regarding the changes in employment and labor income. Socially, Alternative 3A may provide improved cooperation between the Forest Service and the MGA.

Alternative 4

Under Alternative 4, Authorized Use is equal to the allotments' initial estimated carrying capacity, which is expressed in AUMs. Since the economic analysis uses AMs for its calculations, the AUMs under alternative 4 were converted to AMs. Any reductions implemented under Alternative 4 would be limited to 10 percent per year for each of the affected allotments. The result is that reductions will be phased in over a 5-year period and that the total reductions proposed would be less than 10 percent every year.

Tables 3.45 and 3.46 how the contributions and (impacts) for the next 5 years for part and full-time jobs as well as annual labor income based on the federal forage only and on all cows, calves, and yearlings spending any time on NFS lands in the project area. These estimates include additional infrastructure investments made where there may be a small increase in economic activity in the agriculture support sector. This could lead to one or two additional jobs per year in the 12-county area. The projected annual level of investments in grazing infrastructure coming from Conservation Practice funds, permittees, Forest Service watershed funds, and Forest Service wildlife funds are estimated at $47,917. This money is multiplied with the response coefficients for the agriculture support activities sector in the 12-county area. Taken together, the estimated changes in the number total of part- and full-time jobs range from no change in 2011 to a loss of four jobs in 2015. The estimated change in the annual labor income from the current condition ranges from +$22,907 during 2011, to minus $53,626 during 2015. The explanation for why there is an increase in labor income estimates for 2011 is that the new investments outweigh the reductions the first year.

Tables 3.45 and 3.46 display annual part- and full-time employment and labor income contributions from the federal forage and on all cows, calves, and yearlings spending any time on NFS lands in the project area. Changes from the current conditions are indicated in parentheses.

Table 3.45 — Annual part- and full-time employment and labor income contributions from federal forage, Alternative 4*

Alternative 4	2011	2012	2013	2014	2015 and Each Year in the Future
Direct part and full-time jobs contributed per year	10 (+1)	10 (+1)	10 (+1)	10 (+1)	10 (+1)
Indirect and induced part and full-time jobs contributed per year	10 (0)	9 (-1)	9 (-1)	9 (-1)	9 (-1)
Total part and full-time jobs contributed per year	20 (0)	19 (-1)	19 (-1)	19 (-1)	19 (-1)
Direct labor income contributed per year	$128,926 (+$40,250)	$125,131 (+$36,455)	$123,650 (+34,974)	$123,322 (+$34,636)	$123,295 (+$34,619)
Indirect and induced labor income contributed per year	$253,478 (-$17,341)	$241,886 (-$28,933)	$237,364 (-$33,455)	$236,362 (-$34,457)	$236,281 (-$34,538)
Total labor income contributed per year**	$382,404 (+22,907)	$367,017 (+$7,520)	$361,014 (+$1,517)	$359,684 (+$187)	$359,576 (+$79)

* Changes from current contributions indicated in parentheses.
** Totals reflect the sum of rounded estimates.

Table 3.46 — Annual part- and full-time employment and labor income contributions from federal forage based on the economic contribution of all cows, yearlings and calves that spend time in the project at some point in the year, Alternative 4*

Alternative 4	2011	2012	2013	2014	2015 and Each Year in the Future
Direct part and full-time jobs contributed per year	19 (0)	18 (-1)	18 (-1)	17 (-2)	17 (-2)
Indirect and induced part and full-time jobs contributed per year	19 (-1)	18 (-2)	17 (-3)	17 (-3)	17 (-3)
Total part and full-time jobs contributed per year	37 (-2)	36 (-3)	35 (-4)	35 (-4)	35 (-4)
Direct labor income contributed per year	$207,221 (+$32,469)	$199,742 (+$24,990)	$196,823 (+$22,071)	$196,177 (+$21,425)	$196,124 (+$21,372)
Indirect and induced labor income contributed per year	$492,593 (-$41,105)	$469,750 (-$63,948)	$460,838 (-$72,860)	$458,863 (-$74,835)	$458,703 (-$74,995)
Total labor income contributed per year**	$699,814 (-$8,639)	$669,492 (-$38,961)	$657,661 (-$50,792)	$655,040 (-$53,413)	$654,827 (-$53,626)

* Changes from current contributions indicated in parentheses.
**Totals reflect the sum of rounded estimates.

Alternative 4 would see a reduction in grazing fees collected; therefore, fewer Bankhead-Jones and conservation practice funds would be available. The U.S. Treasury would also see a reduction in funds paid into the treasury. Table 3.47 shows what those reductions may look like based on a current congressionally set rate of $1.35 / head month.

Table 3.47 — Effects of Alternative 4 on grazing fee collections

Alternative 4	2011	2012	2013	2014	2015 and Each Year in the Future
Grazing fees	$35,763	$34,083	$33,425	$33,279	$33,268

Alternative 4 is also an adaptive alternative, so if further reductions in authorized AUMs were necessary there might be some additional negative impacts past 2014, and the receipts to the U.S. Treasury, counties, and grazing association would decrease from current levels. The amount is unknown because future possible reductions are unknown.

The NDSU Ranch Viability Analysis

The NDSU ranch viability analysis describes new expectations for each of the three herd-size operations as well as the change from baseline conditions for both net margins and debt repayment capacity.

For a 150-cow herd, a grazing reduction of 10 percent was expected to reduce livestock sales over the study period by about $103,000. Cumulative net margins over the period decreased by $36,000 relative to the baseline situation (NDSU Report - Table 1). The combination of fewer cows and greater relative fixed expense per cow resulted in net margins decreasing in percentage terms and dollar values in excess of the relative reduction in grazing capacity. Over the study period, a 10 percent reduction in herd size for a 150-cow herd reduced cumulative net margins by over 16 percent (NDSU Report --Table 1). Under the 10 percent reduction scenario for a 150-cow herd, the average annual debt repayment capacity decreased to nearly $7,700 or by 46 percent from baseline levels. With just a 10 percent reduction in herd size, ranches with debt-to-asset ratios greater than 20 percent would likely find their ability to service debt substantially compromised.

A grazing reduction of 20 percent was expected to reduce livestock sales over the study period by about $202,000. Cumulative net margins over the period decreased by $68,000 relative to the baseline situation (NDSU Report - Table 2). Over the study period, a 20 percent reduction in herd size for a 150-cow herd reduced cumulative net margins by over 31 percent (NDSU Report - Table 2). With a 20 percent reduction in herd size, even a ranch with low debt-to-asset ratios would have difficulty meeting debt obligations. While under baseline conditions, a typical ranch would likely handle debt obligations with a debt-to-asset ratio between 40-to-60 percent. With a 20 percent grazing cut, that same ranch would no longer be capable of servicing an average level of debt.

A grazing reduction of 40 percent was expected to reduce livestock sales over the study period by about $395,000. Cumulative net margins over the period decreased by $128,000 relative to the baseline situation (NDSU Report - Table 3). Over the study period, a 40 percent reduction in herd size for a 150-cow herd reduced cumulative net margins by 58 percent (NDSU Report - Table 3).

The profitability of the enterprise was reduced substantially greater than the relative loss of livestock sales in all cases.

A 250-cow herd was projected to generate in excess of $1.5 million in gross livestock sales over the 10-year study period based on average productivity coefficients and expected future livestock prices (NDSU Report - Table 1). Over that period, after accounting for expected changes in variable expenses and fixed expenses, that operation would likely generate a cumulative net

margin around $308,000 (NDSU Report - Table 1). By comparison, a grazing reduction of 10 percent was expected to reduce livestock sales over the study period by about $164,000. Cumulative net margins over the period decreased by $55,000 compared to the baseline situation. Over the study period, a 10 percent reduction in grazing capacity for a 250-cow herd reduced cumulative net margins by 18 percent (NDSU Report - Table 1). A 10 percent reduction in herd size also results in a substantial decrease in the ranch's ability to cover debt payments. While the debt repayment margin was estimated to remain positive under a 10 percent herd reduction, the margin decreased by 57 percent from baseline levels. Repayment margins would suggest ranches with debt-to- asset ratios less than 40 percent could handle average debt with a 10 percent reduction in cow-herd size. Conversely, slight reductions in herd size would create debt repayment problems for typical 250-cow herd ranches with greater than 40 percent debt-to-asset ratios.

A grazing reduction of 20 percent was expected to reduce livestock sales over the study period by about $313,000. Cumulative net margins over the period decreased by $94,000 compared to the baseline situation. Over the study period, a 20 percent reduction in grazing capacity for a 250-cow herd reduced cumulative net margins by nearly 31 percent (NDSU Report - Table 2). A 20 percent reduction in herd size results in a substantial decrease in the ranch's ability to cover debt payments. While the debt repayment margin was estimated to remain positive under a 20 percent herd reduction, the margin decreased by 78 percent from baseline levels.

A grazing reduction of 40 percent was expected to reduce livestock sales over the study period by about $614,000. Cumulative net margins over the period decreased by $177,000 compared to the baseline situation. Over the study period, a 40 percent reduction in grazing capacity for a 250-cow herd reduced cumulative net margins by nearly 57 percent (NDSU Report - Table 3). A 40 percent reduction in herd size results in a substantial decrease in the ranch's ability to cover debt payments. While the debt repayment margin was estimated to remain positive under a 40 percent herd reduction, the margin decreased by over 62 percent from baseline levels. A typical ranch with a 250-cow herd with debt-to-asset ratios at 20 percent or less would be capable of handling their debt obligations.

A 350-cow herd was projected to generate nearly $2.2 million in gross livestock sales over the 10-year study period based on average productivity coefficients and expected future livestock prices (NDSU Report - Table 1). Over that period, after accounting for expected changes in variable expenses and fixed expenses, that operation would likely generate a cumulative net margin around $432,000 (NDSU Report - Table 1). By comparison, a grazing reduction of 10 percent was expected to reduce livestock sales over the study period by about $235,000. Cumulative net margins over the period decreased by $82,000 compared to the baseline situation. Over the study period, a 10 percent reduction in grazing capacity for a 350-cow herd reduced cumulative net margins by 19 percent (NDSU Report - Table 1). A 10 percent reduction in herd size results in a substantial decrease in the ranch's ability to cover debt payments. While the debt repayment margin was estimated to remain positive under a 10 percent herd reduction, the margin decreased by 76 percent from baseline levels. Repayment margins would suggest

ranches with debt-to-asset ratios less than 40 percent could handle average debt with a 10 percent reduction in cow-herd size.

A grazing reduction of 20 percent was expected to reduce livestock sales over the study period by about $445,000. Cumulative net margins over the period decreased by $139,000 compared to the baseline situation. Over the study period, a 20 percent reduction in grazing capacity for a 350-cow herd reduced cumulative net margins by 32 percent (NDSU Report - Table 2). A 20 percent reduction in herd size results in a substantial decrease in the ranch's ability to cover debt payments (i.e., $233,000 compared to -$7,300) and would likely jeopardize the ability to cover average debt repayment levels. Repayment margins would suggest 350-cow herd ranches with debt-to-asset ratios less than 40 percent could handle average debt with a 20 percent reduction in cow-herd size.

A grazing reduction of 40 percent was expected to reduce livestock sales over the study period by about $874,000. Cumulative net margins over the period decreased by $262,000 compared to the baseline situation. Over the study period, a 40 percent reduction in grazing capacity for a 350-cow herd reduced cumulative net margins by 60 percent (NDSU Report - Table 3). The sum of the debt repayment margins over the study period was $233,000 for the baseline condition and ($144,000) for the 40 percent grazing reduction scenario (NDSU Report - Table 5). A 40 percent reduction in herd size would prevent an average ranch from being able to service average levels of debt. Repayment margins would suggest a typical ranch with a 350-cow herd, under the 40 percent herd reduction scenario, would only be capable of servicing debt if the ranch had debt-to-asset ratios less than 20 percent prior to the grazing reductions.

Summary of Debt Repayment Capacities

Debt repayment capacities were estimated for three cow herd sizes. A baseline condition was estimated, along with changes to debt repayment capacities under a 10 percent, 20 percent, and 40 percent grazing cut. The results of estimating debt repayment capacities and debt repayment margins clearly show that both on relative and absolute terms, the 150-cow herds cannot support the same level of debt as the larger cow herds. Further, small reductions in grazing capacity quickly compromise the ability of the 150-cow herds to service debt. For the larger herds, debt repayment becomes compromised with 20 percent or greater grazing cuts; although, some herds could have trouble meeting debt obligations if they are over leveraged prior to even modest grazing cuts. Regardless of existing debt obligations, debt repayment capacities for all herd sizes decreased with grazing cuts. In some cases, debt repayment capacities became negative–implying that the herd could no longer service any debt. Under those circumstances, only debt free operations would survive grazing cuts.

Regardless of the magnitude of grazing reductions or size of the cow herd, highly leveraged ranches will have greater difficulty meeting debt obligations. Ranches with debt- to-asset ratios in the neighborhood of 40 percent or greater prior to the grazing reductions will experience substantially reduced debt repayment capacities. With the 20 percent and 40 percent grazing cuts, the 150-cow herds are unlikely to be able to service any debt. Even debt-free herds in the 150-cow size might find survivability compromised since they no longer have the ability to

finance any debt, which might prevent the ranch from acquiring necessary intermediate debt (e.g., financing replacement machinery). The vulnerability of the larger cow-herds becomes more pronounced as the grazing cuts exceed 20 percent. Under the 40 percent grazing reductions, only the largest cow herds with the lowest debt levels would remain capable of servicing their debt obligations after herd reductions.

The assessment of debt repayment capacities did not examine all of the strategies to cope with decreased herd sizes and the accompanying reduction in debt repayment capacities. The assessment did not attempt to evaluate how debt repayment might be affected by adjusting key financial measures reflective of individual ranch characteristics or strategies for handling herd reductions (e.g., reducing family living withdrawals, securing additional non- farm income). Also, the one-time sale of breeding stock was ignored in the analysis (see Project Record, Cooperating Agency for discussion of the values of herd liquidations). It is plausible to expect that ranches facing grazing cuts might choose to use that cash to pay down existing debt. However, it is also plausible that ranches might retain those resources to assist in meeting unforeseen financial obligations over the short term. Another potential option for ranches would be to sell some ranch assets to pay down existing debt. What those ranch assets would be, and how many assets would be available for sale will vary by ranch size (i.e., less flexibility for small ranches) and individual operations. Ultimately, each ranch will handle the specifics of a grazing reduction in a manner that best suits the individual physical and financial characteristics of the ranch. However, based on typical and average values for debt, it remains unclear how existing ranches that have moderate to high levels of debt would find the resources to service existing debt obligations after incurring the proposed level of grazing cuts.

The NDSU report provides summary information suggesting what will happen to permittees with various size cow-calf operations under three reduction levels in terms of the operation's net margins and their operator's debt repayment capacity. These analyses are intended to represent many of the scenarios under Alternative 4. The loss of cow-calf operations described as a likely outcome of AM reductions on North Billings allotments by the NDSU economists would have similar effects to the direct decreases in jobs and labor income contributions estimated in the regional economic impact analysis. The regional economic impact analysis goes the extra step of describing the additional multiplier effects that would be felt in the twelve-county economic impact area.

The social impacts of the Alternative 4 reductions in Authorized Use are the same as those in Alternative 1 except that fewer people would be likely to change positions, retire, etc., as a result of this alternative. If further reductions in Authorized Use were to occur as adaptive actions, it could have a multiplier effect in terms of the number of people who may change lifestyles or seek additional work. However, the effects would depend on the same factors as those identified in Alternative 3 and 3A above. Without knowing this information it not feasible to predict the effects of additional reductions in authorize use.

Perhaps the largest social impacts would be the relationship between the cattle ranching community and the Forest Service. This long tradition of grazing NFS lands would likely be perceived as degrading.

Summary of Economic and Social Conditions

The Forest Service has taken a hard look at the existing social and economic conditions and the consequences of implementing the five alternatives. This evaluation of existing conditions and contributions consists of a brief demographic and economic profile, a description of social setting, and a description of the spectrum of current contributions that federal forage makes to the regional economy (based on two calculation methods). This was conducted by a Forest Service Northern Region (Region 1) economist. This analysis indicates that there are between 9 and 19 direct part- and full-time jobs and 20 to 39 total (direct plus multiplier) part- and full-time jobs associated with the forage available and the cattle feeding on that forage at some point in the year, respectively.

The depiction of the existing condition also includes ranch viability and debt repayment capacity analyses conducted by economists with NDSU, compiled for Billings County, a cooperating agency. The NDSU report provides estimates of the number of affected MGA permittees in several herd size categories and attempts to reveal current annual net margins from cow-calf operations for three herd sizes (150, 250, and 350 head). The report shows that, based on NDSU projections for input and beef prices for the next 10 years, even with no changes, under the baseline condition the smallest ranch operations will struggle to service medium and long-term debt. The 250-head and 350-head ranch operations appear to be capable of servicing debt under the baseline scenario (Alternative 2).

The report then addresses the impacts of implementing the five alternatives using many of the same tools, where impacts are defined as changes from existing condition. The regional economic impacts are based on any planned reductions in AMs of Forest Service grazing for alternatives 1 and 4 using the same two calculation methods used to estimate the existing contribution; the reductions in AMs are shown as both purely NFS AM reductions and as reductions in the total number of AMs reflecting a loss of all cattle spending any time of the year on NFS lands. The regional economic impact estimates also account for the small increases in Forest Service expenditures associated with allotment improvements in alternatives where these apply (3, 3A, and 4). These regional economic impacts are broken into direct impacts and multiplier impacts (indirect and induced) and then summed as total impacts. The majorities of the direct impacts, shown in the regional economic impact analysis, are due to AM reductions and are moderated only slightly by increased investments in allotment improvements.

The NDSU report provides summary information suggesting what will happen to permittees with various size cow-calf operations under three reduction levels in terms of the operation's net margins and their operator's debt repayment capacity. These analyses are intended to represent many of the scenarios under Alternative 4. The loss of cow-calf operations described as a likely outcome of AM reductions on allotments in the project area by the NDSU economists would have similar effects to the direct decreases in jobs and labor income contributions estimated in the regional economic impact analysis. The regional economic impact analysis goes the extra step of describing the additional multiplier effects that would be felt in the 12-county economic impact area.

In general, Alternative 1 would terminate existing contributions that the project area makes to local ranch operations and the regional economy after grazing was eliminated (2012). This would also terminate the multiplier effects associated with these direct contributions and it would cause undesirable social change through the transition of several cattle ranching operators to other jobs and retirement, and to possible land sales. Barring unforeseen circumstances, Alternative 2 would maintain economic current contributions and the ability to handle debt. Alternatives 3 and 3A would provide a small increase in short-term contributions to the local economy from increased Forest Service investments in improvements, but, depending on monitoring and future AM scenarios, longer term impacts could be close to the existing contributions shown for Alternative 2 or the impacts associated with reductions under alternative 4. Alternative 4 is predicted under the Forest Service analysis to result in labor income impacts ranging from an additional $79 to a loss of $53,626 of annual labor income.

Under the NDSU analysis, Alternative 4 would reduce ranchers' net margins and debt repayment capacity as early as 2011, probably making it impossible for some permittees to survive many more years as cow-calf operations. The reduction in AMs and, therefore, reductions in marketings from this area would lead to negative direct effects, as well as negative multiplier effects for the 12-county economic impact area. This alternative could also cause social change through the transition of several cattle ranching operators to other jobs, retirement, and/or possible land sales.

As with any modeling, the combination of assumptions used and the fact that the economy is dynamic (the current boom in oil and gas) mean that both the ranch viability analysis and the regional economic impact analysis are best used as relative projections between alternatives. What is clear, however, is that those that could be affected by the selection of any alternative— local ranchers and communities— hold cattle ranching culture in high esteem and do not wish to lose this cultural identity and preferred lifestyle.

CUMULATIVE EFFECTS

Cumulative effects result from the combination of effects resulting from past, present, and reasonably foreseeable actions plus the direct and indirect effects of the alternatives. A discussion of past and present actions, reasonably foreseeable actions, and a summary of the cumulative effects by alternative follows.

Past and Present Actions

The following past and present actions have likely influenced economic conditions associated with raising livestock in the project area.

Livestock ranching has occurred on what is now the Little Missouri National Grassland (LMNG) since the 1880s. Over the decades combinations of climatic events, markets, ranching and business management decisions, etc., have affected the economic returns associated with raising livestock on the LMNG. Drought, poor farming, and livestock management practices combined with the economic depression of the 1930s drove many ranchers out of the livestock industry.

Those days have passed; however, some of the same challenges remain today. Drought is a continuing factor directly affecting ranching operations and economic outcome. Noxious weeds, oil and gas development, and wildfire also continue to affect livestock management and economic returns. Fluctuations in livestock markets, business management decisions, etc., continue to affect economic returns, which in turn affects ranching profitability.

Reasonably Foreseeable Actions

Elkhorn Ranchlands. The recently purchased Elkhorn Ranchlands require that the Grasslands Plan be amended to establish management direction for the newly acquired lands. Approximately 800 acres of the 5,200-acre Elkhorn purchase are directly associated with five of the allotments in the North Billings project. Under the proposed amendment, these lands would be managed in accordance with the adjacent management area which is MA 3.65 Rangelands with Diverse Natural Appearing Landscapes. In the interim, as directed by 36 CFR 254.3(f)(2008), these portions of the purchase are being managed in accordance with the adjacent MA 3.65.

The proposed Plan amendment for the Elkhorn Ranchlands also includes establishing a special interest area (SIA) for the remaining 4,400 acres of the purchase and approximately 17,160 acres contained in grazing allotments 279 and 280, which were associated with the Elkhorn Ranchlands when they were owned privately. If implemented, the SIA would establish a forage reserve on those acres.

Travel Management. An environmental assessment (EA) for travel management on the LMNG was released for comment in 2010. The proposed action under this EA would close all single-use oil and gas roads, unauthorized roads (i.e., two tracks), and an additional 18 miles of system roads in the project area. The travel management plan is expected to have minimal effect on grazing permit holders unless single-use roads are blocked from access. If access were to be blocked, then additional two-track roads could be created as permittees can travel cross county to administer their permits. It would be unlikely that the travel management plan would have an effect on economic and social conditions.

Oil and Gas Development. The Forest Service has received five applications for permit to drill (APDs) on NFS lands in the project area. The APDs seek to drill oil and gas wells. The well pads associated with each well would be approximately 4 to 5 acres in size, encompassing about 22 acres total. Approximately 4,250 feet of roads would be built to access the well sites. The well pads would be surfaced with scoria or gravel and kept free of vegetation so there is little opportunity to encourage the spread of invasive grasses. One of the proposed wells is located with a mile of a known sharp-tailed grouse lek the others are not.

Cumulative Effects by Alternative

Economics

This section summarizes direct and indirect effects of the alternatives and the effects of reasonably foreseeable actions on economics. These effects in combination with past and present effects combine to create cumulative effects.

Alternative 1 would result in a shift of current livestock grazing occurring on national grasslands to private pasture and/or feeding operations and a reduction in the number of cattle grazing in the economic impact area starting two years after notification of permit cancellation. Under this alternative some people may retire or change to other professions. This may result in a new configuration of cattle ranching operations in the economic impact area. Some land owners with pasture available for lease may benefit from new demand.

Reasonably foreseeable oil and gas exploration and extraction are expected to continue to grow in the area and on the LMNG. Oil and gas development may provide an additional source of income for some ranchers or a different career opportunity. The employment growth in the oil and gas sector will likely outpace any declines in the cattle ranching and farming sector, even when considering forward and backward economic linkages with cattle ranching. The Elkhorn Ranchlands Grasslands amendment may offer some relief as an alternate source of forage for a limited number of livestock for short periods of time.

Alternative 2 represents the current grazing occurring on the 43 allotments. No changes are anticipated in federally authorized AMs. This means the current economic contributions from the allotments would continue, there would be no changes to economic impacts and no change to collected receipts expected from federal actions unless grazing fees change. However, ranchers with small herds may need to seek additional income or new job opportunities as market factors and other factors may cause some ranchers with smaller operations to leave the ranching industry.

The NDSU ranch viability analysis describes baseline conditions and associated 10-year enterprise conditions as total and annual net margins and annual and total debt repayment capacity. Since this alternative would not change grazing levels in the project area, these baseline observations would persist, and there would be no change from the existing condition. However, as pointed out by the NDSU analysis, small herd ranchers are barely able to service livestock related debt. Given the uncertainty of future markets, management decisions, etc., the cumulative effects would be the same as identified under the Forest Service analysis, that is, some ranchers may leave the livestock ranching occupation, find additional work to supplement ranch income, change careers, or retire. The effect of reasonable foreseeable actions would be the same as previously identified.

Alternatives 3 and 3A would initially maintain stocking at current levels, so the cumulative effects are similar to Alternative 2. However, if monitoring indicates that impacted resources are not making sufficient progress towards desired conditions and reductions in Authorized Use are implemented as adaptive actions, then cumulative effects would change. However, the effects would vary depending on the size of the reductions, the size of the ranching operation, other available forage opportunities, reasonably foreseeable events, and other factors, so it is not possible at this time to predict the cumulative effects.

Alternative 4 sets Authorized Use at carrying capacity, which is predicted to reduce the ability of ranchers to repay debt and the number of jobs and labor income generated in the impact areas cattle ranching sector. Both the Forest Service and NDSU analyses indicate a reduction in jobs.

The Forest Service analysis predicted up to four jobs lost in the 12-county economic impact area and a loss of up to about $53,600 in annual labor income. The NDSU analysis indicates that the 150-cow herd could not support the same levels of debt as the 250- and 350-cow herds and that small reductions in grazing capacity quickly compromise the ability of the 150-cow herd ranchers to repay debt. It also points out that regardless, of existing debt obligations, debt repayment capacities for all herd sizes decrease with grazing reductions. In some cases, debt repayment capacities become negative, implying that the herd could no longer service any debt. Under those circumstances, only debt-free operations would survive grazing reductions. The NDSU report concludes that this alternative may result in an unspecified number of ranchers leaving the ranching industry.

The cumulative effect of this alternative impacting a handful of jobs in the 12-county economic impact area, which had 57,261 jobs during 2005, is low; however, to those directly affected it may be a major change resulting in a new career, lifestyle changes, or retirement. Reasonably foreseeable oil and gas development may provide additional income or new career opportunities and the Elkhorn amendment may offer some short term forage alternatives.

Adaptive Management: If monitoring reveals that initial proposed action are not achieving desired resource outcomes than adaptive options or other tools from the grazing management toolbox would be implemented to address the concern. The selected tools may include additional Authorized Use reductions, other structural or nonstructural actions or a combination thereof. Actions affecting Authorized Use would likely affect jobs and revenue whereas changes in range infrastructure or grazing systems probably would not. Because of the different combinations of management actions that could be implemented under the action alternatives, it is not possible at this point to determine the potential cumulative economic effects.

SOCIAL

Livestock grazing has occurred in the project are since at least the 1880s. At that time communities were often formed around ranching and the agricultural sectors in western North Dakota. Those communities that have endured are still influenced socially and economically by these sectors today. For many, raising livestock is more than an occupation it defines their lifestyle and life choices. So anything perceived as a threat to the occupation is also seen as a threat to a valued way of life.

The reasonable foreseeable actions associated with this project proposal include the LMNG Travel Management EA, the Elkhorn Ranchlands Grasslands Plan amendment, and oil and gas development.

Alternative 1 would result in the cessation of livestock grazing on the allotments contained in the project area. This may lead to changes in professions and lifestyles as ranching operations are no longer able to continue due to lack of graze or the ability to replace graze. The social fabric of smaller rural communities may be affected if longtime ranching residents leave the area for other jobs or retire to larger communities. Another social impact would be the relationship between the cattle ranching community and the Forest Service. This long tradition of grazing NFS lands would likely be perceived as degrading. Even if resource conditions were to improve following the implementation of proposed actions, and even if this spurred additional economic activity in the agriculture support services and recreation and tourism-related sectors (such as hunting and bird watching), the net effect would likely be a negative perception of federal lands management. Reasonably foreseeable oil and gas development offers the potential for new jobs or supplemental income, however, for some this may mean the loss or modification of a valued way of life.

Alternative 2 would maintain the current lifestyles and normal economic cycles. Ranching operations may change as ranches are bought and sold; communities would adjust accordingly. Oil and gas development may offer additional sources of income or a second job opportunity. The relationship between the ranching community and the Forest Service would likely remain the same. The Elkhorn Ranchlands Plan amendment would offer alternate sources of forage in the event of graze being lost to fire or other natural climatic events.

Alternatives 3 and 3A initially do not reduce Authorized Use; therefore, the social effects would be similar to Alternative 2. If monitoring shows that additional management actions are needed and reductions in authorize use occur, then there could be a shift of some livestock grazing from federal to private lands and, if the federal graze can’t be made up for by private graze and /or feeding, a possible reduction in herd sizes. This may lead to a new configuration of cattle ranching operations in the economic impact area. In other cases, the increased cost of renting private graze and/or feed for the current herd size could lead to a smaller number of cattle ranching operations. This could mean that some people retire or change to other professions. However, this is supposition because the amount of reductions, if they occur, is unknown at this point it time. Oil and gas development may offer additional sources of income or a second job

opportunity. The Elkhorn Ranchlands Plan amendment would offer alternate sources of forage in the event of graze being lost to fire or other natural climatic events.

Alternative 4 is projected to result in the loss of one to four jobs, loss of annual labor income, and reductions in cumulative net margins and the ability pay down debt. Under Alternative 4, with the initial reductions, and possibly with additional reductions following monitoring, there would be an immediate shift of some livestock grazing from federal to private lands and a possible reduction in herd sizes if the federal graze can't be made up with private graze and /or feeding. This may lead to a new configuration of cattle ranching operations in the economic impact area. In other cases the increased cost of renting private graze and/or feed for the current herd size could possibly lead to a smaller number of cattle ranching operations. This could mean that some people may retire or change to other professions. Oil and gas development may offer additional sources of income or a second job opportunity. The Elkhorn Ranchlands Plan amendment could offer alternate sources of forage in the event of graze being lost to fire or other natural climatic events if the Grasslands Plan were amended to allow this.

Index

A

adaptive management, xiv, xix, xxii, xxiii, 15, 16, 17, 46, 51, 54, 57, 63, 69, 93, 247
alternative, vii, xii, xiv, xxii, xxiii, 1, 7, 17, 20, 32, 44, 46, 51, 62, 63, 69, 74, 87, 102, 103, 180, 188, 197, 216, 218, 225, 246, 247, 248, 251
alternatives, vii, xi, xii, xviii, xxii, xxiii, 1, 15, 17, 20, 26, 32, 44, 49, 51, 62, 63, 69, 74, 208, 238
AM, xviii, xxix, 50, 69, 247
AMs, 94, 102, 104, 107, 238, 239, 244, 245, 247, 248, 251, 258
animal month, 237, 245
animal months, 237, 245
animal unit equivalent, 93
animal unit equivalents, 93
AUEs, 93
AUE, 93
AUEs, 93
AUM, xviii, 50, 216
AUMs, xv, xviii, xxix, 33, 42, 46, 50, 69, 248

C

carrying capacity, 51, 188, 248
CEQ, 16, 27, 77
Council on Environmental Quality, 16, 17, 27
Council on Environmental Quality (CEQ), 16
cow size, xv, 46, 93

D

deferred rotation, 16

E

early seral stage, xxvi, 67, 188
ecological site, 188
ecological sites, 188
economics, xi, 26
Economics, xi, 26
ephemeral stream, 121
ephemeral streams, 121
erosion, ix, 22, 29, 75, 79, 134, 187

F

Forest Service Handbook (FSH), xiii, 45, 244
Forest Service Manual (FSM), 11

G

grazing association, 5, 6, 29, 86, 93, 94, 242, 243, 247, 251

H

habitat, x, xiii, 23, 29, 30, 31, 33, 34, 45, 79, 81, 188, 195, 211, 212, 213, 214, 216, 219, 222
herbaceous structure, vi, xiii, 14, 45, 61, 180, 212, 213, 214, 216

I

income, xi, xxvii, 26, 68, 235, 237, 238, 239, 245, 246, 247, 248, 249, 250
intermittent stream, ix, 22, 78, 81
intermittent streams, ix, 22, 78, 81
invasive grasses, xxvi, 67, 84, 197, 201, 202, 208, 210
invasive species, 197
issues, iv, viii, xii, xxii, 1, 12, 16, 20, 22, 27, 44, 58, 64

J

jobs, xi, 26, 234, 237, 238, 244, 245, 246, 247, 248, 249, 250, 259

L

late seral stage, xi, xxvi, 25, 61, 67, 188, 201

M

MA, 8
management area, 7, 8, 10
management areas, 8
management indicator species, 33
MAs, 8
mid seral stage, 188
MIS, 33, 35, 36, 211

N

noxious weeds, 20, 30, 81, 84, 134, 208

O

overgrazing, 29, 79

P

perennial stream, 78
perennial streams, 78
PFC, ix, xxi, xxiv, 22, 56, 58, 59, 64
plant composition, xi, 25, 61, 188
preference, xiv, 46, 237, 243
prescribed burn, xv, xix, 47, 50
prescribed fire, xix, 50

R

recreation, 10, 11, 31, 32, 33, 132, 236, 260

S

scoping, vii, xii, 21, 44
SRT, 15

V

VOR, xxi, 56, 60, 172, 212, 213

W

wildfire, 145, 208
winter feeding, xv, 47, 94
winter grazing, 94
woody draw, x, xiii, xv, xx, xxi, xxv, 23, 31, 45, 47, 55, 56, 59, 60, 65, 75, 76, 101, 131, 132, 133, 134
woody draws, ix, x, xv, xx, xxi, xxv, 23, 31, 47, 55, 56, 59, 65, 101, 131, 132, 133, 139, 145, 146

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Final Environmental Impact Statement

Volume II

North Billings County Allotment
Management Plan Revisions

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North Billings County Allotment Management Plan Revisions
Final Environmental Impact Statement

Volume II

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Abstract: This Final Environmental Impact Statement (FEIS) summarizes the North Billings County Allotment Management Plan Revisions project. It describes the purpose and need for the project, issues related to the project, alternatives considered, and the effects of each alternative on the major resource concerns and issues. The purpose of this project is to continue livestock grazing while meeting or moving toward the goals and objectives of the Dakota Prairie Grasslands Land and Resource Management Plan (Grasslands Plan). Significant issues identified for the project include, riparian conditions, herbaceous structure, woody draws, seral condition, and economics. Alternative 1 proposes the cessation of livestock grazing Alternative 2 proposes to maintain existing management; Alternative 3 proposes to continue livestock grazing in an environmentally acceptable manner using an adaptive management approach and a variety of structural and nonstructural management practices. Alternative 3A was added to the SDEIS in response to public comment on the DEIS and is now part of the FEIS. It proposes the same adaptive management approach but modifies the proposed action by adding or deleting management actions in response to public comment. Alternative 4 is also adaptive management based but utilizes some initial action nonstructural practices not utilized in the other alternatives. The effects of each alternative are described to compare and contrast the alternatives.

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Table of Contents

TABLE OF CONTENTS 1
LIST OF TABLES 2
LIST OF FIGURES 6
CHAPTER 3 PART 2 1
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES BY ALLOTMENT 1
INTRODUCTION 1
ALLOTMENT 126 1
ALLOTMENT 127 29
ALLOTMENT 130 88
ALLOTMENT 131 105
ALLOTMENT 135 171
ALLOTMENT 136/139 192
ALLOTMENT 140 204
ALLOTMENT 141 218
ALLOTMENT 142 227
ALLOTMENT 158 240
ALLOTMENT 220 256
ALLOTMENT 221 263
ALLOTMENT 230 277
ALLOTMENT 237 290
ALLOTMENT 239 301
ALLOTMENT 240 314
ALLOTMENT 241 330
ALLOTMENT 243 343
ALLOTMENT 244 355
ALLOTMENT 248 368
ALLOTMENT 249 377
ALLOTMENT 256 388
ALLOTMENT 258 409
ALLOTMENT 272 426
ALLOTMENT 277 444
ALLOTMENT 278 460
ALLOTMENT 281 471
ALLOTMENT 282 483
ALLOTMENT 283 503
ALLOTMENT 286 516
ALLOTMENT 287 529
ALLOTMENT 288 545
ALLOTMENT 289 556
ALLOTMENT 300 572
ALLOTMENT 301 590
ALLOTMENT 302 609
SHORT TERM USE/ LONG TERM PRODUCTIVITY 622
UNAVOIDABLE ADVERSE EFFECTS 622
IRREVERSIBLE/IRRETRIEVABLE 623
OTHER REQUIRED DISCLOSURES 623
INDEX 624

List of Tables

Table 126.1 – An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 126 in the North Billings County AMP Revisions project area 1
Table 126.2 – Allotment 126 – Key issues, existing condition, need for action 2
Table 126.3 – Allotment 126 by alternative 3
Table 127.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 127 in the North Billings County AMP Revision Project area 29
Table 127.2 — Allotment 127 – Key issues, existing condition, need for action 30
Table 127.3 — Allotment 127 by alternative 31
Table 128.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 128 in the North Billings County AMP Revisions project area 40
Table 128.2 — Allotment 128 – Key issues, existing condition, need for action 41
Table 128.3 — Allotment 128 by alternative 42
Table 129.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 129 in the North Billings County AMP Revisions project area 62
Table 129.2 — Allotment 129 – Key issues, existing condition, need for action 63
Table 129.3 — Allotment 129 by alternative 64
Table 130.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 130 in the North Billings County AMP Revisions project area 88
Table 130.2 — Allotment 130 – Key issues, existing condition, need for action 89
Table 130.3 — Allotment 130 by alternative 90
Table 131.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 131 in the North Billings County AMP Revisions project area 105
Table 131.2 — Allotment 131 – Key issues, existing condition, need for action 106
Table 131.3 — Allotment 131 by alternative 107
Table 132A.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 132A in the North Billings County AMP Revisions project area 118
Table 132A.2 — Allotment 132A – Key issues, existing condition, need for action 118
Table 132A.3 — Allotment 132A by alternative 119
Table 132H.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 132H in the North Billings County AMP Revisions project area 126
Table 132H.2 — Allotment 132H – Key issues, existing condition, need for action 126
Table 132H.3 — Allotment 132H by alternative 127
Table 133.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 133 in the North Billings County AMP Revisions project area 138
Table 133.2 — Allotment 133 – Key issues, existing condition, need for action 138
Table 133.3 — Allotment 133 by alternative 139
Table 133D5.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 133D5 in the North Billings County AMP Revisions project area. 151
Table 133D5.2 — Allotment 133D5 – Key issues, existing condition, need for action 151
Table 133D5.3 — Allotment 133D5 by alternative 152

Table 134.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 134 in the North Billings County AMP Revisions project area 158
Table 134.2 — Allotment 134 – Key issues, existing condition, need for action 159
Table 134.3 — Allotment 134 by alternative 160
Table 135.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 135 in the North Billings County AMP Revisions project area 171
Table 135.2 — Allotment 135 – Key issues, existing condition, need for action 172
Table 135.3 — Allotment 135 by alternative 173
Table 136/139.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 136/139 in the North Billings County AMP Revisions project area 192
Table 136/139.2 — Allotment 136/139: – Key issues, existing condition, need for action..... 193
Table 136/139.3 — Allotment 136/139 by alternative 194
Table 140.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 140 in the North Billings County AMP Revisions project area 204
Table 140.2 — Allotment 140 – Key issues, existing condition, need for action 205
Table 140.3 — Allotment 140 by alternative 206
Table 141.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 141 in the North Billings County AMP Revisions project area 218
Table 141.2 — Allotment 141 – Key issues, existing condition, need for action 218
Table 141.3 — Allotment 141 by alternative 219
Table 142-1 — Summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 142 in the North Billings County AMP Revision project area 227
Table 142.2 — Allotment 142 – Key issues, existing condition, need for action 228
Table 142.3 — Allotment 142 by alternative 229
Table 158.1 — Summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 158 in the North Billings County AMP Revisions project area..... 240
Table 158.2 — Allotment 158 – Key issues, existing condition, need for action 241
Table 158.3 — Allotment 158 by alternative 242
Table 220.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 220 in the North Billings County AMP Revisions project area 256
Table 220.2 — Allotment 220 – Key issues, existing condition, need for action 256
Table 220.3 — Allotment 220 by alternative 257
Table 221.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 221 in the North Billings County AMP Revisions project area 263
Table 221.2 — Allotment 221 – Key issues, existing condition, need for action 264
Table 221.3 — Allotment 221 by alternative 265
Table 230-1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 230 in the North Billings County AMP Revisions project area 277
Table 230.2 — Allotment 230 – Key issues, existing condition, need for action 278
Table 230-3. Allotment 230 by alternative 279
Table 237.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 237 in the North Billings County AMP Revisions project area 290
Table 237.2 — Allotment 237 – Key issues, existing condition, need for action 291
Table 237-3. Allotment 237 by alternative 292

Table 239.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 239 in the North Billings County AMP Revisions project area 301
Table 239.2 — Allotment 239 – Key issues, existing condition, need for action 302
Table 239.3 — Allotment 239 by alternative 303
Table 240.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 240 in the North Billings County AMP Revisions project area 314
Table 240.2 — Allotment 240 – Key issues, existing condition, need for action 315
Table 240.3 — Allotment 240 by alternative 316
Table 241.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 241 in the North Billings County AMP Revisions project area 330
Table 241.2 — Allotment 241 – Key issues, existing condition, need for action 331
Table 241.3 — Allotment 241 by alternative 332
Table 243.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 243 in the North Billings County AMP Revisions project area 343
Table 243.2 — Allotment 243 – Key issues, existing condition, need for action 344
Table 243.3 — Allotment 243 by alternative 345
Table 244.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 244 in the North Billings County AMP Revisions project area 355
Table 244.2 — Allotment 244 – Key issues, existing condition, need for action 356
Table 244.3 — Allotment 244 by alternative 357
Table 248.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 248 in the North Billings County AMP Revisions project area 368
Table 248.2 — Allotment 248 – Key issues, existing condition, need for action 369
Table 248.3 — Allotment 248 by alternative 370
Table 249.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 249 in the North Billings County AMP Revisions project area 377
Table 249.2 — Allotment 249 – Key issues, existing condition, need for action 377
Table 249.3 — Allotment 249 by alternative 378
Table 256.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 256 in the North Billings County AMP Revisions project area 388
Table 256.2 — Allotment 256 – Key issues, existing condition, need for action 389
Table 256.3 — Allotment 256 by alternative 390
Table 258.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 258 in the North Billings County AMP Revisions project area 409
Table 258.2 — Allotment 258 – Key issues, existing condition, need for action 410
Table 258.3 — Allotment 258 by alternative 411
Table 272.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 272 in the North Billings County AMP Revisions project area 426
Table 272.2 — Allotment 272 – Key issues, existing condition, need for action 427
Table 272.3 — Allotment 272 by alternative 428
Table 277.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 277 in the North Billings County AMP Revisions project area 444

TABLE 277.2 — ALLOTMENT 277 – KEY ISSUES, EXISTING CONDITION, NEED FOR ACTION 445
TABLE 277.3 — ALLOTMENT 277 BY ALTERNATIVE 446
TABLE 278.1 — AN EXISTING SUMMARY OF MANAGEMENT AREAS, LAND OWNERSHIP ACREAGE, PERMITTED LIVESTOCK, INITIAL ESTIMATED CARRYING CAPACITY, AND NUMBER OF PASTURES FOR ALLOTMENT 278 IN THE NORTH BILLINGS COUNTY AMP REVISIONS PROJECT AREA 460
TABLE 278.2 — ALLOTMENT 278 – KEY ISSUES, EXISTING CONDITION, NEED FOR ACTION 460
TABLE 278.3 — ALLOTMENT 278 BY ALTERNATIVE 461
TABLE 281.1 — AN EXISTING SUMMARY OF MANAGEMENT AREAS, LAND OWNERSHIP ACREAGE, PERMITTED LIVESTOCK, INITIAL ESTIMATED CARRYING CAPACITY, AND NUMBER OF PASTURES FOR ALLOTMENT 281 IN THE NORTH BILLINGS COUNTY AMP REVISIONS PROJECT AREA 471
TABLE 281.2 — ALLOTMENT 281 – KEY ISSUES, EXISTING CONDITION, NEED FOR ACTION 471
TABLE 281.3 — ALLOTMENT 281 BY ALTERNATIVE 472
TABLE 282-1 — AN EXISTING SUMMARY OF MANAGEMENT AREAS, LAND OWNERSHIP ACREAGE, PERMITTED LIVESTOCK, INITIAL ESTIMATED CARRYING CAPACITY, AND NUMBER OF PASTURES FOR ALLOTMENT 282 IN THE NORTH BILLINGS COUNTY AMP REVISIONS PROJECT AREA 483
TABLE 282.2 — ALLOTMENT 282 – KEY ISSUES, EXISTING CONDITION, NEED FOR ACTION 484
TABLE 282.3 — ALLOTMENT 282 BY ALTERNATIVE 485
TABLE 283.1 — AN EXISTING SUMMARY OF MANAGEMENT AREAS, LAND OWNERSHIP ACREAGE, PERMITTED LIVESTOCK, INITIAL ESTIMATED CARRYING CAPACITY, AND NUMBER OF PASTURES FOR ALLOTMENT 283 IN THE NORTH BILLINGS COUNTY AMP REVISIONS PROJECT AREA 503
TABLE 283.2 — ALLOTMENT 283 – KEY ISSUES, EXISTING CONDITION, NEED FOR ACTION 504
TABLE 283.3 — ALLOTMENT 283 BY ALTERNATIVE 505
TABLE 286.1 — AN EXISTING SUMMARY OF MANAGEMENT AREAS, LAND OWNERSHIP ACREAGE, PERMITTED LIVESTOCK, INITIAL ESTIMATED CARRYING CAPACITY, AND NUMBER OF PASTURES FOR ALLOTMENT 286 IN THE NORTH BILLINGS COUNTY AMP REVISIONS PROJECT AREA 516
TABLE 286.2 — ALLOTMENT 286 – KEY ISSUES, EXISTING CONDITION, NEED FOR ACTION 516
TABLE 286.3 — ALLOTMENT 286 BY ALTERNATIVE 517
TABLE 287.1 — AN EXISTING SUMMARY OF MANAGEMENT AREAS, LAND OWNERSHIP ACREAGE, PERMITTED LIVESTOCK, INITIAL ESTIMATED CARRYING CAPACITY, AND NUMBER OF PASTURES FOR ALLOTMENT 287 IN THE NORTH BILLINGS COUNTY AMP REVISIONS PROJECT AREA 529
TABLE 287.2 — ALLOTMENT 287 – KEY ISSUES, EXISTING CONDITION, NEED FOR ACTION 530
TABLE 287.3 — ALLOTMENT 287 BY ALTERNATIVE 531
TABLE 288.1 — AN EXISTING SUMMARY OF MANAGEMENT AREAS, LAND OWNERSHIP ACREAGE, PERMITTED LIVESTOCK, INITIAL ESTIMATED CARRYING CAPACITY, AND NUMBER OF PASTURES FOR ALLOTMENT 288 IN THE NORTH BILLINGS COUNTY AMP REVISIONS PROJECT AREA 545
TABLE 288.2 — ALLOTMENT 288 – KEY ISSUES, EXISTING CONDITION, NEED FOR ACTION 545
TABLE 288.3 — ALLOTMENT 288 BY ALTERNATIVE 546
TABLE 289.1 — AN EXISTING SUMMARY OF MANAGEMENT AREAS, LAND OWNERSHIP ACREAGE, PERMITTED LIVESTOCK, INITIAL ESTIMATED CARRYING CAPACITY, AND NUMBER OF PASTURES FOR ALLOTMENT 289 IN THE NORTH BILLINGS COUNTY AMP REVISIONS PROJECT AREA 556
TABLE 289.2 — ALLOTMENT 289 – KEY ISSUES, EXISTING CONDITION, NEED FOR ACTION 557
TABLE 289.3 — ALLOTMENT 289 BY ALTERNATIVE 558
TABLE 300.1 — AN EXISTING SUMMARY OF MANAGEMENT AREAS, LAND OWNERSHIP ACREAGE, PERMITTED LIVESTOCK, INITIAL ESTIMATED CARRYING CAPACITY, AND NUMBER OF PASTURES FOR ALLOTMENT 300 IN THE NORTH BILLINGS COUNTY AMP REVISIONS PROJECT AREA 572
TABLE 300.2 — ALLOTMENT 300 – KEY ISSUES, EXISTING CONDITION, NEED FOR ACTION 573
TABLE 300.3 — ALLOTMENT 300 BY ALTERNATIVE 574
TABLE 301.1 — AN EXISTING SUMMARY OF MANAGEMENT AREAS, LAND OWNERSHIP ACREAGE, PERMITTED LIVESTOCK, INITIAL ESTIMATED CARRYING CAPACITY, AND NUMBER OF PASTURES FOR ALLOTMENT 301 IN THE NORTH BILLINGS COUNTY AMP REVISIONS PROJECT AREA 590
TABLE 301.2 — ALLOTMENT 301 – KEY ISSUES, EXISTING CONDITION, NEED FOR ACTION 591
TABLE 301.3 — ALLOTMENT 301 BY ALTERNATIVE 592

Table 302.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 302 in the North Billings County AMP Revisions project area 609
Table 302.2 — Allotment 302 – Key issues, existing condition, need for action 610
Table 302.3 — Allotment 302 by alternative 611

List of Figures

Figures 126.1a and 126.1b — a) Healthy woody draw conditions along an upper slope in pasture 2. b) At Risk woody draw conditions near a developed spring in pasture 4 with the understory dominated by smooth brome..... 6
Figure 126.2 – Woody draw observed during early spring in pasture 5 near hay feeding area. High winter use of the woody draw is evidenced by accumulated manure along the roadside and within the draw..... 9
Figure 126.3 – Hay feeding in pasture 5/6 when livestock are free to graze open rangeland. 10
Figure 126.4 — Crested wheatgrass and sweet clover seed/flower heads that comprise hay in pasture 4. 10
Figure 126.5 – One of several beaver ponds upstream of developed spring in pasture 6..... 16
Figure 128.1 — Whitetail Creek is incised in Section 31, T144N, R100W and Section 35 and 36, T144N, R101W. Erosion, sediment transport, and deposition rates are high. Livestock can be temporarily trapped in the incised channel. They trail along the channel, further damaging riparian vegetation..... 45
Figure 128.2 — Mineral station within drainage at the north end of pasture 1 immediately upstream of a developed spring. 45
Figure 129.1 — Reaches 4 and 5 of Magpie Creek have incised since the 1980s. The high width/depth ratio is indicative of high sediment transport, excessive channel energy, and flashy hydroperiod. Riparian vegetation is poorly established along most of these reaches. Efforts to establish riparian vegetation should lead to increased bank stability, decreased erosion and sediment transport, and greater conservation of stream discharge through bank storage of moisture. 68
Figures 130.1a and 130.1b. — a) Site of past hay feeding at the south end of pasture 1 with accumulated manure, annual brome, and barnyard weeds. b) Conditions at the end of the hay feeding season at the north end of pasture 1. 93
Figure 130.2 — Hay feed storage area on east side of pasture 7 with foreground dominated by smooth brome and crested wheatgrass. 93
Figure 132A.1 — West-central portion of the pasture downstream from a dugout reservoir. Crested wheatgrass in the foreground and increasing amounts of Kentucky bluegrass in lower-lying area around electric pole indicated by brown hue of seed heads..... 121
Figure 132A.2 — East side of allotment dominated by invasive bluegrass with scattered occurrences of crested wheatgrass and native grasses. Brown seed heads of Kentucky bluegrass are especially dense or evident in the background..... 121
Figure 133.1 — Woody draws in pasture 1..... 141
a) Healthy community with beaver pond where willow and aspen saplings were later harvested. 141
b) At Risk community below developed spring with dense smooth brome understory and no tree/shrub regeneration..... 141
Figure 133.2 — Dominance of invasive bluegrass in unbroken land on east side of pasture 1. 141
Figure 133.3 — Invasive bluegrass dominance in the north half of pasture 2. Most of the brown sheen at the top of the grass layer is attributed to seed heads of bluegrass. 142
Figures 134.2a and 134.2b — Large beaver pond along Whitetail Creek in photo a with areas of aspen cut by beaver in photo b..... 162
Figure 134.3 — Shrub community with remnant trees of green ash and willow along terrace of Whitetail Creek with relatively open structure resulting from heavy trailing and grazing between shrubs. 164
Figure 135.1 — Mikes Creek is incised in pastures 8, 9, and 10 of Allotment 135. It has a functionality rating of NF. 176
Figure 135.2 — Corridor of Mikes Creek in pasture 9/10 that receives heavy livestock use and exhibits early seral stages of blue grama with remnant amounts of western wheatgrass and needlegrass. 180
Figure 136/139.1 — Healthy woody draw in pasture 136.2 that has lacked a permanent water source in recent years. ... 196
Figure 140.1, a and b — At Risk woody draws in the northwest and southeast corners of pasture 1 that exhibit minimal tree regeneration and lack of tall shrub layers. 208
Figure 141.1 220
Figure 141.2, a and b — a) Pasture 3 at north end of the allotment..... 221
Figure 221.1 — Two At Risk woody draws in pasture 2 with a lack of recent tree regeneration and desired shrub layers. 266

Figure 221.2 — a) Under-utilized crested wheatgrass observed at the north end of pasture 6 during late September. b) High use around stock pond and unbroken land in southeast quarter of pasture. 267
Figure 230.1 — Pasture 3 on right side of fence with a high amount of sweet clover and no sweet clover on private land of adjacent allotment left of fence. 281
Figure 237.1 a and b — Examples of (a) Healthy, and (b) At Risk, woody draws in Allotment 237. 293
Figure 239.1 — Existing vegetation dominated by Kentucky bluegrass emerging through accumulated litter. 304
. 318
Figure 240.2 — Spring Creek has a functional rating of PFC. 318
Figure 240.3 — Animal watering facilities and supplemental feeding structures are located on or near the banks of Spring Creek. 318
Figure 241.1 — Unhealthy woody draw adjacent to a developed spring in pasture 1. 333
Figures 241.2a and 241.2b — Woody draw in pasture 7. a) Relatively Healthy north aspect slopes, and b) Unhealthy conditions along the drainage bottom with no tree regeneration and no shrub layer. 334
Figure 241.3 — Sere plot in pasture 6 dominated by Canada bluegrass with high amounts of litter and low levels of grazing. 334
Figure 243.1 — Sere plot at the northwest end of pasture 1 with tall clumps of crested wheatgrass and shorter interspaces of Canada bluegrass and sedge. 347
Figure 256.1 — Reach 4 of Blacktail Creek is incised and shows evidence of continued channel incision. 393
Figure 256.2 — Examples of Healthy, on the left, and At Risk, on the right, woody draws in Allotment 256. 394
Figure 256.3 — Four photos indicate various trailing impacts that decrease hydrologic function and the ability to produce vegetation. 397
Figure 258.1a — The reaches of Ash Coulee within livestock exclosures have attained riparian functionality ratings of PFC in less than 5 years. 414
Figure 258-1b. — Within the exclosures, the channel of Ash Coulee is aggrading, channel width depth ratios have been modified, the floodplain has been rebuilt, flood processes have been restored, and moisture is stored in the alluvial banks. 414
Figure 258.1c — Outside the livestock exclosures, the channel of Ash Coulee has a high width depth ratio, high rates of channel and bank erosion, high rates of sediment transport, and very little riparian vegetation. 415
Figure 272.1 — At Risk and Unhealthy woody draws in pasture 2. 430
Figure 272.2 — Sere plot in southwestern portion of pasture 1 revealing high level of utilization during October 2008. 431
Figure 272.3 — Crested wheatgrass stands along south end of pasture 1 during the spring of 2010. Large amounts of standing dead material are indicative of low utilization during 2009. 434
Figure 277.2 — Upper reach of Scairt Woman Draw in Allotment 289 is at PFC. 448
Figure 277.3 — Livestock grazing during April 2009 in hay feeding pasture of Allotment 277. 452
Figure 278.1 — Headwater drainage of Betsy Creek in Allotment 278 does not have riparian habitat. 462
Figure 281.2 — Healthy woody draw on the left and At Risk on the right in pasture 2. 474
Figure 282.1 — Reach 7 of Magpie Creek in Allotment 282 has a functionality rating of NF. 488
Figure 282.2 — Reach 11 of Whitetail Creek in Allotment 282 has a functionality rating of NF. 488
Figure 282.3 — Watering site on sagebrush terrace along Magpie Creek in pasture 6 with annual brome indicated by brown patches. 489
Figure 282-4. Hay feeding site in pasture 3. 493
Figure 283.1 — Pasture 4 with woody draws concentrated along upper drainages in the northwestern portion of the pasture. 507
Figure 283.2 — Looking southeast over pasture 4 from VOR transect 7-283-1 starting point. (photo taken Oct 26, 2004). 508
Figure 283.3 — Effects of hay feeding in pasture 4. 511
Figure 286.1 — Unhealthy woody draw conditions in pasture 1 exhibiting no shrub layer or recent tree regeneration and heavy grazing of the understory. 519
Figure 286.2 — Sere plot in broken land of pasture 2 at a mid-early seral stage with high utilization suggested by the lack of residual cover after livestock turn-off. 520
Figure 287.1 — Healthy (a) and At Risk (b) woody draws in pastures 2 and 3 533
Figure 287.2 — Crested wheatgrass in pasture 2 during the spring of 2010. 534

Figure 288.1 — Repeated pace transect within broken land during the fall of 2009 with lightly utilized crested wheatgrass and grazed needle-and-thread, sedge, and blue grama in the interspaces. 550
Figure 289.1 — Woody draw sampled in pasture 2 of exceptional condition and diverse species composition. 560
Figure 289.2 — Winter hay feeding site at south end of pasture 2 observed during April 2009. 564
Figure 300.1 — Water lot in the northeastern corner of Allotment 300 pasture 1 is adversely affected by the concentration of livestock. 577
Figure 300.2 — Upper end of woody draw with high reproduction as evidenced by numerous saplings and young trees. .. 577
Figure 301.1 — Livestock concentrate in the reach of Magpie Creek immediately south of Allotment 131 and in the north end of pasture 301-1. 595
Figure 301.2 (a), (b), and (c) — Livestock trailing disturbances occurring along drainages with developed springs and reservoirs. 596
Figure 302.1 — Stand of black cottonwood in Healthy woody draw of pasture 2. 613

CHAPTER 3 Part 2

Affected Environment and Environmental Consequences by Allotment

INTRODUCTION

This part of Chapter 3 provides specific information and effect analysis by allotment for each alternative and resource. This part was created to bring all the allotment specific information together in one place.

ALLOTMENT 126

Table 126.1 – An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 126 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 3.65 – Rangelands With Diverse Natural-Appearing Landscapes	590	30	
Management Area 6.1 – Rangeland With Broad Resource Emphasis	1360	70	
Total allotment acres	4161	100	
National Forest System (NFS) acres	1950	47	
State land acres	0	0	
Private land acres	2211	53	
Current permitted livestock grazing (AMs) on NFS lands			489
Initial estimated carrying capacity (AUMs) on NFS lands			798
Number of pastures containing NFS lands			6

Table 126.2 – Allotment 126 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	Whitetail Creek at Proper Functioning Condition (PFC).	Maintain PFC.
Woody draws	31 percent of sampled woody draws are Healthy; 69 percent are At Risk due to a lack of regeneration in flat bottomed woody draws and near water developments.	Establish regeneration and/or increase survival of saplings. Need to reduce rate of head cutting and gully creation in pasture 2.
Structure	Transect Results : Low - Exceeding Objectives Moderate - Meeting Objectives High - Below Objectives 2004 Transects: 2.75; 1.28; 1.00; 1.91 2004 Stations percent: Low-60/Moderate-40/High-0 2005 Transects: 2.65; 2.31 2005 Stations percent: Low-7.5/Moderate-92.5/High-0	Manage for additional High structure on biologically capable habitats.
Seral stages	Predominance of mid seral stages and varying mixtures of native and invasive grasses comprised unbroken land. The south and northeast portions of pasture 5, the south half of pasture 6, and all of pasture 10 consisted of broken land and crested wheatgrass.	Limit the expansion of invasive grasses and maintain or increase the proportion of native grasses while achieving an increase of early and late seral stages.
Sharp-tailed grouse	Suitable habitat is present within the allotment. There are two leks within 1 mile of the allotment.	Manage for increased High vegetative structure on biologically capable sites to enhance habitat.
Remarks	There are approx. 58 acres of Canada thistle (Cirsium arvense (L.) Scop.) located primarily in woody draws and riparian areas. Burdock (Arctium minus Bernh.) was also identified in most wooded areas.	

Table 126.3 – Allotment 126 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action	Alternative 3A	Alternative 4
Authorized Use is 489 federal AMs. Three-year average permitted use is 2,258 summer federal AMs (Note average is a combination of Allotments 126 and 128).* Permit type: Inventory (12 months). Rotation: Complementary modified deferred rotation with two or three herds in nine pastures. Also, rotation is combined with three pastures located in Allotment 128. Class(s) of livestock: Cow/calf pairs and yearlings. See allotment map in Appendix B for current range developments.	Initial Actions Authorized federal AMs: 489. Develop new water source in pasture 5 to pull livestock away from woody draws and riparian areas. Install temporary electric fence between pastures 5 and 6. Extend range water pipeline from Allotment 128 pasture 2 into Allotment 126 pasture 4. Fence spring development in pasture 4. Combine Allotments 126 and 128 and continue a complementary modified deferred rotation grazing system. When pasture 5 is used as an early pasture place salt and supplement so as to maximize use of crested wheatgrass areas. Adaptive Options Fence high-value woody draws. Fence spring development in pasture 6. Adjust Authorized Use. Install temporary electric fence in pasture 5 to segregate crested wheatgrass areas from native grass areas. Utilize fire to reduce excessive litter, regenerate decadent “wolfy” crested wheatgrass areas throughout allotment Utilize rest, fencing, or change in season of use if riparian falls below PFC. Develop new water sources to pull livestock away from riparian areas.	Initial Actions Authorized federal AMs: 489. Develop new water source in pasture 5 to pull livestock away from woody draws and riparian areas. Install temporary electric fence between pastures 5 and 6. Extend range water pipeline from Allotment 128 pasture 2 into Allotment 126 pasture 4. Combine Allotments 126 and 128 and continue a complementary modified deferred rotation grazing system. When pasture 5 is used as an early pasture place salt and supplement so as to maximize use of crested wheatgrass areas. Adaptive Options Fence high-value woody draws. Adjust Authorized Use. Install temporary electric fence in pasture 5 to segregate crested wheatgrass areas from native grass areas. Utilize fire to reduce excessive litter, regenerate decadent “wolfy” crested wheatgrass areas throughout allotment Utilize rest, fencing, or change in season of use if riparian falls below PFC. Develop new water sources to pull livestock away from riparian areas.	Initial Actions Authorized federal AUMs: 798. Combine Allotments 126 and 128 and implementing a seven- pasture rest/deferred rotation grazing system. Treat pastures 5, 10, and south part of 6 as crested wheatgrass pastures. Generally, graze these pastures between April 20th and June 15th. Install temporary electric fence in pasture 5 to segregate crested wheatgrass areas from native grass areas. Develop new water source in pasture 5 to pull livestock away from woody draws and riparian areas. Adaptive Options Utilize fire to stimulate regeneration in woody draws. Fence high-value woody draws. Maintain spring development in pasture 6; ensure overflow is functional and operating properly. Utilize rest, fencing, or change in season of use if riparian falls below PFC. Utilize fire to reduce excessive litter; regenerate decadent “wolfy” crested wheatgrass areas throughout allotment. Adjust Authorized Use. Develop new water sources to pull livestock away from riparian areas.

Alternative 2 - Current Management	Alternative 3 - Proposed Action	Alternative 3A	Alternative 4
Monitoring Review annual planned management identified in allotment worksheets. Conduct annual allotment inspections to monitor current management. Conduct annual fall tour inspections to determine next season's management needs.	Monitoring Survey woody draws once every 3 to 5 years. Gather Visual Obstruction Readings once every 3 years. Complete Properly Functioning Condition survey once every 5 years. Collect vegetative composition and production data once every 3 to 5 years.	Monitoring Same as Alternative 3	Monitoring Same as Alternative 3

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 126 — Existing Condition

Range – This allotment is approximately 4,161 acres in total size with 1,950 acres of NFS lands. Currently, this allotment is issued a private allocation inventory permit for 90 head for 8 months of summer grazing by the Medora Grazing Association (MGA). This type of permit is for the entire 12 months, not just May 1st to December 31st. Livestock are wintered on private and intermingled private and NFS lands during January through April. This allotment has been subdivided into nine pastures. Six contain NFS lands. Of the six pastures four of them contain solely NFS land and two consist of both private and NFS lands. The pastures range from 160 acres to 1,081 acres in size. Portions of this allotment were part of the old Blacktail Common at one time, meaning that certain areas of this large common were allocated specifically to Allotment 126. Allotment 128 is currently managed together with this allotment.

The number of livestock within each pasture varies throughout the year. The current permittee normally divides the 90 head and 261 head (from Allotment 128) into several herds and rotates them based on climate conditions and grass conditions. The permittee normally estimates the number of days the livestock will be in a pasture. Depending upon the amount of rainfall and the amount of forage production, that number can change. The rotation is a modified, deferred rotation with NFS, private, and state lands within the two allotments. Typically there is a cow/calf herd and a yearling herd that rotate through this allotment during the summer months.

Of the six pastures that contain NFS lands, all areas have crested wheatgrass (*Agropyron cristatum* (L.) Gaertn.). With intermingled native species and introduced grass species, it becomes a challenge to balance a rotation to graze at the appropriate time. The presence of crested wheatgrass in these pastures can be linked back to areas that were farmed and replanted to crested wheatgrass, or are related to oil and gas activity. Current AMs provided by NFS lands are 489. The assumption made within the initial estimated carrying capacity does not consider the presence of crested wheatgrass or other introduced species, which may boost the annual forage production within a pasture depending upon the climate conditions and the condition of the crested wheatgrass stands. Water

developments within this allotment include developed springs, reservoirs, dugouts, and a well/stock tank.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there are approximately 58 acres of Canada thistle and burdock. Infestations of Canada thistle are mostly in the woody draws and riparian areas, and burdock is found in the woody draws. Through recent weed inventories and communication between the Forest Service, Billings County Weed Officer, and the permittee, other infestations have been identified. Herbicides have been the primary control agent for noxious weeds within this allotment.

Oil and gas development on NFS lands in this allotment has removed a total of approximately 8.3 acres from livestock access. A total of approximately 13.4 acres of oil and gas pads and access roads have been reclaimed and are, or will be, available for livestock access. Associated forage from these acres is approximately 3.0 and 4.8 AUMs, respectively.

Riparian –

Allotment-pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
126-05	Whitetail Creek (5)	0.11					0.11
126-06	Whitetail Creek (5)	1.61					1.61

A 1/10-mile segment of Whitetail Creek traverses pasture 5 in Allotment 126 and a 1.6-mile reach in pasture 6. These reaches have a riparian functionality rating of PFC and are meeting desired conditions.

There are developed springs in pasture 4 and pasture 6. There is no historic riparian habitat at the sources. In pasture 4, the water is piped several hundred feet down slope to a stock tank. The stock tank has a functioning overflow that is supporting approximately 0.1 acre of riparian habitat. In pasture 6, the water is piped a short distance to a stock tank with a functioning overflow. The spring brook originating from the overflow has a steep gradient and moves water down slope to discharge in the large, wet draw below.

Woody Draws — Of 13 woody draw samples collected among all five pastures, 31 percent are Healthy and 69 percent are At Risk. Healthy woody draws tended to occur on steep slopes above the main drainages or first-order side drains (Figure 126.1a). The close proximity of developed water sources in relation to several woody draws, along with topographic characteristics that funnel livestock through the draws, are major factors contributing to At Risk conditions among several sample sites. For example, woody draws around a developed spring in pasture 4 experience high livestock browsing and trampling disturbances (Figure 126.1b). Winter hay feeding adjacent to the spring has likely facilitated the current dominance of smooth brome (*Bromus inermis* Leyss. subsp. *inermis)* that can impede the regeneration of woody species. Smooth brome dominance and trail networks also occur around a developed spring and woody draw on the west side of pasture 6. A large portion of the upland habitat in pasture 2 consists of steep slopes above woody draw drainages, so trailing disturbances can be concentrated along the drainage bottom as livestock travel to and from a water tank near the head of the drainage. Rocky Mountain juniper (*Juniperus*

scopulorum Sarg.) comprised significant portions of the woodland communities on the western side of the allotment.

Figures 126.1a and 126.1b — a) Healthy woody draw conditions along an upper slope in pasture 2. b) At Risk woody draw conditions near a developed spring in pasture 4 with the understory dominated by smooth brome.

Herbaceous Structure — The four randomly selected sample sites in 2004 had transect VOR averages of 2.75, 1.28, 1.00, and 1.91— two Low and two Moderate structure. The station frequency of these transects is 60 percent Low, 40 percent Moderate, and 0 percent High VOR.

In 2005, two of these were randomly selected for re-sampling. The VOR transects had averages of 2.65 and 2.31. The overall 2005 station structure class frequency of these transects is 7.5 percent Low, 92.5 percent Moderate, and 0 percent High. One transect went from Low to Moderate and the other remained in the Moderate class. Station data also showed a strong Moderate dominance with nearly 93 percent of the stations in Moderate with the remaining in Low structure.

In September 2006, two VOR transects were subjectively selected in some of the highest cover observed. These transects were conducted with the permittee as a result of a challenge to the 2004 and 2005 results. One transect was measured at 3.5 inches and the other at 3.44 inches. Both are in the Moderate class. After measuring these transects and finding them to be Moderate, it was determined that there was not enough High structure grasslands in the rest of the allotment to fully address the structure objectives.

Oil and gas development on NFS lands in this allotment has removed a total of approximately 8.3 acres of potential habitat, of which some may be biologically capable. A total of approximately 13.4 acres of oil and gas pads and access roads have been reclaimed and are available as potential habitat, of which some may be biologically capable.

Seral Stages — About 16 percent of pasture 1 consisted of NFS lands in two separate parcels. Broken land comprising about 8 percent of NFS land occurred in the northern parcel where invasive bluegrass was intermixed with crested wheatgrass and native grasses. Bluegrass persisted in patches outside of broken land, particularly along lower slopes within and adjacent to drainages. A Robel

transect along a lower slope recorded bluegrass with lesser amounts of western wheatgrass (*Agropyron smithii* Rydb.) and sedge as the dominant species. Native grass dominance increased to the south and along ridge shoulders.

NFS land constituted about 44 percent of pasture 2 and primarily involved steep slopes above a large drainage. A sere plot along a ridge shoulder extending the length of the pasture above the drainage was at a mid seral stage with dominance of blue grama (*Boutaloua gracilis* (H.B.K.) Lag. ex Griffiths), western wheatgrass, and bluegrass, which along with smooth brome and annual brome comprised 19 percent of the relative grass canopy cover. Lower slopes along the drainage were often dominated by smooth brome.

Pasture 4 consisted of native grasses with varying mixtures of bluegrass along ridgelines and high amounts of smooth brome along lower slopes among woody draw patches. A sere plot at the northern end of the pasture was at a mid seral stage with moderate amounts of annual brome and bluegrass.

Broken land or crested wheatgrass-dominated areas comprised about 35 percent of pastures 5 and 6 along broad ridgelines. A sere plot at the northern end of pasture 5 was at a mid seral stage for broken land with blue grama, sedge, and light amounts of bluegrass occurring with crested wheatgrass. Native grass communities dominate more rugged badland topography in the northwestern quarter of pasture 5. Another sere plot on the edge of broken land in pasture 6 was at an early seral stage with blue grama and sedge cover greatly exceeding crested wheatgrass. Clubmoss (*Selaginella densa* Rybd.) comprised 22 percent of the ground cover. Smooth brome and light amounts of bluegrass were also present. Intermixed native and invasive grasses occurred along the plateau north of the sere plot and broken land. A plateau in the northeastern corner of pasture 6, isolated by Whitetail Creek, contained high condition communities of needle-and-thread (*Stipa comata* Trin. & Rupr.) and sedge, but invasive grasses increased along the lower slopes and dominated the terraces of the creek.

More than 80 percent of pasture 10 consisted of broken land where crested wheatgrass, smooth brome, and Kentucky bluegrass (*Poa pratensis* L.) comprised about 90 percent of the grass production in a North Dakota State University (NDSU) sample plot. The site was at or approaching an Invaded Grass State with Kentucky bluegrass and smooth brome comprising 35 percent of the grass production. An ecoplot at the northern end of the pasture was dominated by crested wheatgrass and blue grama when measured in 1997.

Sharp-tailed Grouse — The allotment contains suitable habitat for sharp-tailed grouse. There are two leks within one mile of the allotment.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed after 2 years.
- Most range infrastructure would begin to be removed concurrently.

Range — A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards conservation practice (CP) funds. Removal or maintenance of existing range infrastructure would be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian — The riparian condition along Whitetail Creek as described in the existing condition would continue and evolve toward the potential riparian community. The riparian habitat associated with the unnamed springs would evolve toward the potential riparian community if the spring developments are reclaimed.

Woody Draws — The removal of livestock browsing and trampling disturbances would assist rapid improvement of woody draw conditions by increasing opportunities for uninterrupted growth and reproduction of desired woody species. Although beaver and other wildlife would continue to affect woody draw conditions, livestock grazing is the dominant influence on the landscape and results in the greatest source of disturbance. The predominance of invasive grass layers in the understory of most At Risk woody draws has the potential to impede the regeneration of woody species and slow the rate of structural development (Lesica 2009, Uresk and Boldt 1986). The removal of livestock disturbances would facilitate the accumulation of plant litter that would provide feedback for additional invasive grass expansion with the potential to further impede woody species regeneration.

Herbaceous Structure — There would be increased opportunity for the development of High and Moderate structure, and a decrease in the amount of Low structure.

Seral Stages — Potential shifts towards late seral stages would occur with the removal of livestock grazing disturbances that would allow increased development of the herbaceous community. Plant diversity would decrease with later seral stages, particularly among forbs. However, increasing litter with the removal of livestock grazing would facilitate the increase of bluegrass and smooth brome and the gradual transition to Invaded Grass States that would impede the development or maintenance of native plant communities in large portions of the allotment. Crested wheatgrass might persist for longer periods but would gradually be replaced by more aggressive bluegrass and smooth brome.

Sharp-tailed Grouse — The increase in High structure would benefit nesting and brooding habitat for sharp-tailed grouse. However, over time the decrease in forb diversity would decrease foraging opportunities.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by an inventory grazing association permit, and Authorized Use is 489 federal AMs.

- Cow/calf pairs and yearlings are in two different herds in a nine-pasture, complementary modified deferred rotation which includes pastures from Allotment 128.
- See allotment map in Appendix B for current range developments.

Range — Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weed control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian — The riparian condition along Whitetail Creek and the unnamed springs as described in the existing condition would continue.

Woody Draws — A high proportion of At Risk woody draws would persist under current management, under which present conditions developed. Although Healthy woody draws are present on steep slope positions and occurrences of trees establishing on open slopes are present, woody draws along the main drainages exhibit a lack of desired tree and shrub regeneration. Developed water sources and mineral stations within, or adjacent to, woody draws contribute to high livestock disturbances among some sites. Multiple grazing rotations within individual pastures during the year contribute to the frequency of woody draw disturbance and impede woody regeneration. Extended green periods of the herbaceous vegetation and browse species within woody draws can contribute to livestock disturbances during mid and late summer when palatability of crested wheatgrass and bluegrass decreases in the uplands. Winter use and hay feeding with high livestock concentrations within or near woody draws would continue to contribute to high levels of trampling disturbance when livestock seek thermal shelter. Hay feeding contributes to invasive grasses that can impair seedling establishment of woody species, and high manure inputs around hay feeding areas may assist the establishment of invasive grasses as a result of increased nutrients (Figure 126.2).

Figure 126.2 – Woody draw observed during early spring in pasture 5 near hay feeding area. High winter use of the woody draw is evidenced by accumulated manure along the roadside and within the draw.

Herbaceous Structure — Current management would continue to perpetuate the herbaceous structure distribution with a limited proportion of High herbaceous structure. Potential management

factors include unaccounted winter use and timing of grazing as influential factors on composition and regrowth.

Seral Stages — Levels of Authorized Use that are 30 percent less than initial estimated carrying capacity after adjusting for cow size suggest the potential occurrence and maintenance of high condition native plant communities. However, collected field data and observations indicate a predominance of mid seral stages, frequent invasive grass occurrences, and some transitions to Invaded Grass States. Evidence of increasing invasive grasses is provided by vegetation maps from 1983 that do not indicate the occurrence of these species in pastures or portions thereof where they are now frequent or dominant, and invasive grasses have a high potential to continue increasing.

Although Authorized Use is 30 percent less than initial estimated carrying capacity, winter use is not counted towards the amount of Authorized Use and would decrease the difference between total use and initial estimated carrying capacity as a result of grazing during periods of low snow cover (Figure 126.3). Additionally, carrying capacity has not been adjusted for long distances to water or rough topography (Holechek 1994, NRCS 1997).

Figure 126.3 – Hay feeding in pasture 5/6 when livestock are free to graze open rangeland.

Figure 126.4 — Crested wheatgrass and sweet clover seed/flower heads that comprise hay in pasture 4.

Hay feeding assists the spread of invasive grasses in portions of several pastures by directly introducing seed of these species (Figure 126.4) and decreasing the vigor of native grasses through heavy trampling and premature grazing (Manske 2001, Manske and Sedivec 1999). As recorded in Annual Operating Instructions/Allotment Worksheets (AOIs/AWs), premature early spring grazing frequently occurs in pastures that should have been treated as native grass pastures with later turn-in dates because of the small proportions of broken land or crested wheatgrass. Early season grazing may now be appropriate for portions of these pastures with high invasive grass components, but the intermixed nature of native and invasive grasses increases the potential for continued premature use of the native component. In other words, the invasive grass component is not sufficiently extensive to direct grazing management in several pastures. Additionally, early

season use of one pasture that facilitates the use of invasive grasses allows palatability of these species to decrease in other pastures that contribute to selective use of the native component during later season grazing. Increased grazing disturbances and additional grazing rotations that occur in native pastures prematurely grazed compound the effect of reduced plant vigor and increase the susceptibility to spreading invasive grasses.

Sharp-tailed Grouse — Due to the minimal potential for an increase in High herbaceous structure under current livestock management, existing nesting and brooding habitat would be maintained but enhancement would not be expected.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 489 federal AMs.
- Developing a new water source in pasture 5 to pull livestock away from woody draws and riparian areas.
- Installing a temporary electric fence between pasture 5 and 6.
- Extending the range water pipeline from Allotment 128 pasture 2 into Allotment 126 pasture 4.
- Fencing the spring development in pasture 4.
- Combining Allotments 126 and 128 and continuing a complementary modified deferred rotation grazing system.
- When pasture 5 is used as an early pasture, placing salt and supplement to maximize use of crested wheatgrass areas.

ADAPTIVE OPTIONS:

- Fencing high-value woody draws.
- Fencing spring development in pasture 6.
- Adjusting Authorized Use.
- Installing temporary electric fence in pasture 5 to segregate crested wheatgrass areas from native grass areas.
- Utilizing fire to reduce excessive litter, regenerate decadent “wolfy” crested wheatgrass areas throughout allotment.
- Utilizing rest, fencing, or change in season of use if riparian falls below PFC.
- Developing new water sources to pull livestock away from riparian areas.

Range

Initial Actions — Because the initial Authorized Use will remain the same as current management, the permittee will be allowed to harvest the same amount of forage. The use of federal AMs in this allotment would be different than the existing condition because of the implementation of a complementary, modified deferred rotation grazing where crested wheatgrass pastures will be identified, and combining this allotment with Allotment 128. Deferring turnout until June 1st on native pastures, with the exception of inventory permits where early turnout would be allowed 1 out

of 3 years, would not have an effect on this allotment due to the availability of crested wheatgrass pastures for the complementary, modified deferred rotation system.

The development of a new water source in pasture 5 would pull livestock away from woody draws and riparian areas because the spring development in pasture 6 would not be the primary water source. Overall, livestock distribution would not change because of the topography and size of pastures 5 and 6. In drought years, livestock would be more attracted to the woody draws and riparian areas because of the quality of forage due to available soil moisture within these areas compared to senesced upland herbaceous plant communities.

The installation of a temporary electric fence between pastures 5 and 6 would concentrate livestock more in a general area of each pasture and would focus grazing pressure on the crested wheatgrass stands. Livestock management would be more intense than the existing management, requiring more time from both the permittee and Forest Service in assuring that over-utilization of native herbaceous species doesn't occur within the smaller pastures. An analysis of the AMs available would be used as a starting point in each pasture to develop a rotation that takes into consideration the smaller size of each pasture and the differences in topography and herbaceous plant communities. There would be an initial cost of the cross-fence installation.

Extending a range water pipeline from Allotment 128 pasture 2 into Allotment 126 pasture 4 to replace the existing spring development in pasture 4 (spring would be fenced out) would not have any effects on livestock distribution within this pasture due to the size of pasture 4. Livestock would still have access to, and would trail through, the woody draw and spring area to access the eastern side of this pasture.

By combining Allotments 126 and 128 and implementing a complementary, modified deferred rotation (two to three herds), the forage harvested by livestock would occur during different periods of the grazing season and the duration of grazing would be different from the existing condition. Native herbaceous plant communities along with crested wheatgrass pastures would have a recovery period during the growing season and during critical growing periods of the season. Individual pastures containing at least 70 percent crested wheatgrass would be treated as earlier season pastures and grazed during the month of May. This would defer turnout onto native pastures until June 1st.

Placing salt and supplement within the crested wheatgrass stands in pasture 5 would aid in minimizing the use of the native communities because the supplements would act as an attractant in these areas. Livestock would still utilize native herbaceous species within the crested wheatgrass stands.

Adaptive Options — Fencing high-value woody draws would have little to no change in livestock distribution across the allotment if the exclosure is kept to a small acreage. Depending on the size of the exclosure, increased livestock grazing pressure may occur on the remaining forage and change the distribution of livestock. There would be a cost to install these fences and an additional maintenance cost to prevent livestock access to the woody draws.

Fencing of the spring development in pasture 6 would have a minimal effect on livestock distribution because of the topography and size of the pasture. There would be a change in

utilization levels in the area of the spring development because it would no longer be the primary source of livestock water. However, livestock would still have access to, and would trail through, the woody draw because there is nothing in place to detour its use.

Adjusting Authorized Use downward would result in fewer livestock numbers because of the inventory permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock. The amount of forage harvested would be less than the existing rate.

Installing a temporary electric fence in pasture 5 to segregate the crested wheatgrass from the native grasses would provide additional deferment to the native grasses. Livestock use would be concentrated within the crested wheatgrass areas, and additional management would be required to prevent overutilization in these areas.

Utilizing fire to reduce excessive litter to regenerate decadent "wolfy" crested wheatgrass areas throughout the allotment would initially result in a loss of AMs available if fenced out and allowed to rest for a year. The timing of the burn and climatic conditions will determine if burned areas require a rest, or if the area could be used in the fall, resulting in no loss in AMs for the grazing season. Distribution of livestock would change because livestock would be attracted to the burn area because of the palatability of crested wheatgrass and other native and tame herbaceous species regrowth.

Utilizing rest would result in a loss of AMs available in that pasture. Fencing areas of Whitetail Creek would have little to no change in livestock distribution across the allotment because of the size and topography of the pasture. A larger sized exclosure could increase livestock grazing pressure on the remaining available forage. There would be a cost for installing and maintaining the fences to prevent livestock access to Whitetail Creek.

A change in season of use would not have an effect on AMs available, but would have an effect on the distribution of livestock since livestock favor different herbaceous species at different times of the grazing season.

Developing new water sources to pull livestock away from riparian areas would have an effect on livestock distribution depending on the size of the particular pasture and the topography in the area.

Riparian

Initial Actions — Adding a water source in pasture 5 would pull livestock away from the riparian corridor along Whitetail Creek. Although desired conditions are being met, a reduction in livestock use would further benefit riparian condition by minimizing bank trailing, trampling, and loafing in the riparian area, allowing for herbaceous and woody riparian vegetation maintenance.

Installing a temporary electric fence between pastures 5 and 6 would have no effect on riparian condition along Whitetail Creek because livestock use on the creek would not increase.

Extending a range water pipeline from Allotment 128 pasture 2 into Allotment 126 pasture 4 to replace the existing spring development in pasture 4 (spring would be fenced out) would not have any effect on riparian condition along Whitetail Creek due to being located in a different pasture.

Fencing the spring development in pasture 4 at the source would have no effect on the spring riparian habitat because the habitat has been lost historically from dewatering. Fencing the small riparian habitat area at the tank overflow would protect the habitat from livestock use and trampling.

Combining Allotments 126 and 128 and implementing a complementary, modified deferred rotation would not have an effect on desired riparian conditions along Whitetail Creek, Reach 5. The rotation would not result in any additional livestock use or occupation on the riparian corridor.

Placing salt and supplement within the crested wheatgrass stands in pasture 5 would aid in minimizing the use on the native communities. There would be no effect on riparian condition along Whitetail Creek.

Adaptive Options — Fencing high-value woody draws should have no effect on riparian conditions along Whitetail Creek because there would be no expected change in livestock distribution and the distance of separation.

Fencing the spring development in pasture 6 at the source would have no effect on spring riparian habitat since there is none due to dewatering.

Reducing Authorized Use should help improve the upland vegetation, which in turn reduces overland flow further benefitting the riparian conditions along Whitetail Creek. A reduction in overland flow delivered to the creek would result in reduced stream velocities, allowing for the establishment of riparian vegetation and building stream banks.

Utilizing fire to reduce excessive litter to regenerate decadent “wolfy” crested wheatgrass areas throughout the allotment would have no effect on riparian condition along Whitetail Creek because livestock use on the creek would not increase.

The new water sources developed in pasture 6 to pull livestock away from the riparian corridor would benefit riparian conditions by minimizing bank sloughing, trailing, trampling, and loafing, allowing for herbaceous and woody riparian vegetation recovery.

Woody Draws

Initial Actions — Constructing a new pipeline-supplied water source in the uplands of pasture 4 would minimally improve At Risk woody draws adjacent to a developed spring because the small size (348 acres) and narrow linear shape of the pasture would result in close proximity of the draws to any potential tank location. Although the existing spring-fed water tank would be fenced to control livestock access, amenities provided by the woody draws within a short distance of the new tank location would continue to attract livestock and impair the regeneration of woody species as a result of browsing and trampling disturbances. The existing water tank and overflow area that would be fenced would minimally enhance the maintenance or improvement of wetland habitat due to the predominance of smooth brome in the surrounding area.

Developing a new water source and tank in pasture 5 would facilitate increased woody draw conditions upstream of a developed spring on the eastern edge of pasture 6. The spring would remain unfenced, and varying levels of uncontrolled livestock use would continue along the adjacent drainage, woody draw, and wetland habitat, but the frequency of browsing and trampling

disturbances would decrease with a more centrally located water tank situated in upland grass communities. Increasing woody draw conditions upstream of the spring could be countered by increased browsing and trampling disturbances in other woody draws, depending on the location of the new tank.

Constructing a temporary electric fence between pastures 5 and 6, which are currently grazed as one pasture, would assist improvement of the woody draw/spring habitat in pasture 6 by decreasing the length of time, or in the case of multiple herds, the number of livestock that would have access to the draw. The potential degree of woody draw improvement would decrease if livestock in pasture 6 do not have access to the water tank proposed in pasture 5, but the tank could be situated on the fenceline to provide access from both pastures. There would be some potential for woody draws in both pastures to experience increased levels of livestock disturbance due to the smaller pasture size and increased livestock density relative to the combined pastures and depending on management of multiple livestock herds. As much as one-third of pastures 5 and 6 that are dominated by crested wheatgrass with low palatability after mid to late June would contribute to increased woody draw disturbances when livestock seek extended green periods or shade during mid and late summer grazing rotations.

Placing salt and supplement within stands of crested wheatgrass when pastures 5 and 6 are used as early season pastures would concentrate livestock disturbances within these areas and outside of woody draws, thus decreasing browsing and trampling disturbances.

Benefits to woody draws as a result of combining Allotments 126 and 128 are not apparent because two to three separate livestock herds would be maintained and grazing systems would not be appreciably different than current systems. Multiple grazing periods would continue in some pastures and would maintain current woody draw disturbances that impede the regeneration of desirable species. Winter use/hay feeding with adverse affects associated with the spread of invasive grasses, and use of woody draws for thermal cover, would continue to impact the condition of some sites. Continuation of current levels of use would maintain the frequency, intensity, and seasons of disturbance within woody draws that have resulted in a high proportion of At Risk sites.

Adaptive Options — Fencing woody draws or decreasing Authorized Use would increase the potential for successful regeneration of woody species by removing or decreasing livestock browsing and trampling disturbances. Exclusion of livestock disturbances through fencing would provide the fastest and greatest degree of woody draw improvement, but regeneration of woody species could be impaired by existing and potential increases of invasive grasses in many woody draws.

The effectiveness of fencing the developed spring in pasture 6 to decrease browsing and trampling disturbances within the adjacent woody draw would be low as a result of high overflow from the spring, several beaver ponds, and other springs along the drainage where livestock would have continued water access (Figure 126.5). Fencing a larger portion of the upper drainage above the spring would be more effective at removing livestock disturbances and improving woody draw and wetland conditions along a segment of the drainage, while allowing continued livestock access to the spring that has a low potential for improved ecologic conditions due to the predominance of smooth brome and other weeds.

Figure 126.5 – One of several beaver ponds upstream of developed spring in pasture 6.

Temporarily fencing the stand of crested wheatgrass in pasture 5 would assist only slight improvement of woody draw conditions outside the fence because crested wheatgrass is palatable during the frequently implemented early season grazing of this pasture, when there is a decreased incentive for livestock to seek shade or extended green periods of herbaceous vegetation within woody draws.

Implementing prescribed burns to reduce plant litter and invigorate crested wheatgrass, as well as other herbaceous communities, could temporarily assist woody draw improvement by drawing livestock to fresh herbaceous growth in the uplands and decreasing the degree of disturbance within woody draws.

Developing additional water sources in the uplands to pull livestock away from riparian areas along Whitetail Creek could facilitate increased woody draw conditions adjacent to the creek by decreasing browsing and trampling disturbances. However, woody draws would continue to be sought for shade, escape from insect pests, and extended green periods, particularly if pasture 6 is used during summer rotations.

Utilizing rest, fencing, or a change in the season of use to improve riparian conditions would contribute to decreased browsing and trampling disturbances and an increased potential for the maintenance or improvement of adjacent woody draws.

Herbaceous Structure

Initial Actions — Initial Actions would not improve the potential of Allotment 126 to increase the proportion of High herbaceous structure within a 10 to 15 year timeframe. Authorized Use would remain at 489 AMs (562 AUMs), which is below the initial estimated carrying capacity by approximately 42 percent after accounting for cow size (798 AUMs). Proposed actions occurring within pastures 5 and 6 include developing a new water source in pasture 5 to draw livestock more to the uplands, utilizing a temporary fence in pasture 5 and 6 to separate crested wheatgrass areas, and utilizing mineral placement as an attractant in crested wheatgrass sites. Additionally, it is assumed that the crested portion could become a part of the early rotation within the proposed

rotation strategy. The proposed actions focus on utilizing the uplands more efficiently, which would tend to homogenize herbaceous structure within these pastures. The exception could be when there is early use (May) of these pastures, when there could be sufficient regrowth time to recover some residual cover by the fall. The proposed actions for pasture 4 include developing a new water source and fencing the spring development. It will be assumed that the new water tank would be placed in the uplands, perhaps along the western area of this pasture. The effects to structure from the tank would be relative to the location of the new tank and the management of the spring development, which is not discussed. The farther the new tank is away from the spring, the more changes there could be to herbaceous structure, but that change could be a shift in the spatial arrangement of the structure. However, if the spring development is managed as a water source, then a higher degree of homogenization would be expected.

Combining Allotments 126 and 128 and implementing a complementary modified deferred rotation with two to three herds could provide some recovery in the early grazed crested wheatgrass pasture(s). However, given that two to three herds would be rotating through the pastures, it is projected that there may not be a sufficient amount of growing season for recovery for most of the pastures to appreciably alter the existing herbaceous structure distribution within the allotments.

Adaptive Options — Fencing specific woody draws could have negative effects relative to the size and location of the exclosure but is not expected to be appreciable due to the relative small amount of woody draw habitat projected to be fenced. Fencing the spring development in pasture 6 in combination with the new water in pasture 5 could permit water management scenarios but those are not outlined. It is assumed that fencing the spring would result in increased use of the uplands and a reduction in residual cover in the upland setting. Installing a temporary fence to segregate the crested wheatgrass in pasture 5 could provide residual cover in the fall if the fenced crested wheatgrass is grazed early and allowed to regrow. However, if the temporary fence is let down and the crested wheatgrass area is allowed to be utilized, then there would be less residual cover in the fall. Utilizing fire in crested wheatgrass areas throughout the allotment would directly reduce the potential cover for at least one year. Follow up management would dictate positive or negative effects to herbaceous structure. Resting for an entire grazing season would provide the best option for improving herbaceous structure in the treated stands. Grazing the stand in the same calendar year would have negative effects for herbaceous structure. Adjusting the Authorized Use downward would have the most potential to increase the amount of standing crop, i.e. higher structure, and improve the herbaceous structure distribution in general.

Adaptive actions to improve riparian areas such as rest, fencing, or changing season of use could have various effects depending on the tool selected and how it is specifically implemented. Developing new water to draw livestock out of sensitive riparian areas, however, would likely result in further homogenization of the uplands.

Seral Stages

Initial Actions — Developing two new water sources in pastures 4 and 5 would result in a shift towards early seral stages in the surrounding area as a result of increased livestock grazing and trampling disturbances. Both of the potential tank sites could be placed in areas with dominant or high amounts of invasive grasses in order to concentrate high trampling disturbances away from

native dominated communities. Placing salt and supplement within the stand of crested wheatgrass when pastures 5 and/or 6 are used as early season pastures would provide similar benefits. The potential for livestock to spread invasive grass seed from the tank or mineral sites to other portions of the pasture would probably be only slightly greater than the current potential. Disturbances resulting from the construction of water well sites or pipelines through native grass communities would have a high potential to contribute to the spread of invasive grasses.

Combining Allotments 126 and 128 and implementing a complimentary modified deferred rotation with two to three separate livestock herds and 12-month inventory permits would not be appreciably different than current management and would be unlikely to increase the development of late seral stages or halt the spread of invasive grasses. Premature use of native dominated pastures in Allotment 128 could be alleviated by concentrating early-season use to pastures or portions thereof in Allotment 126 that contain high amounts of invasive grasses. However, less than half of pastures 5 and 6 are dominated by stands of crested wheatgrass. Pasture 10 primarily consists of crested wheatgrass, and other invasive grasses comprise only 160 acres. Pastures 5 and 6 are normally used during winter hay feeding periods and the acreage of crested wheatgrass in these pastures, as well as pasture 10, are likely to be insufficient for early season grazing with as many as three livestock herds. Winter use of other pastures to defer use of pastures 5, 6, and 10 for early season grazing would increase adverse effects of hay feeding and premature grazing to the other pastures. Additional pasture rotations and later season use of other pastures in Allotment 126 would complicate or impede the effective utilization of invasive grasses in these pastures and contribute to excessive utilization of the native component that assists the spread of invasive grasses.

Constructing a temporary electric fence between pastures 5 and 6 would assist the management of multiple livestock herds but could have adverse effects on plant composition in pasture 6, or at least complicate the complimentary modified deferred rotation. A stand of crested wheatgrass/invasive grasses straddles the south boundary of these two pastures, and after splitting the pastures, the invasive grass dominated portion of pasture 6 would comprise only 15 percent of the pasture. A degree of increased use at the north end of pasture 6 could increase the utilization of invasive grasses that are mixed among the native community, or at least impede the accumulation of litter that may be assisting the spread of invasive grasses in this area. However, use of pasture 6 after fencing to separate it from pasture 5 would increase the potential for premature grazing of the native component that would assist the spread of invasive grasses. Conversely, early season grazing in pasture 5 should naturally concentrate on the high palatability of crested wheatgrass that would comprise a larger portion of the pasture compared to pasture 6. Later season grazing in these pastures would shift to native grasses in secondary range. Overall, the decreased pasture sizes would contribute to increased evenness of livestock grazing, with a resulting decrease of secondary range and a mosaic of grazing pressure and seral stages.

Fencing the spring development in pasture 4 would have minimal effect on plant composition and seral stages due to the small size of the exclosure and the predominance of smooth brome in the surrounding area.

Adaptive Options — Installing temporary electric fence around the stand of crested wheatgrass that comprises about 39 percent of pasture 5 would increase utilization of this forage component

and alleviate potential premature use of the native component. However, early season grazing of this pasture should result in most utilization occurring within crested wheatgrass due to high palatability, close proximity to the proposed water tank, and gentle terrain, potentially decreasing the need for a fence. Native grasses in the northwestern portion of the pasture are unlikely to be sought during early season grazing due to rugged terrain and long distances to water. Additionally, a significant portion of native dominated communities in pasture 5 consist of little bluestem that tends to experience relatively low levels of utilization, particularly during the early season before growth of this warm-season species has been initiated. Selective grazing of native grass communities in the northwestern corner of the pasture would be expected during mid and late season grazing, when palatability of crested wheatgrass decreases. Continued utilization of crested wheatgrass could be maintained within the fence during this period, thus facilitating seral development of native communities in the northwest. However, this could begin to effect plant vigor and production of crested wheatgrass that would be needed for early season grazing.

Prescribed burning to regenerate crested wheatgrass vigor and palatability could result in increased use of this forage component if grazing periods are appropriately synchronized with peak palatability of the species, with benefits to native communities resulting from decreased grazing disturbances. However, grazing seasons appropriately timed to the palatability of crested wheatgrass should negate the need for burning to regenerate crested wheatgrass. Prescribed burns of relatively small occurrences of crested wheatgrass in other pastures is unlikely to result in increased use of the species as a result of low palatability during grazing periods that should be coordinated with more extensive native grass communities. Maintaining the decadence or low vigor of crested wheatgrass in areas where it cannot be efficiently utilized for logistical reasons might provide greater benefits to native grasses by increasing their competitive ability relative to crested wheatgrass.

Burning within crested wheatgrass as well as other communities would assist in decreasing areas of excessive litter and slowing the spread of invasive bluegrass. However, invasive bluegrass can benefit from the same positive effects of burning as other grasses, and infrequent prescribed burning, or burning that is not conducted at sufficient intensity or synchronized with vulnerable growth periods of bluegrass have resulted in its increase (Dix 2010, Smith 2010). Fire can also assist the spread of noxious weeds. Monitoring would be conducted to assess the effects of burning on plant composition to direct future management decisions.

Reducing Authorized Use would facilitate the maintenance of native plant communities and a shift towards late seral stages by decreasing the level of grazing and trampling disturbances. However, decreased levels of use could facilitate increased litter accumulation, which would assist the expansion of bluegrass and smooth brome in portions of some pastures. Neither increases nor decreases in Authorized Use would halt invasive grass expansion without coordinating the grazing season with the palatability and proportion of the invasive and native grass components.

Developing additional water sources to decrease use within riparian areas would result in concentrated grazing and trampling disturbances around the new water site, with shifts towards early seral stages and potential increases of invasive grasses.

Resting pasture 6 to improve riparian conditions would facilitate shifts towards late seral stages in the upland herbaceous communities, but resulting increases in litter at the north end of the pasture would facilitate invasive grass expansion. Fencing the riparian corridor or changing the season of use to decrease livestock disturbances along Whitetail Creek would result in increased disturbances within upland communities, with potential shifts towards early seral stages. However, increased use of the uplands could facilitate decreased litter accumulation, which appears to be assisting the spread of invasive grasses at the north end of the pasture. Fencing woody draws or spring developments would not have an appreciable effect on seral stages outside the exclosures due to their limited size and the current predominance of invasive grasses within the area that would be fenced.

Sharp-tailed Grouse

Initial Actions — Initial Actions would not improve the potential of Allotment 126 to increase the proportion of High herbaceous structure within a 10 to15 year timeframe. Authorized Use would remain at 489 AMs (562 AUMs), which is below the initial estimated carrying capacity by approximately 42 percent after accounting for cow size (798 AUMs), but several issues are still evident from this level. Proposed initial actions occurring within pastures 5 and 6 include developing a new water source in pasture 5 to draw livestock more to the uplands, utilizing a temporary fence in pasture 5 and 6 to separate crested wheatgrass areas, and utilizing mineral placement as an attractant in crested wheatgrass sites. Additionally, it is assumed that the crested portion could become a part of the early rotation within the proposed rotation strategy. The proposed actions focus on utilizing the uplands more efficiently, which would trend to less residual cover within these pastures. The exception could be when there is early use (May) of these pastures, when there could be sufficient regrowth time to recover some residual cover by the fall, which may improve grouse nesting habitat the following spring. The proposed actions for pasture 4 include developing a new water source and fencing the spring development. It will be assumed that the new water tank would be placed in the uplands, perhaps along the western area of this pasture. The effects to grouse habitat from the new tank would be relative to the location of the new tank and the management of the existing spring development, but this is not discussed. The farther the new tank is away from the spring the more changes there could be to grouse habitat, but that change could just be a shift in the spatial arrangement of the structure. However, if the spring development is managed as a water source as well, then a higher degree of homogenization of grouse habitat would be expected.

Combining Allotments 126 and 128 and implementing a complementary modified deferred rotation with two to three herds could provide some recovery of potential grouse habitat in the early grazed crested wheatgrass pasture(s). However, given that two to three herds would be rotating through the pastures, it is projected that there may not be a sufficient amount of growing season for recovery for most of the pastures, outside the early pasture(s), to appreciably alter the existing grouse nesting conditions within the allotments.

Adaptive Options — Fencing specific woody draws could have negative effects to grouse nesting habitat relative to the size and location of the exclosure but is not expected to be appreciable due to the relative small amount of woody draw habitat projected to be fenced. Fencing the spring

development in pasture 6 in combination with the new water in pasture 5 from the initial action could permit water management scenarios, but those are not outlined. It is assumed that fencing the spring to aid riparian issues would result in increased use of the uplands and a reduction in potential grouse nesting cover in the upland setting. Installing a temporary fence to segregate the crested wheatgrass in pasture 5 could provide residual cover in the fall if the fenced crested wheatgrass is grazed early and allowed to regrow via retaining the fence. This could retain potential grouse nesting habitat the following spring. However, if the temporary fence is let down and the crested wheatgrass area is allowed to be utilized, then there would be less residual cover in the fall and the following spring. Utilizing fire in crested wheatgrass areas throughout the allotment would directly reduce the potential grouse nesting cover for at least 1 year. Follow-up management would dictate positive or negative effects to grouse nesting habitat. Resting the treated areas for an entire grazing season would provide the best option to enhance grouse nesting habitat in the spring. Grazing the stand in the same calendar year would have direct negative effects for spring nesting needs. Adjusting the Authorized Use downward would have the most potential to increase the amount of standing crop (i.e., higher structure) and enhance grouse nesting habitat.

Adaptive actions to improve riparian areas such as rest, fencing, or changing season of use could have various effects depending on the tool selected and how it is specifically implemented. Developing new water to draw livestock out of sensitive riparian areas, however, would likely result in further homogenization of upland grouse habitat.

Effects of Alternative 3A

After meeting with the individual permittee and modifying Alternative 3, the effects of Alternative 3A are the same as Alternative 3 with the following stated exceptions.

INITIAL ACTIONS:

- Drop the initial action of fencing the spring development in pasture 4, and make it available as a range development.

ADAPTIVE OPTIONS:

- Drop the adaptive option of fencing the spring development in pasture 6, and keep it available as a range development.

Range

Initial Actions — The effect of this alternative would be that two range water sources would be available for livestock in this pasture, but due to the size of the pasture and its topography livestock distribution would not likely change.

Adaptive Options — Keeping the spring development in pasture 6 along with development of a new water source in pasture 5 would provide for two developed livestock water sources besides Whitetail Creek when the temporary electric fence is not functioning between the two pastures. Livestock distribution would likely be more evenly dispersed throughout the two pastures, but the

livestock distribution pattern would not change greatly due to the size and topography of the pasture.

Riparian

Initial Actions — The effects of Alternative 3A are the same as Alternative 3 with the following exception: fencing the spring development in pasture 4 would not occur. There is no spring riparian habitat to fence at the source. The small riparian habitat at the tank overflow would continue to be accessed by livestock. Livestock use and trampling at the overflow riparian habitat would continue.

Adaptive Options — The effects of Alternative 3A are the same as Alternative 3 with the following exception: fencing the spring development in pasture 6 would not occur. There is no spring riparian habitat at the source to fence due to dewatering.

Woody Draws

Initial Actions — Not fencing the area of the spring collection box, water tank, and a short segment of overflow in pasture 4 would remove opportunities for controlling livestock access to the water source and decrease the potential degree of reduced browsing and trampling disturbances within woody draws that surround the spring. However, livestock would continue using the spring site with amenities provided by the draws whether the spring is fenced or not. Additionally and as discussed under Alternative 3, the proposed water tank in the uplands of pasture 4 is likely to be of limited effectiveness in reducing livestock disturbances to woody draws around the spring due to the shape and small size of the pasture in relation to woody draw occurrences.

Herbaceous Structure

Effects of the proposed actions are the same as Alternative 3.

Seral Stages

Initial Actions — Not fencing the spring site would not have an appreciable effect on seral stages because the area surrounding the spring is and would continue to be dominated by smooth brome and the distribution of livestock in the pasture would not change regardless of fencing or not fencing the spring.

Sharp-tailed Grouse

Effects of the proposed actions are the same as Alternative 3.

Effects of Alternative 4

The effects of the initial actions in Alternative 4 are the same as Alternative 3 with the exception of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.
- Combining Allotments 126 and 128 and implementing a seven-pasture rest/deferred rotation grazing system.
- Treating pastures 5, 10, and the south part of 6 as crested wheatgrass pastures. Generally, graze these pastures within the time frame of April 20th to June 15th.

- Installing a temporary electric fence in pasture 5 to segregate crested wheatgrass areas from native grass areas.

ADAPTIVE OPTIONS:

- Utilizing fire to stimulate regeneration in woody draws.
- Maintaining the spring development in pasture 6, ensuring overflow is functional and operating properly.

Range

Initial Actions — Authorized Use for this allotment would be 798 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 489 federal AMs converted to AUMs by adjusting for cow size is 562 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 42 percent increase from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the cow size when calculating the number of head and the grazing season that can be grazed when planning the rotation for the allotment.

Implementing a seven-pasture rest/deferred rotation would result in the forage being harvested by livestock during different periods of the grazing season from year to year. With only one herd running through the rotation system, the duration of grazing would be different from the existing condition. Native herbaceous plant communities along with crested wheatgrass pastures would have an opportunity for a recovery period during the growing season and during critical growing periods.

Treating pastures 5, 10, and the southern part of pasture 6 as crested wheatgrass pastures and generally grazing them April 20th through June 15th would provide for deferment of the native pastures. This would allow them to reach range readiness before being grazed. Due to the size and topography of pastures 5, 10, and the southern side of pasture 6, livestock distribution would not change. Pastures 5, 10, and the southern part of pasture 6 do have native herbaceous species intermixed within the crested wheatgrass and introduced herbaceous stands, which, if grazed at the end of April through May, would have a negative effect on the native herbaceous species due to the potential of grazing before typical range readiness.

Installing a temporary electric fence in pasture 5 to segregate crested wheatgrass areas from native grass areas would have a positive effect on the existing native plant communities by deferring livestock use on native grasses until the proper stage of growth is reached. This should have a positive effect on the crested wheatgrass stands as well, since livestock use would be focused when the stands are range ready, and would promote thick, dense stands of crested wheatgrass. Livestock distribution would be more even throughout the pastures due to confining livestock to a smaller area. Livestock would be forced to utilize areas that typically have received light grazing pressure, which may result in a moderate to heavy grazing pressure. There would be an initial cost of the installation of the cross fence.

Adaptive Options — Utilizing fire to stimulate regeneration in woody draws would attract livestock to the areas burned due to the quality of the forage after regrowth. Livestock grazing would have to be deferred or rested for a grazing season. If rest is selected, the area burned would

have to be fenced out. The cost of installing the fence, maintenance of the fence, and its removal would all be an additional effect of the proposed option. Depending on the size of the burn and the climatic conditions at the time, the area could be rested for as long as 2 years, and an additional reduction in federal AUMS would be needed. There would be an increase in costs to the existing noxious weed program on the Medora Ranger District because of the nature of noxious weeds establishing in disturbed areas.

Maintaining the spring development in pasture 6 and ensuring that the overflow is functional would not have any effect on livestock distribution because they would still have access to the existing water development.

Riparian

Initial Actions — Treating pastures 5, 10 and the southern part of 6 as crested wheatgrass pastures would have no effect on riparian condition along Whitetail Creek because livestock use would not increase.

Adaptive Options — The effects would be the same as described in Alternative 3.

Woody Draws

Initial Actions — Combining Allotments 126 and 128 and implementing a seven-pasture complimentary rest/deferred rotation with a single livestock herd would adversely affect woody draw conditions in Allotment 126. Although Authorized Use for the combined allotments would be reduced 20 percent according to initial estimated carrying capacity and adjustments for cow size, Authorized Use in Allotment 126 would increase by 42 percent. Thus, woody draw disturbances would increase despite decreased periods of pasture use resulting from the single herd once-over rotation. Additionally, livestock density and the evenness of grazing disturbances within each pasture would increase as a result of the combined livestock herds that would further contribute to increased woody draw disturbances.

Woody draws in pastures 5 and 6 would experience relatively low levels of disturbance during the early grazing season grazing period with cooler temperatures, fewer insect pests, and palatable invasive grasses in the uplands. However, later season grazing targeted to native forage components at the north end of these pastures would maintain or increase woody draw disturbances as a result of increased livestock density with the combined herd. Only one woody draw is present in pasture 10 (160 acres), so relatively high levels of livestock disturbances and At Risk conditions would persist or the conditions of the woody draw could deteriorate.

The rest/deferred once-over rotation with five summer pastures plus the north ends of pastures 5 and 6 would result in greater differences in the season of individual pasture use than presently occurs with the multiple pasture rotations, so varying levels of annual woody draw disturbances would occur, depending on conditions of the upland herbaceous vegetation and climatic variables. The potential would exist for a year of relatively high woody draw disturbances in a given pasture to be followed by 1or more years of lower disturbance, when woody species would have the opportunity for recovery and regeneration. However, slow recovery of woody species from browsing disturbances would decrease this potential. Woody draw conditions in Allotment 126 pasture 4 and

Allotment 128 pasture 4 would have the potential to decrease as a result of more consistent use and increased disturbances compared to inconsistent use reported in recent AOIs/AWs.

Installing temporary electric fence in pasture 5 to segregate the area of crested wheatgrass from native grasses is unlikely to have an appreciable effect on woody draw conditions because crested wheatgrass is palatable during the proposed early season use of this pasture. Thus, there would be a decreased incentive for livestock to seek shade or extended green periods of herbaceous vegetation within woody draws. Later summer use of the north end of the pasture, as well as pasture 6, would have the potential to increase woody draw disturbances as a result of the combined livestock herds and decreased pasture size.

Adaptive Options — Developing an additional water source in pasture 5 would decrease livestock disturbances to the woody draw and adjacent spring in pasture 6, as well as woody draws that border the corridor of Whitetail Creek. Although amenities of the woody draws would continue to attract livestock, the level of disturbances would decrease among these draws due to their location on the eastern side of the pasture and the availability of other woody draws.

Prescribed burning of woody draws may assist improvement of current conditions by promoting regrowth or sprouting of decadent trees and improving seedbed conditions for the germination and survival of woody species. However, fire can also result in complete mortality of individual woody plants, and the predominance of invasive grasses within most woody draws in need of improvement have the potential for vigorous regrowth after burning that may negate short-term improvement of seedbed conditions. Monitoring would therefore be conducted to determine the net result of prescribed burning under different situations.

Fencing woody draws or decreasing Authorized Use would increase the potential for improved conditions by removing or decreasing livestock browsing and trampling disturbances. However, decreases in Authorized Use would have to exceed the 42 percent proposed increase. Exclusion of livestock disturbances through fencing would provide the fastest and greatest degree of woody draw improvement, but regeneration of woody species could be impeded by accumulating plant litter that would facilitate the maintenance or expansion of invasive grasses in many woody draws. Fencing of individual woody draws has the potential to increase disturbances and decrease conditions in adjacent unfenced draws.

Herbaceous Structure

Initial Actions — The initial action of adjusting the Authorized Use to the initial estimated carrying capacity would not enhance the nesting and brooding habitat for sharp-tailed grouse within Allotment 126, though Allotment 128 may benefit from the balancing of the Authorized Use. Allotment 126 would experience a 42 percent increase in Authorized Use (562 AUMs to 798 AUMs) under this proposal. Authorizing a higher level of use would be counterproductive to achieving the herbaceous structure objectives. The early season use of crested wheatgrass (April 20th to June 15th) could result in a potential to increase the proportion of High herbaceous structure in those sites and the herbaceous structure distribution in general. The earlier the grazing period ends on a pasture, the better the potential for regrowth and increase the proportion of High structure grasslands.

The effects of a seven-pasture rest/deferred rotation system, by combining Allotments 126 and 128, would depend on what happens to the AUMs deferred/displaced during the rest period of a particular pasture. In terms of a growing season rest, the rested pasture would potentially increase the proportion of High structure within the rested pasture and the allotment(s). If the deferred AUMs from the rested pasture are displaced to the other pastures, there could be high use in the remaining grazed pastures that would be carrying a larger grazing burden. This could increase the occurrence of Low structure in the grazed pastures and the allotment overall. Under this scenario, the repeated heavy use could eventually impact the ability of a pasture to produce Moderate to High structure over time. Early grazed pastures (typically crested wheatgrass: April 20th to June 15th) could have time to regrow a higher level of herbaceous structure. The other native pastures would generally not have a long enough time to recover to High structure but could achieve Moderate levels. On the other hand, if the AUMs are deferred to other uses and not displaced to increase the grazing pressure on the other pastures, with all grazed pastures only stocked to their appropriate initial estimated carrying capacity level, then there could potentially be a more diverse herbaceous structure distribution across the allotment(s). Installing a temporary fence to segregate the crested wheatgrass in pasture 5 could provide residual cover in the fall if the fenced crested wheatgrass is grazed early and allowed to regrow. However, if the temporary fence is let down and the crested wheatgrass area is allowed to be utilized, then there would be less residual cover in the fall.

Adaptive Options — Using fire to stimulate regeneration within woody draws would depend on the size and location of the treated area, but the effects to herbaceous structure would likely be temporary and would be dependent on follow-up management. The effects of maintaining the spring development in pasture 6 would be relative to the follow-up management. The effects of livestock use would primarily affect riparian and woody draw issues. However, retaining the additional water source could alleviate the negative effects to the uplands from implementation of the new water in pasture 5.

Seral Stages

Initial Actions — The proposed 42 percent increase in Authorized Use for Allotment 126 would result in increased grazing and trampling disturbances that would facilitate shifts towards early seral stages and increased invasive grasses and counter several potentially positive effects of proposed management changes.

Combining Allotments 126 and 128 and implementing a complimentary rest/deferred rotation with a single livestock herd would increase the evenness of livestock distribution and forage utilization as a result of increased livestock density within pastures. Other than the increase in Authorized Use, this would be an improvement over current management that includes multiple pasture rotations and frequent premature grazing of native dominated pastures because grazing periods would be shortened within individual pastures and greater opportunities would be available for plant recovery and the completion of critical growth periods. Consistent early season use of broken land in pastures 5, 6, and 10 would coordinate grazing periods with high invasive grass palatability and alleviate premature use of native grasses in other pastures. However, this would have the potential to be compromised by the 12-month inventory permit and winter hay feeding in unspecified pastures that

is not counted towards Authorized Use and that would continue to result in greater levels of disturbance than indicated by the level of Authorized Use.

Invasive grasses that occur in at least moderate amounts in portions of pastures 1, 2, and 4 that are proposed for summer use would have a high potential to continue increasing and impede the development or maintenance of native plant communities. Palatability of invasive grasses other than smooth brome would be low during summer rotations in these pastures and contribute to selective use of native grasses on a frequent annual basis. The initial estimated carrying capacity and proposed levels of Authorized Use assume all herbaceous forage is equally used, but selective use of the native component will result in its excessive use, thereby decreasing plant vigor, assisting the spread of invasive grasses, and facilitating shifts towards early seral stages or Invaded Grass States.

The effects of installing temporary electric fence around the stand of crested wheatgrass in pasture 5 were discussed under Alternative 3. With the fence in place there would be an additional pasture created in the northwest portion of the pasture for the summer grazing rotation. Increased grazing in this area would be compounded by an increased number of livestock resulting from combining multiple herds, and would have a high potential to facilitate shifts towards early seral stages. Excluding the south end of pasture 6 from the area of crested wheatgrass fencing would exclude livestock access to the spring on the edge of pasture 6 from pasture 5. Water would also be unavailable to livestock in the northwest portion of pasture 5 if it is grazed during the summer grazing rotation.

Adaptive Options — The effects of all Adaptive Options were discussed under Alternative 3.

Sharp-tailed Grouse

Initial Actions — The initial action of adjusting the Authorized Use to the initial estimated carrying capacity would not enhance the nesting and brooding habitat for sharp-tailed grouse within Allotment 126, though Allotment 128 may benefit from the balancing of the Authorized Use. Allotment 126 could experience a 42 percent increase in Authorized Use (562 AUMs to 798 AUMs) under this proposal. If regrowth occurs in the crested wheatgrass pastures after early use (April 20th to June 15th), there could be increased potential to enhance the nesting and brooding habitat for sharp-tailed grouse in these areas except the high Authorized Use could have negative impacts on the crested wheatgrass stands (Angell 1997). The timing of grazing proposed on the early-use crested wheatgrass areas could also disrupt some initial nesting sharp-tailed grouse because of the presence of livestock, but disruption should not be appreciable. If one herd is used in the rotation, there may be potential to enhance the nesting and brooding habitat for sharp-tailed grouse in the early grazed pastures. The earlier the livestock come off a pasture, the better the potential to increase the proportion of High herbaceous structure, which may result in enhancing grouse nesting habitat.

The effects of a seven-pasture rest/deferred rotation system by combining Allotments 126 and 128 would depend on what happens to the AUMs deferred/displaced during the rest period of a particular pasture. In terms of a growing season rest, the rested pasture would potentially increase the proportion of grouse nesting habitat within the rested pasture and the allotment(s). If the deferred AUMs from the rested pasture are displaced to the other pastures, there could be high use

in the remaining grazed pastures that would be carrying a larger grazing burden. This would be especially true under the high Authorized Use for this allotment under this alternative (798 AUMs). This would increase the probability of poor quality grouse nesting habitat in the grazed pastures. Under this scenario, the repeated heavy use could eventually impact the ability of a pasture to produce sufficient levels of grouse nesting habitat over time. Early grazed pastures (typically crested wheatgrass: April 20th to June 15th) could potentially have time to regrow grouse nesting habitat. The other native pastures would generally not have a long enough time to recover to appreciable levels of potential grouse nesting habitat. On the other hand, if the AUMs are deferred to other uses and not displaced to increase the grazing pressure on the other pastures, with all grazed pastures only stocked to their appropriate initial estimated carrying capacity level, then there could potentially be a more diverse herbaceous structure distribution across the allotment(s) as a result since the pastures would be used at different times of the season and different lengths of time. The end result would be a mosaic of structure across the allotment. Installing a temporary fence to segregate the crested wheatgrass in pasture 5 could provide residual cover in the fall if the fenced crested wheatgrass is grazed early and allowed to regrow. However, if the temporary fence is let down and the crested wheatgrass area is allowed to be utilized, then there would be less residual cover in the fall to carry over for grouse nesting habitat.

Adaptive Options — Using fire to stimulate regeneration within woody draws would depend on the size and location of the treated area, but the effects to grouse nesting habitat would be temporary and would be dependent on follow-up management. The effects of maintaining the spring development in pasture 6 would be relative to the follow-up water management. The effects of livestock use would primarily affect riparian and woody draw issues. However, retaining the additional water source could alleviate the negative effects of homogenizing upland habitat due to the implementation of the new water in pasture 5.

ALLOTMENT 127

Table 127.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 127 in the North Billings County AMP Revision Project area

Summary	Acres	Percent	Number
Management Area 3.51b – Bighorn Sheep Habitat With Non-Federal Mineral Ownership	127	11	
Management Area 3.65 – Rangelands With Diverse Natural-Appearing Landscapes	991	89	
Total allotment acres	1628	100	
NFS acres	1118	69	
State land acres	350	21	
Private land acres	159	10	
Current permitted livestock grazing (AMs) on NFS lands			412
Initial estimated carrying capacity (AUMs) on NFS lands			345
Number of pastures containing NFS lands			2

Table 127.2 — Allotment 127 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	There are no perennial or intermittent stream reaches in this allotment.	None.
Woody draws	80 percent of sampled woody draws were Healthy; 20 percent were At Risk due to lack of adequate regeneration and impacted shrub layer.	Maintain or improve current woody draw conditions.
Herbaceous structure	Transect Results: Low - Exceeding Objectives Moderate - Below Objectives High - Below Objectives 2004 Transects: 1.3; 1.33; 1.0 2004 Stations percent: Low-85/Mod-15/High-0 2005 Transects: 4.71; 2.48 2005 Stations percent: Low-7.5/Mod-80/High-12.5	Manage for additional High structure on biologically capable habitats.
Seral stages	Native grasses are dominant with minimal broken lands. Two sampled sites are rated at mid seral stages. Invasive grasses are prominent in association with oil and gas infrastructure and occur in varying but usually light amounts in native range.	Maintain native grass communities and limit the expansion of invasive grasses.
Sharp-tailed grouse	There are no known leks in the allotment. Suitable habitat is present within the allotment, and there is less than one acre within one mile of a known lek outside of the allotment.	Manage for increased High vegetative structure on biologically capable sites to enhance habitat.
Remarks	• Portions of pasture 2W were burned in the 2004 Magpie Fire. • Monitor burned area for new noxious weed infestations. • Pasture 4 and its associated AUMs conveyed to private ownership in 2008, permitted and Authorized Use have been adjusted.	

Table 127.3 — Allotment 127 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action	Alternative 3A	Alternative 4
• Authorized Use is 412 federal AMs. • Three-year average permitted use is 384 summer federal AMs.* • Permit type: Inventory (12 months). • Rotation: Two-pasture deferred rotation. • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 412. • Continue a two-pasture deferred rotation between pastures 2 and 3. • Improve allotment boundary fence between Allotment 127 and 280 to maintain proper stocking. **Adaptive Options** • Adjust Authorized Use.	**Initial Actions** • Authorized federal AMs: 412. • Continue a two-pasture deferred rotation between pastures 2 and 3. • Improve allotment boundary fence between Allotment 127 and 280 to maintain proper stocking. • Construct a water lot around the existing spring development to allow access to both pastures 2 and 3 in the northeast quarter of the southwest quarter of Section 17, T144N, R101W. **Adaptive Options** • Adjust Authorized Use.	**Initial Actions** • Authorized federal AUMs: 345. • Continue a two-pasture deferred rotation between pastures 2 and 3. • Improve allotment boundary fence between Allotment 127 and 280 to maintain proper stocking. **Adaptive Options** • Adjust Authorized Use.
Monitoring • Review annual planned management identified in Allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every 3 years. • Collect vegetative composition and production data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3.	**Monitoring** • Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 127 — Existing Condition

Range – This allotment is approximately 1,628 acres in total size, with 1,118 acres of NFS lands. Until 1970, the two western pastures of this allotment were undivided from common use by the current permittee and two other permittees, and seasonlong grazing was the system of practice. The livestock use at that time was mostly by cattle. However, historical information found in the 1970 Range Management Plan recorded horse herds grazing this area as well.

This allotment has been subdivided into five pastures;of these, two contain NFS lands. The five pastures range from 160 acres to 936 acres in size. Of the two NFS pastures (2W and 3), one is solely NFS lands and the other one consists of both state and NFS lands.

Before and after the 1970 Range Management Plan, the current permittee has not usually used all of his permitted time because weather has forced a late turn in or early removal from pastures 2W and 3. The existing conditions also show heavier utilization within these areas because of the topography and location of existing fences and natural barriers. Because of the location of the existing water sources, livestock funnel up through natural barriers and at times enter into either pasture 2W or 3 from adjacent Allotment 280.

Topographic constraints influence livestock distribution throughout pastures 2W and 3. The northern portions of these pastures receive moderate to light livestock use due to the topography and the location of existing water developments.

Pastures 2W and 3, according to the 1970 Range Management Plan, are permitted for 35 head for 8 months and grazed as a two-pasture deferred rotation. The permittee does open gates between the two pastures due to unreliable livestock water developments. In the summer of 2004, portions of pasture 2W were burned during the Magpie Fire. The following year, the permittee volunteered to take non-use in this pasture. Currently, this allotment is permitted as a private allocation inventory by the MGA. Owing to the recent conveyance of NFS lands to private ownership, this allotment no longer has livestock wintering on NFS lands but rather on private lands from January through April. Current AMs provided by NFS lands can be found in Table 127.2. Water developments within this allotment include one spring, two reservoirs, and a dugout.

Oil and gas development on NFS lands in this allotment has removed a total of approximately 30.5 acres from livestock access. A total of approximately 7.5 acres of oil and gas pads and access roads have been reclaimed and are, or will, be available for livestock access. Associated forage from these acres is approximately 10.5 and 2.6 AUMs, respectively.

Riparian – There are no intermittent or perennial stream reaches in this allotment.

Woody Draws – Woody draws tend to be concentrated along steep north aspect slopes of a ridgeline that extends across the center of the allotment. Of five woody draw samples, four were Healthy and one was At Risk. Rocky Mountain juniper can be prominent in portions of some woody draws.

Herbaceous Structure – The three randomly selected sample sites in 2004 had a transect VOR average of 1.30, 1.33, and 1.0, which are all Low structure. The station frequency of these transects

is 85 percent Low, 15 percent Moderate, and 0 percent High VOR. In 2005, two of these were randomly selected for re-sampling. The VOR transects had averages of 4.71 and 2.48. The overall 2005 station structure class frequency of these transects is 7.5 percent Low, 80 percent Moderate, and 12.5 percent High. Oil and gas development on NFS lands in this allotment has removed a total of approximately 30.5 acres of potential habitat, some of which may be biologically capable.

Approximately 7.5 acres of oil and gas pads and access roads have been reclaimed and are available as potential habitat of which some may be biologically capable.

On September 12, 2006, members of the interdisciplinary team (IDT) made a field trip to assess the herbaceous structure because the permittee had questioned the results of the previous survey (2004). The team conducted four transects in areas that appeared to hold High structure. The four transects had VORs of 3.08, 3.48, 3.05, and 2.10. All were Moderate structure. The IDT determined that there was not enough High structure for the allotment to address the herbaceous structure objectives.

Seral Stages – Native grass communities with varying but usually light amounts of invasive grasses dominate the allotment. Small patches of broken land occur along the central ridgeline extending east-west across the two pastures and where disturbances associated with an access road and several oil well sites have contributed to the occurrence of invasive grasses. However, an ecoplot from 1998 on the ridgeline in pasture 2W was at a mid-late seral stage without invasive grasses; a belt transect measured on the site in 2004 also recorded similar dominance of blue grama and western wheatgrass. Another ecoplot located on the north aspect slope of the ridge was at a mid seral stage with light amounts of Kentucky bluegrass. A Robel transect on the south aspect slope recorded blue grama and western wheatgrass as the dominant species.

A sere plot in pasture 3 near a reclaimed oil well site on the ridgeline was at a mid seral stage. Another sere plot on a lower south aspect slope and an ecoplot on a north aspect were at mid seral stages. All of these sites contained light amounts bluegrass and/or smooth brome. A Robel transect and a belt transect along the ridgeline recorded native grasses as the three dominant species.

Sharp-tailed Grouse – There are no known leks within this allotment. There is less than 1 acre overlap within 1 mile of a known lek. Potentially suitable habitat is located primarily in the southern portion of pastures 2W and 3 along the southeast/northwest ridgeline. There are two other known leks within 2 miles of this ridgeline.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed 2 years later.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would now

be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – There are no intermittent or perennial stream reaches in this allotment.

Woody Draws – The removal of livestock grazing would facilitate increased woody draw conditions as a result of decreased browsing and trampling disturbances and increased regeneration of desired woody species. Existing invasive grasses and potential increases of these species, as assisted by increasing plant litter from the removal of livestock grazing would have the potential for slowing or decreasing the degree woody regeneration. However, increased structural complexity would occur in both Healthy and At Risk woody draws within 5 to 10 years and exceed objectives for 80 percent Healthy conditions.

Herbaceous Structure – With the removal of livestock, there would be increased opportunity for the development of High and Moderate structure, and a decrease in the amount of Low structure resulting in increased nesting opportunities for ground nesting birds requiring or preferring Moderate/High structure habitat. Species that favor Low structure habitat would be expected to decrease in abundance.

Seral Stages – The removal of livestock grazing disturbances would facilitate a shift towards late seral stages with a decrease of early and mid seral stages. Plant diversity would decrease with the development of late seral stages, particularly with regard to forb species. Although invasive grasses are relatively light in the allotment, increasing litter with the removal of livestock grazing would facilitate their increase. Transitions to Invaded Grass States would gradually occur but could require as long 10-20 years due to the relatively light and patchy occurrences of invasive grasses at present.

Sharp-tailed Grouse – The increase in High structure would benefit nesting and brooding habitat for sharp-tailed grouse. Over time, the decrease in forb diversity would reduce foraging opportunities and nesting and brooding quality.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by an inventory grazing association permit, and Authorized Use is 412 federal AMs.
- Cow/calf pairs are in a two-pasture, deferred rotation.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing

association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – There are no intermittent or perennial stream reaches in this allotment.

Woody Draws – Current conditions of 80 percent Healthy and 20 percent At Risk woody draws would likely continue under current management. Authorized Use exceeds initial estimated carrying capacity by 37 percent after adjusting for cow size, but is 15 to 42 percent greater than use reported in AOIs/AWs during 2004 through 2008 and has likely contributed to the predominance of Healthy woody draws. Steep slopes associated with several of the sites also contribute to low levels of livestock disturbances. Increased stocking at the current level of Authorized Use would have the potential for decreasing woody draw conditions.

Herbaceous Structure – Allotment 127 currently does not meet the structure objectives in the Grasslands Plan. Under Alternative 2, Low and Moderate structure would be expected to predominate and High structure would be underrepresented. There is minimal potential for increase of High herbaceous structure under current livestock management because Authorized Use exceeds initial estimated carrying capacity.

Seral Stages – The predominance of mid seral stages among sample sites would be expected to continue under current management but with a moderate potential for increasing invasive grasses. The deferred rotation provides opportunities for native species to complete critical spring and fall growth stages during alternate years, thus assisting the maintenance of plant vigor and reproduction. However, frequent turn-in dates during mid May are usually premature for native grasses and can decrease plant vigor and production, and are not necessarily compensated by the deferred rotation and later season grazing during alternate years. Much of the allotment away from the central ridgeline consists of rugged topography and barren landforms that concentrates grazing and trailing disturbances within the most accessible areas. Therefore, although Authorized Use has been greater than reported use, the level of forage utilization among native communities in primary use areas has the potential to be high. These factors would impede the potential development of late seral stages and stocking at the level of Authorized Use that exceeds initial estimated carrying capacity by 37 percent would contribute to shifts towards early seral stages.

Sharp-tailed Grouse – Because of the minimal potential for an increase in High herbaceous structure under current livestock management, existing nesting and brooding habitat would be maintained and enhancement would not be expected.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 412 federal AMs.
- Continuing a two-pasture, deferred rotation.
- Improving the allotment boundary fence between Allotments 127 and 280 to maintain proper stocking.

ADAPTIVE OPTIONS:

- Adjusting Authorized Use.

Range

Initial Actions – Continuation of a two-pasture deferred rotation between pastures 2W and 3 with a June 1st turn-out date 2 out of 3 years would defer livestock grazing on these two pastures by 1 month for those years. This would affect the permittee by either requiring one extra month of winter grazing/feeding or moving the livestock to off-permit lands 2 out of 3 years. Livestock distribution would not change because of the topography and location of existing range developments. Improving the allotment boundary fence would prevent additional forage from being harvested by unauthorized livestock. The permittee would be responsible for the cost of maintenance and installation of a fence where natural barriers are ineffective.

Adaptive Actions – Adjusting Authorized Use downward would result in fewer livestock numbers because of the inventory permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock, but the amount of forage harvested would be less than the existing forage harvested.

Riparian – There are no intermittent or perennial stream reaches in this allotment.

Woody Draws

Initial Actions – Specifically identifying a two-pasture deferred rotation would increase the consistency of annually changing the season of use in each pasture but would not have an appreciable effect on the current proportion of 80 percent Healthy woody draw conditions. A deferred rotation is usually implemented at present and seasons of use would persist during the summer months when livestock are most apt to seek woody draws for escape from heat and insect pests.

Improvement of the allotment boundary fence would maintain or potentially improve existing conditions by decreasing additional browsing and trampling disturbances by livestock from adjacent allotments.

Maintaining Authorized Use 37 percent above initial estimated carrying capacity after adjusting for cow size would maintain the potential for increased woody draw disturbances and decreased conditions relative to levels of use reported in AOIs/AWs during 2003 and 2008.

Adaptive Options – Decreasing Authorized Use would facilitate improved woody draw conditions by decreasing browsing and trampling disturbances and increasing the regeneration of desired woody species. However, the level of decreased use would have to exceed current levels of reported use that are less than Authorized.

Herbaceous Structure

Initial Actions – The proposed actions are similar to current management. Given the Authorized Use level is 27 percent above the initial estimated carrying capacity (accounting for cow size), the two-pasture, deferred rotation system would maintain the homogenized herbaceous structure distribution.

Adaptive Actions – Adjusting Authorized Use downward would eventually create a potential for meeting High herbaceous structure by decreasing grazing intensity and thereby increasing residual standing crop.

Seral Stages

Initial Actions – Consistent or continued implementation of a deferred rotation would facilitate the maintenance of native plant communities and plant vigor by maintaining opportunities for plants to complete critical spring and fall growth stages during alternate years in each pasture. The inventory permit would allow for premature spring grazing in each pasture once every three years, thereby resulting in potential premature use of each pasture once every 6 years. However, adverse effects of decreased plant vigor resulting from premature grazing would decrease in frequency compared to current conditions where each pasture is subject to premature grazing every other year. Potential increases in plant vigor and shifts towards late seral stages might be impeded by current levels of use that are less than Authorized, and increased stocking to current levels of Authorized Use would facilitate shifts towards early seral stages.

Improvement of the allotment boundary fence would maintain or potentially improve existing conditions by decreasing additional browsing and trampling disturbances by livestock from adjacent allotments.

Adaptive Options – Decreasing Authorized Use below currently reported levels of use would facilitate shifts towards late seral stages by decreasing livestock grazing and trampling disturbances. Increasing Authorized Use would have the opposite effect.

Sharp-tailed Grouse

Initial Actions – Since the allotment is effectively not within the 1 mile proximity of an active lek, enhancement of grouse nesting habitat is desirable but not necessary per Grasslands Plan direction. Potential habitat can be found throughout the allotment, but the ridgeline located in the southern portion of the allotment offers the largest potential block of habitat. This ridgeline is within 2 miles of three known leks. However, as noted under herbaceous structure, the initial actions will not improve potential habitat for sharp-tailed grouse and limit the enhancement of nesting and brooding habitat in this allotment.

Adaptive Options – Adjusting Authorized Use downward would eventually provide enhancement of nesting and brooding habitat by decreasing grazing intensity and thereby increasing residual standing crop.

Effects of Alternative 3A

The effects of Alternative 3A are the same as Alternative 3 with the following stated exceptions.

INITIAL ACTIONS:

- Constructing a water lot around the existing spring development to allow access to both pastures 2W and 3.

ADAPTIVE OPTIONS:

- The adaptive options and effects in Alternative 3A are the same as Alternative 3.

Range
Initial Actions – The construction of a water lot would change the distribution of livestock slightly since the livestock would no longer have access to the other pasture. However, because of the topography, livestock would still funnel through the woody draw to access the water lot.

Riparian – There are no intermittent or perennial stream reaches in this allotment.

Woody Draws
Initial Actions – Allowing access to the spring from pasture 2W would result in increased use of portions of the draw east of the pasture fenceline. This could adversely affect the Healthy woody draw associated with the spring and decrease the proportion of Healthy woody draws in the allotment. However, there are indications that the spring is presently accessible from both pastures and much of the woody draw occurs on steep slopes that deter livestock trailing. Any additional impacts are therefore likely to be concentrated around the immediate area of the spring.

Herbaceous Structure
Initial Actions – No additional effects from Alternative 3.

Seral Stages
Initial Actions – Potentially increased use of the upper slopes and ridgeline resulting from consistent access to the developed spring from both pastures could result in shifts towards early seral stages. However, increased use around the spring could be countered by decreased grazing disturbances and shifts towards late seral stages around an existing dugout in the northern portion of the pasture.

Sharp-tailed Grouse
Initial Actions – No additional effects from Alternative 3.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the changes below. The analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 4 are the same as Alternative 3.

Range
Initial Actions – Authorized Use for this allotment would be 345 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 412 federal AMs

converted to AUMs by adjusting for cow size is 474 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 27 percent reduction in AUMs from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the cow size when calculating the number of head and the grazing season duration when planning the rotation for the allotment.

Riparian – There are no intermittent or perennial stream reaches in this allotment.

Woody Draws

Initial Actions – Decreasing Authorized Use by 27 percent according to initial estimated carrying capacity and adjustments for cow size would maintain or enhance woody draw conditions by slightly decreasing browsing and trampling disturbances relative to current levels of reported use.

Herbaceous Structure

Initial Actions – Adjusting AUMs to the initial estimated carrying capacity would create the potential for an increase of High herbaceous and improve the herbaceous structure distribution. The decrease in grazing intensity would increase the potential for increased residual cover. Retaining the two-pasture deferred rotation would not appreciably contribute to increasing High structure due to the lack of sufficient time for regrowth after livestock are rotated out of the first pasture.

Seral Stages

Initial Actions – Decreasing Authorized Use by 27 percent according to initial estimated carrying capacity and adjustments for cow size would facilitate shifts towards late seral stages by decreasing livestock grazing and trampling disturbances. However, the degree of benefit would be reduced bacausethe new level of Authorized Use would range from 3 percent greater to 16 percent less than currently reported use.

Sharp-tailed Grouse

Initial Actions – Adjusting AUMs to the initial estimated carrying capacity would create the potential improve the herbaceous structure distribution and grouse habitat. The decrease in grazing intensity could increase the potential for increased residual cover. Retaining the two-pasture deferred rotation would not appreciably contribute to increasing grouse nesting habitat due to the lack of sufficient time for regrowth after livestock are rotated out of the first pasture approximately the end of July to the beginning of August.

Allotment 128

Table 128.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 128 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 3.65 – Rangelands With Diverse Natural-Appearing Landscapes	3,754	87	
Management Area 6.1 – Rangeland With Broad Resource Emphasis	405	10	
Newly acquired NFS lands with unassigned management area	140	3	
Total allotment acres	5,416	100	
NFS acres	4,299	79	
State land acres	639	12	
Private land acres	478	9	
Current permitted livestock grazing (AMs) on NFS lands			1,866
Initial estimated carrying capacity (AUMs) on NFS lands			1,380
Number of pastures containing NFS lands			3

Table 128.2 — Allotment 128 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	There is a large headcut in Whitetail Creek located in pasture 1. Above the headcut the creek is rated at FAR-D and below the headcut it is rated at NF.	Start FAR-D and NF reaches on an upward trend toward PFC. On the NF reach reduce stream velocity to help the stream heal itself.
Woody draws	63 percent of sampled woody draws were Healthy; 32 percent were At Risk due to insufficient regeneration; 5 percent were Unhealthy because they contained no seedling or sapling regeneration. Juniper is encroaching into hardwood draws and grassland areas.	Establish regeneration and/or increase survival of saplings. Reduce juniper encroachment.
Herbaceous structure	Transect Results: Low - Exceeding Objectives Moderate - Meeting Objectives High - Below Objectives 2004 Transects: 2.15; 1.98; 1.41; 2.00; 1.83; 2.20; 1.11; 1.43 2004 Stations percent: L-50.63/M-49.38/H-0 2005 Transects: 1.78; 1.69; 1.12 2005 Stations percent: L-46.67/M-53.33/H-0.	Manage for additional High structure on biologically capable habitats.
Seral stages	Native plant communities at mid seral stages predominated with frequent occurrences but relatively low amounts or localized occurrences of invasive grasses.	Maintain native grass dominance while increasing the proportion of early and late seral stages and limiting the expansion of invasive grasses.
Sharp-tailed grouse	There is one known lek within the allotment.	Manage for increased High vegetative structure on biologically capable sites to enhance habitat.
Remarks	• 15 acres of Canada thistle located primarily in riparian areas. Small amount of burdock noted in pasture 4.	

Table 128.3 — Allotment 128 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 1,866 federal AMs. • Three-year average permitted use is 2,258 summer federal AMs (Note average is a combination of Allotments 126 and 128).* • Permit type: Inventory (12 months). • Rotation: Three pasture deferred rotation. Also, rotation is combined with complementary deferred with two herds in nine pastures in Allotment 126. • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 1,866. • In pasture 1, fence developed spring located in southwest quarter of the southwest quarter of Section 25, T144N, R101W. Relocate tank further away from developed spring. • Control livestock distribution in pasture through stock tank management. • Combine Allotments 126 and 128 and implement a complementary modified deferred rotation grazing system. • Harden stream crossings/watering areas along Whitetail Creek in Section 6. • Install stream structures below headcut on Whitetail Creek to help dissipate stream energy. **Adaptive Options** • Utilize herding. • Utilize fire to reduce juniper encroachment. • Temporarily fence heavily impacted woody draws. • Adjust Authorized Use. • Develop a riparian pasture within pasture 1. To create this pasture an existing range pipeline will have to be extended from pasture 2 (Section 18) into pasture 1 (Section 6).	**Initial Actions** • Authorized federal AUMs: 1,380. • Fence in developed spring located in southwest quarter of southwest quarter of Section 25, T144N, R101W (pasture 1). Pipe water from spring to a tank located away from spring area. • Control livestock distribution in pasture through stock tank management. • Combine Allotments 126 and 128 and implement a seven pasture complementary rest/deferred rotation grazing system. • In pasture 1, on Whitetail Creek, construct a 35 acre riparian exclosure. Plant native trees and build sediment traps/stream stabilization structures. No grazing of exclosure for first 3 years. **Adaptive Options** • Harden 1 stream crossing/ watering areas upstream of headcut along Whitetail Creek in Section 6. • Construct a 5-20 acre riparian exclosure above headcut. • Install stream structures below headcut on Whitetail Creek, to help dissipate stream energy. • Develop a riparian pasture within pasture 1. To create this pasture an existing range pipeline will have to be extended from pasture 2 (Section 18) into pasture 1 (Section 6). • Riparian exclosure: At end of year 3 conduct vegetation survey. If survey reveals excessive litter initiate compressed prescribed grazing. Prescribe graze in late or dormant season preferred. Prescribed grazing would be identified in AOI/AW. • Construct 9 and 22 acre riparian exclosures on Whitetail Creek in pasture 1, Sections 6 and 31 respectively. (Reaches 9 and 12). • Adjust Authorized Use.

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every 3 years. • Complete Properly Functioning Condition survey once every 3 years then once every 5 years if a positive trend has been established. • Collect vegetative composition and production data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 128 — Existing Condition

Range – This allotment is approximately 5,416 acres in total size, with 4,299 acres of NFS lands. This allotment is currently subdivided into three pastures, with the smallest being 261 acres and the largest 3,134 acres. Currently, this allotment is issued a private allocation inventory permit for 261 head for eight months by the MGA. Portions of this allotment were part of the old Blacktail Common at one time, meaning that certain areas of this large common were allocated specifically to Allotment 128. Rotation on this allotment is a three-pasture modified deferred rotation and is also managed together with Allotment 126.

Pasture 1 is the largest of the three and contains NFS, private, and state lands. The northern tier of the pasture is made up of NFS land, with the majority of it ranked into the heavy use level from distribution mapping. The northwestern portion of this pasture has large areas in which crested wheatgrass occupy the landscape. The crested wheatgrass areas also have some native species but they are mostly dominated by crested wheatgrass. Overall, this pasture is still treated as a native pasture since the percentage of crested wheat grass is not 70 percent or greater of the existing vegetative community, as directed in the Grasslands Plan.

The south side of pasture 1 is very similar to the north side; however, the topography is a little rougher than the northern tier. Both sides of this pasture had relatively good litter cover and a good mixture of native species. Mapping this pasture was a little difficult due to the topography so a lot of the area, which may be in the moderate level, was lumped into the heavy level.

Pasture 2 is the southernmost pasture in this allotment. Water developments in this pasture include a well and pipeline system with stock tanks. The distribution of livestock is altered because of the topography of this pasture. The high-use areas by livestock are on the eastern side of the pasture. Vegetative communities in the eastern portion of the pasture are a mixture of native and introduced graminoid species. The introduced species can be found along the road and in areas where oil and gas disturbance have occurred. Livestock utilize the other portions of the pasture at a moderate to low level.

Pasture 4 is the northern most pasture of this allotment. Water developments in this pasture include a spring development (limited flow) and a reservoir (very seasonal). Because of the unreliable water, the permittee normally opens the gates between pastures 1 and 4 to allow livestock to utilize this pasture (livestock do utilize the spring development in Section 26, T144N, R101W). The gates between the two pastures are closed when livestock are not scheduled to graze pasture 4. This pasture has a combination of native and introduced graminoid species. Introduced graminoid species are located mostly in the areas of disturbance by oil and gas access roads, reclaimed access roads, and pipeline corridors.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there are approximately 15 acres of Canada thistle located primarily in riparian areas. Through recent weed inventories and communication among the Forest Service, Billings County Weed Officer, and the permittee, other infestations have been identified. Herbicide treatment has been the primary control agent for the noxious weeds within this allotment.

Oil and gas development on NFS lands in this allotment has removed a total of approximately 20.0 acres from livestock access. Approximately 10.0 acres of oil and gas pads and access roads have been reclaimed and are, or will be, available for livestock access. Associated forage from these acres is approximately 5.8 and 2.9 AUMs, respectively.

Riparian –

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
128-01	Whitetail Creek (6)				1.07		1.07
128-01	Whitetail Creek (7)					0.19	0.19

The segments of Whitetail Creek that cross Allotment 128 are in poor riparian condition and do not meet objectives. The channel is deeply incised (8 to10 meters; 25 to 30 feet) in Sec. 31, T 144 N/R 100 W and Sections 35 and 36, T 144 N/R 101 W (Figure 128.1). A channel knickpoint, or headwall, in the southwestern quarter of Section 31 marks the upstream point of channel incision in 2006. This knickpoint has migrated several miles upstream over the past 80 years (Dwight Hecker, personal communication, 2006). The 0.2-mile reach downstream of the knickpoint is Non-Functioning due to a drop in water table, the loss of water storage in the banks, the high rates of channel and bank erosion, and the scarcity of riparian vegetation. The 1.1-mile reach upstream the headwall (Sec. 31 T 144 N/ 100 W and Sec. 6, T 143 N/ 100 W) has a functionality rating of FAR-D due to the high probability of knickpoint migration and ensuing channel incision.

Figure 128.1 — Whitetail Creek is incised in Section 31, T144N, R100W and Section 35 and 36, T144N, R101W. Erosion, sediment transport, and deposition rates are high. Livestock can be temporarily trapped in the incised channel. They trail along the channel, further damaging riparian vegetation.

Woody Draws – Of 19 sampled woody draws across the allotment, 63 percent were Healthy, 32 percent were At Risk, and 5 percent were Unhealthy. A high proportion of woody draws at the south end of pasture 2 were At Risk, while several draws at the north end of pasture 1 and all draws in pasture 4 were Healthy. A developed spring and mineral feeding station contributed to high livestock disturbances at the north end of pasture 1 (Figure 128.2). Steep slopes that limited livestock access of several adjacent woody draws assisted Healthy conditions even though the lower slopes and drainage bottoms with greater livestock disturbance were At Risk. Rocky Mountain juniper was common in woody draws and comprised the dominant woodland type on steep slopes in several portions of the allotment.

Figure 128.2 — Mineral station within drainage at the north end of pasture 1 immediately upstream of a developed spring.

Herbaceous Structure – There were eight randomly sampled VOR transects measured in 2004. Three were Low structure, and five were Moderate structure. Station averages showed Low structure at approximately 51 percent, and Moderate structure at 49 percent. No High structure transects or stations were recorded.

Three transects were resurveyed in 2005. One was Low structure and the other two were Moderate. One transect average decreased and the other two showed marginal increases in VOR. Station averages showed approximately 47 percent in Low and 53 percent in Moderate structure.

Jack Dahl and Arden Warm visited Allotments 126 and 128 on November 8, 2006, to determine if there was sufficient High structure to address structure objectives. Both Dahl and Warm agreed there was not a sufficient amount of High structure to meet the structure objectives.

Seral Stages – Collective plant composition data indicated a predominance of native grass communities with consistent but usually subordinate amounts of Kentucky bluegrass and annual brome. Exceptions involved areas of broken land, several oil well disturbances, and a livestock corral along the east boundary of pastures 1 and 2 where crested wheatgrass and areas of Japanese brome (*Bromus japonicus* Thunb. ex Morr.) increased in prominence. Some areas of crested wheatgrass appeared to be spreading outward from areas identified as broken land. An area of crested wheatgrass in the northwest corner of pasture 1 was not identified as broken land and may have established from hay feeding and/or an adjacent road. A wide pipeline corridor contributed to invasive grass occurrences in pasture 4.

An NDSU plot and two sere plots in Sandy ecological sites (ESs) at the north and south ends of pasture 1 were at mid seral stages with light or intermingled patches of invasive grasses. Three Robel transects and a belt transect dispersed on opposite sides of the pasture recorded native grasses as the dominant species. A sere plot at the north end of pasture 2 was also at a mid seral stage but more heavily invaded by crested wheatgrass and Kentucky bluegrass. Two ecoplots within or near the edge of broken land in pasture 2 were at mid seral stages with crested wheatgrass and blue grama dominance and varying amounts of Kentucky bluegrass. An NDSU plot on a Loamy ES in pasture 4 was at a mid seral stage with Kentucky bluegrass constituting 21 percent of the total clipped biomass. An ecoplot, Robel transect, and belt transect generally located on various ridge slopes in pasture 4 were dominated by little bluestem (*Schizachyrium scoparium* (Michx.) Nash – Gould), sedge, and prairie sandreed (*Calamovilfa longifolia* (Hook.) Scribn.).

Sharp-tailed Grouse – One lek is known within the allotment. There are three known leks within 1 mile of the allotment, encompassing approximately 1,520 acres.

Effects of Alternative 1

INITIAL ACTIONS:

- After notifying the affected permittee, all livestock would be removed after 2 years.
- Most range infrastructure would be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian condition along Whitetail Creek as described in the existing condition would improve and evolve toward desired riparian conditions over time. Improvement would result

from the establishment of riparian vegetation which would capture sediment and build stream banks.

Woody Draws – Woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate increased growth and regeneration of desired woody species. However, litter accumulation resulting from the removal of livestock grazing would assist the development of existing invasive grass layers with the potential for slowing or decreasing the potential degree of woody draw improvement.

Herbaceous Structure – There would be increased opportunity for the development of High and Moderate structure, and a decrease in the amount of Low structure resulting in increased nesting opportunities for ground nesting birds requiring or preferring Moderate/High structure habitat. Species that favor Low structure habitat would decrease in abundance.

Seral Stages – The removal of livestock grazing disturbances would facilitate shifts towards late seral stage communities. Plant diversity and a desired mosaic of seral stages would decrease with the development of late seral stages. However, the decrease in grazing disturbance would facilitate an increase of accumulated plant litter that would in turn facilitate the expansion of invasive grasses that are intermixed among native grass communities. Increasing invasive grasses would impede the development or maintenance of late seral native communities and increase the potential for transitioning to Invaded Grass States with reduced maintenance of native plant diversity. Because invasive grasses were present in low to moderate amounts through most of the allotment, the time frame for potential transitions to Invaded Grass States would be on the order of 10 to 20 years. Exceptions involve areas along the east boundary of pasture 2 and portions of pasture 4 where invasive grasses occur in greater amounts and have the potential to contribute to Invaded States in ten years or less.

Sharp-tailed Grouse – The increase in High structure would benefit nesting and brooding habitat for sharp-tailed grouse. However, over time the decrease in forb diversity would decrease foraging opportunities.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by an inventory grazing association permit, and Authorized Use is 1,866 federal AMs.
- Cow/calf pairs are run in a three-pasture modified deferred rotation which is combined with a complementary deferred rotation with two herds in nine pastures in Allotment 126.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing

association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian condition along Whitetail Creek as described in the existing condition would continue.

Woody Draws – Continuation of the current grazing system would perpetuate woody draw conditions that do not meet Grasslands Plan objectives. Potentially increased stocking to the level of Authorized Use that exceeds initial estimated carrying capacity by 56 percent after adjusting for cow size, and developed water sources and mineral stations along drainages would contribute to high disturbances within woody draws.

Herbaceous Structure – Current management would continue to perpetuate the herbaceous structure distribution with a limited proportion of High herbaceous structure. Potential management factors include multiple herds, poor timing in use of crested wheatgrass, Authorized Use levels exceeding initial estimated carrying capacity, and winter grazing/feeding.

Seral Stages – The predominance of mid seral stages among the sample sites would be perpetuated with current livestock management. Premature turn-in dates during May and Authorized Use that greatly exceeds initial estimated carrying capacity would continue to impede the development of late seral stages and increase the potential for invasive grass spreading. Hay feeding would continue to introduce invasive grass seed with the potential for spreading.

Sharp-tailed Grouse – Given current management, it does not appear that existing levels of sharp-tailed grouse nesting and brooding habitat would be enhanced in 10 to 15 years.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 1,866 federal AMs.
- Fencing the developed spring located in Section 25 of pasture 1 and relocating the tank further away.
- Controlling livestock distribution through stock tank management.
- Combining Allotments 126 and 128 and implementing a complementary modified deferred rotation grazing system.
- Hardening the stream crossings/watering areas along Whitetail Creek.

ADAPTIVE OPTIONS:

- Utilizing herding.
- Utilizing fire to reduce juniper encroachment.
- Temporarily fencing heavily impacted woody draws.
- Adjusting Authorized Use.
- Developing a riparian pasture within pasture 1 which will also include extending an existing range pipeline from pasture 2 (Section 18) into pasture 1 (Section 6).

Range

Initial Actions – Under this alternative 1,866 federal AMs would be authorized and would not change from the existing condition of Alternative 2. The use of these federal AMs would be different than the existing condition because of the implementation of a complementary modified deferred rotation grazing where crested wheatgrass pastures would be identified and combining Allotments 126 and 128.

Fencing the developed spring in the southwestern quarter of the southwest quarter of Section 25, T144N, R101W, and relocating the existing tank location away from the discharge location would not have any effects on livestock distribution, if kept near the existing location. Fencing the spring collection area would not have an effect on livestock distribution. Without installing a check valve in the tank, controlling the livestock distribution in these areas would not be possible. Currently water continuously flows to the existing tank site.

Managing the existing tanks would allow managers the flexibility of controlling livestock distribution and control livestock grazing pressure around existing tanks. Livestock management would be more intense than the existing management, because it would require more time from both the permittee and Forest Service in assuring that over-utilization of native herbaceous species doesn't occur.

Combining Allotments 126 and 128 and implementing a complementary modified deferred rotation (two to three herds) would allow forage to be harvested by livestock during different periods of the grazing season and growing season. Native herbaceous plant communities along with crested wheatgrass pastures would have a recovery period during the growing season and during critical growing moisture periods of the growing season. Individual pastures containing 70 percent crested wheatgrass would be treated as earlier season pastures and grazed during the month of May. This would defer turnout onto native pastures until June 1st or range readiness.

By installing a hardened stream crossing/watering areas along Whitetail Creek in Section 6 would not improve distribution, however, it would reduce use of other crossings along Whitetail Creek used by livestock.

The installing of stream structures below the head cut on whitetail creek to help dissipate stream energy would not have any effect of livestock distribution or available AMs.

Adaptive Options – Due to the size of the pastures 1 and 2, the use of herding would directly affect the distribution of the livestock. With herding, livestock would be moved away from areas currently being heavily grazed to a less utilized area. Over time, this would result in increased forage available for livestock grazing on sites recovering from heavy grazing pressure. Initial start-up costs of hiring help or the increase in the permittee's time would create additional expense from the existing condition. Livestock grazing may occur in areas of secondary range which is currently providing habitat for some wildlife species.

A prescribed burn would increase the amount of forage available as graminoid communities replace the existing rocky mountain juniper communities. Livestock distribution would also change from the existing conditions because livestock would be attracted to the regrowth. How the deferment of livestock grazing or resting the pasture would occur, is dependent upon the size and intensity of the

prescribed burn and its effects on the herbaceous community. As a result of the burn, the area could be rested for as long as 2 years. The size of the burn and climatic conditions would determine the length of rest and the amount of federal AMs reduced.

Fencing high-value woody draws would have little to no change in livestock distribution across the allotment if the fencing was kept to a small acreage. Forage within the exclosures would no longer be available for livestock grazing. A large woody draw exclosure, would increase livestock grazing pressure on the remaining forage and change the distribution of livestock. As a result, adjustments in available AMs would need to be altered accordingly. There would be a cost to install these fences and an additional cost of maintenance to prevent livestock access to the woody draws.

Adjusting Authorized Use downward would result in fewer livestock numbers because of the inventory permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock; however, the amount of forage harvested would be less than the existing forage harvested.

The lack of reliable livestock water would require developing a riparian pasture within pasture 1 by extending the existing pipeline from pasture 2 into pasture 1. It would change livestock distribution because of the permanent fence dividing the existing pasture. Available federal AMs in pasture 1 and the new riparian pasture would have to be adjusted for size, topography, and forage available each pasture. There will be an initial cost for the installation of fences and the pipeline extension.

Riparian

Initial Actions – Fencing the spring in pasture 1 and relocating the tank further away from the developed spring would be an initial action. There is no riparian habitat at the source so fencing the spring development would have no effect on riparian condition.

Controlling livestock distribution through stock tank management and combining Allotments 126 and 128, and implementing a complimentary modified deferred rotation grazing system, would more evenly distribute livestock use through the allotments and through the growing season. These actions should benefit riparian conditions along Whitetail Creek by more evenly distributing the use through the corridor over time.

Hardening the watering areas of Whitetail Creek would benefit stream conditions through this reach by protecting banks from livestock trampling and trailing. Installing stream structures below the headcut on Whitetail would help dissipate stream energy, allowing the collecting of sediment and building of stream banks.

These initial actions should improve riparian functionality along Whitetail Creek through the reestablishment of riparian vegetation, entrapment of sediment, and the stabilization of channel banks and bed.

It is expected that desired conditions on Whitetail Creek in pasture 1 would be achieved in 10 to 15 years.

Adaptive Options – Herding livestock out of the riparian area would benefit the riparian corridor by minimizing bank sloughing, trailing, trampling, and loafing, allowing for herbaceous and woody riparian vegetation recovery.

Prescribed burning could induce a short-lived (one to several years) increase in sediment delivery to the channel due to exposed soil. Prescribed burning would eventually replace junipers with an herbaceous plant community which would improve the riparian condition by reducing overland flow. A reduction in overland flow delivered to the creek would reduce stream velocities, allowing for riparian vegetation establishment to re-build stream banks.

Temporarily fencing heavily impacted woody draws would not have an effect on riparian conditions along Whitetail Creek because there would be little to no change in livestock distribution across the allotment.

Reducing Authorized Use should help improve the uplands vegetation which reduces overland flow, further benefitting the riparian conditions along Whitetail Creek. A reduction in overland flow delivered to the creek would reduce stream velocities and allow for the establishment of riparian vegetation.

The use of riparian pastures and exclosures has proven effective in the Little Missouri Badlands (e.g., note the riparian response within the exclosures along Ash Coulee) in reestablishing desired riparian vegetation and controlling sediment loads. The new water source developed in the riparian pasture to pull livestock away from the riparian corridor would benefit the conditions by minimizing bank sloughing, trailing, trampling, and loafing allowing for herbaceous and woody vegetation recovery.

It is expected that desired conditions on Whitetail Creek in pasture 1 would be achieved in 5 to 10 years.

Woody Draws

Initial Actions – Grazing management would not be appreciably different than current management and the proportion of sampled Healthy woody draws would be unlikely to increase. Fencing of a spring collection area in pasture 1 without reconstructing the plumbing system to maintain flow at the spring when the water tank is full would not improve wetland habitat conditions. The large majority of spring flow is collected and would overflow the tank site onto non-wetland habitat that is heavily trailed and trampled by livestock use of the tank site. At best, a thin ribbon of sedges might be maintained below the water tank. Additionally, it would not be possible to manage livestock distribution or decrease the use of woody draws in the surrounding pasture by controlling flow to the water tank.

Strict adherence to locating all mineral sources outside of drainages and woody draws would contribute to decreased trampling impacts within woody draws and adjacent springs (Figure 128.2). However, proposed levels of Authorized Use that greatly exceed initial estimated carrying capacity would maintain the potential for high livestock browsing and trampling disturbances within the most accessible woody draws across the allotment.

Managing two pipeline-supplied water sources in pasture 2 to control livestock distribution and utilization would increase the potential for decreasing excessive woody draw disturbances in portions of this pasture. Managing water sources in pasture 1 would be less effective at controlling livestock distribution. One pipeline supplied water tank could be controlled, but access to the spring discussed above, other seeps or abandoned springs, and two reservoirs would remain uncontrolled.

Hardening stream crossings along Whitetail Creek might assist woody draw improvement by concentrating the area of livestock trailing and trampling disturbances. Installing structures to dissipate stream energy would help stabilize the creek channel and might assist the establishment of woody species that have the potential to be lost to erosion.

The proposal of combining Allotments 126 and 128 and implementing a complementary deferred rotation would have no appreciable effect on the level of woody draw disturbances in Allotment 128 because the continued management of multiple livestock herds would result in similar grazing rotations and stocking levels as presently occurs. The primary change in Allotment 128 would involve delaying turn-in onto native pastures until June 1st or range readiness, but woody draw disturbances during May should be relatively light because of cool temperatures. Grazing time lost at the beginning of the season would be compensated by increasing the number of livestock.

Adaptive Options – Herding would increase livestock distribution with the potential to decrease excessive browsing and trampling disturbances of woody draws in primary use areas.

Temporarily fencing woody draws and/or decreasing Authorized Use would increase the potential for improved woody draw conditions by removing or decreasing livestock browsing and trampling disturbances and facilitating the regeneration of desired woody species. Exclusion of livestock impacts through fencing would provide the fastest and greatest degree of woody draw improvement, but regeneration of woody species could be impaired by increasing litter and invasive grass layers. Fencing of heavily disturbed woody draws would have a high potential to result in increased disturbance and decreasing condition within adjacent unfenced woody draws.

Prescribed burning to reduce Rocky Mountain juniper encroachment may indirectly assist woody draw conditions by decreasing livestock use of the draws as they are attracted to the flush of new herbaceous growth in burned areas. Including woody draws within prescribed burn areas may facilitate increased conditions by removing the competitive effects of juniper, promoting regrowth or sprouting of decadent trees, and improving seedbed conditions for the germination of woody species. However, fire can also result in complete mortality of individual woody plants, and the predominance of invasive grasses within most woody draws have the potential for vigorous regrowth after burning that may negate short-term improvement of seedbed conditions. Thus, monitoring would be conducted to determine the net result of prescribed burning under different situations and provide information regarding the effects of burning on woody draw conditions.

Creation of a riparian pasture along Whitetail Creek in pasture 1 would increase the potential development of riparian habitat and adjacent woody draw patches by decreasing browsing and trampling disturbances and facilitating the regeneration of desired woody species. However, decreased access to the creek and adjacent woody draws could contribute to increased disturbance and decreasing condition of woody draws outside the exclosure.

Reducing Authorized Use would increase the potential for improved woody draw conditions by decreasing browsing and trampling disturbances and increasing opportunities for the regeneration of desired trees and shrubs. Increasing Authorized Use would have the opposite effect.

Herbaceous Structure

Initial Actions – Initial Actions would not improve the potential of this allotment to increase the

proportion of High herbaceous structure within a 10- to 15-year time frame. The proposed actions of this alternative vary little from current management. Rotating livestock distribution using water management would not be effective in pasture 1 (Allotment 128) because of the lack of controlled water sources (Whitetail Creek and unfenced reservoirs/dugouts). In pasture 2 (Allotment 128), management flexibility could be realized to alter use levels through management of the tank; however, because of a natural management tendency to manage towards the middle (Fuhlendorf and Engle 2004 and Toombs et al. 2010) and in light of an Authorized Use that exceeds the initial estimated carrying capacity by 55 percent (after accounting for cow size), it is projected that moderate to heavy use would maintain a relatively homogenous herbaceous structure distribution on the landscape. The effects of fencing the developed spring site and moving the tank would depend on the new location of the tank. There would be a shift in the spatial arrangement of herbaceous structure from being centered on the current tank location to being centered on the new tank location. Use of the crested wheatgrass pastures in Allotment 126 may allow for regrowth of these stands and potentially provide improvement in the herbaceous structure distribution; however, heavy, repeated use on crested stands may impact productivity (Angell 1997). With the use of two to three herds, regrowth on the remaining pastures could be limited, which could limit improving the herbaceous structure distribution. Hardening stream crossings would not be expected to affect the spatial arrangement of herbaceous structure or the herbaceous structure distribution. Installing stream structures below the headcut on Whitetail Creek would have no effect on herbaceous structure. Authorized Use is proposed to remain unchanged from current management levels. With the possible exception on the crested wheatgrass units, there would not be expected to be an improvement in the herbaceous structure distribution on the remaining pastures due to the initial levels of Authorized Use under this alternative.

Adaptive Options – The most efficient tool from an herbaceous structure, grouse nesting and brooding habitat perspective, is adjusting the level of Authorized Use for these allotments. This tool would have the best potential to increase the amount of standing crop, i.e., increase High structure. Utilizing herding would likely result in further homogenization as cattle are moved from areas of high use to areas of low use, which could negatively impact potential secondary range. The effects of using fire to reduce juniper encroachment would be relative to the size and location of the treated areas. The larger the treated acres the more positive the effect there may be for increased levels of herbaceous structure because of the potential for more forage to disperse cattle. Temporarily fencing woody draws in addition to fencing a riparian exclosure above the headcut on Whitetail Creek would increase the livestock grazing pressure on the remaining biologically capable habitat types and decrease the potential for High herbaceous structure or existing High structure. Creating a riparian pasture and adjusting the AMs to account for its management would likely not affect herbaceous structure outside the pasture. Inside the pasture, however, may experience an increase in herbaceous structure under riparian pasture management objectives.

Seral Stages

Initial Actions – The predominance of mid seral stages among the sample sites is likely to be maintained because proposed livestock management would not be appreciably different from current management. Although delaying turn-in until June 1st or range readiness would facilitate

increased plant vigor and potential development of late seral stages among native grass communities, Authorized Use 56 percent greater than initial estimated carrying capacity after adjusting for cow size would continue to impede seral development. Broken land or invasive grass-dominated areas constituting about 10 percent of pasture 1 and 2, as well as additional occurrences of bluegrass that are relatively unpalatable during most of the grazing season, would contribute to apparent levels of over-stocking and utilization of the native forage component. Hay feeding would continue to assist the introduction and spread of invasive grasses.

Management of two pipeline-supplied water sources in pasture 2 would increase the evenness of livestock distribution and grazing disturbances, potentially decreasing excessive disturbance around favored tank sites and facilitating the maintenance of native plant communities. Although opportunities would exist for achieving the desired proportion of seral stages by influencing livestock distribution, the natural management tendency would be towards uniform or moderate grazing across the pasture that would result in the predominance of mid seral stages. Management of water sources in pasture 1 would be less effective at controlling livestock distribution due to two reservoirs, the developed spring, and several natural seeps or abandoned springs where livestock access would remain uncontrolled.

Combining Allotments 126 and 128 and implementing a complementary deferred rotation by utilizing crested wheatgrass pastures in Allotment 126 early in the season would assist in delaying turn-in and avoiding premature grazing disturbances of native-dominated pastures in Allotment 128. However, the continued management of multiple livestock herds could complicate consistent deferment of Allotment 128. Current twice-over rotations would be expected to continue that have the potential to decrease plant vigor and impede seral development.

Adaptive Options – Livestock herding would reduce excessive grazing disturbances in primary use areas and increase disturbances in secondary range. This would tend to homogenize grazing disturbances and seral stages across pastures with the potential for decreasing late seral stages in secondary range.

Utilization of fire to control Rocky Mountain juniper encroachment would assist in maintaining or increasing herbaceous plant vigor and production by removing the competitive effects of juniper. Initial estimated carrying capacity would be increased and livestock would be attracted to the flush of increased herbaceous production and nutrient content occurring in burned areas for one to several years. This would alter livestock distribution patterns and decrease grazing disturbances in current primary use areas that would facilitate increased plant vigor and seral development. Prescribed burning would also decrease plant litter that could temporarily decrease conditions favorable for the spread of invasive grasses. However, invasive bluegrass can benefit from the same positive effects of burning as other grasses, and infrequent prescribed burning or burning that is not conducted at sufficient intensity or synchronized with vulnerable growth periods of bluegrass have resulted in its increase (Dix 2010, Smith 2010). Fire can also assist the spread of noxious weeds. Thus, monitoring would be conducted to assess the effects of burning on plant composition and provide information for future management.

Reducing Authorized Use would facilitate increased plant vigor and shifts towards late seral stages if reductions were sufficient to result in lower levels of use compared to currently reported use. Increasing Authorized Use would have the opposite effect.

Construction of a riparian pasture would constitute about 1 percent of pasture 1 and would therefore not result in appreciably greater grazing disturbances outside the exclosure. The potential would exist for a shift towards late seral stages of herbaceous communities along the perimeter of the riparian pasture, but increased dominance of invasive grasses may occur with decreased grazing and increasing plant litter.

Sharp-tailed Grouse

Initial Actions – The proposed initial actions of this alternative vary little from current management and are not expected to appreciably enhance grouse nesting and brooding habitat. Rotating livestock distribution using water management would not be effective in pasture 1 (Allotment 128) because of the lack of controlled water sources and in pasture 2 (Allotment 128); management flexibility could be realized to alter use levels through management of the tanks. However, because of a natural management tendency to "manage towards the middle" and in light of an Authorized Use that exceeds the initial estimated carrying capacity by 55 percent for Allotment 128, it is projected that moderate to heavy use would enhance grouse nesting and brooding habitat. Depending on the new location of the tank, there would be a shift in the spatial arrangement of herbaceous structure from being centered on the current water source to being centered on the new tank location and would not have an appreciable impact on sharp-tailed grouse habitat. Use of the crested wheatgrass pastures in Allotment 126 may allow for regrowth of these stands and potentially provide opportunities for grouse nesting and brooding habitat; however, heavy, repeated use on crested stands may impact productivity (Angell 1997). With the use of two to three herds, regrowth on the remaining pastures could be limited which could limit improving sharp-tailed grouse nesting and brooding habitat. Hardening stream crossings would not be expected to affect the spatial arrangement of potential grouse habitat. Installing stream structures below the headcut on Whitetail Creek would have no affect on potential grouse habitat. Authorized Use is proposed to remain unchanged from current management levels. With the possible exception of the crested wheatgrass units, there would not be expected to be an improvement in sharp-tailed grouse nesting and brooding habitat on the remaining pastures because of the initial levels of Authorized Use under this alternative.

Adaptive Options – The most efficient tool from a herbaceous structure, grouse nesting, and brooding habitat perspective, is adjusting the level of Authorized Use for these combined allotments. This tool would have the best potential to increase the amount of standing crop towards High herbaceous structure, i.e. enhancing nesting and brooding habitat for grouse. Since utilizing herding would result in moderating use on the allotment(s), there would be an expected decrease in habitat variability. The effects of using fire to reduce juniper encroachment would be relative to the size and location of the treated areas. The larger the area that is treated, the more positive the effect there may be for increased levels of herbaceous structure because of the potential for increased forage to disperse cattle. Temporarily fencing woody draws in addition to fencing a riparian exclosure above the headcut on Whitetail Creek would increase the livestock grazing pressure on

the remaining biologically capable habitat types and decrease the potential for High herbaceous structure or existing High structure. However, this action could improve winter forage habitat for grouse because of the improvement in deciduous shrubs and trees. Creating a riparian pasture and adjusting the AMs to account for its management would likely not affect herbaceous structure outside the pasture. Inside the pasture, however, may experience an increase in herbaceous structure under riparian pasture management objectives. Like the fencing of woody draws above, this may also improve winter forage habitat for grouse.

Effects of Alternative 3A

Both initial and adaptive actions are the same as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the changes discussed below. The analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carry capacity.
- Combining Allotments 126 and 128 and implementing a seven-pasture, rest/deferred rotation grazing system.
- Constructing a 35-acre riparian exclosure in pasture 1 and building sediment traps/stream stabilization structures (no grazing of the exclosure for the first three years).

ADAPTIVE OPTIONS:

- Hardening one stream crossing/watering area upstream of the headcut along Whitetail Creek in Section 6.
- Constructing a 5- to 20-acre riparian exclosure above the headcut.
- Riparian exclosures: At the end of year three, vegetation surveys would be conducted on riparian exclosures and if the survey reveals excessive litter, the initiation of a compressed prescribed grazing in the late or dormant season would occur.
- Installing stream structures below the headcut on Whitetail Creek.
- Constructing 9- and 22-acre riparian exclosures on Whitetail Creek in pasture 1, Sections 6 and 31, respectively.

Range

Initial Actions – Authorized Use for this allotment would be 1,380 federal AUMs, which is the initial estimated carrying capacity for the allotments. The existing Authorized Use of 1,866 federal AMs converted to AUMs by adjusting for cow size would be 2,146 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 36 percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in cow size when calculating the number of head and season duration that can be grazed when planning the rotation for the allotment. This would result in fewer livestock numbers

because of the inventory permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock. However, the amount of forage harvested would be less than the existing forage harvested.

Combining Allotments 126 and 128 and implementing a seven-pasture, rest/deferred rotation would even out the federal AUMs available for both allotments and allow livestock to harvest forage during different periods of the grazing season. Native herbaceous plant communities, along with crested wheatgrass pastures, would have the opportunity for a recovery period during the growing season and during critical growing moisture periods. Individual pastures containing 70 percent crested wheatgrass would be treated as earlier season pastures by grazing during the month of May. This would defer turn-out on to native pastures until June 1st. There would be a change from the existing condition in the number of livestock herd grazing this allotment because the action is for one herd compared to two to three herds

The constructing of a riparian exclosure, approximately 35 acres in size, would fence out approximately 21 to 22 federal AUMs currently available for the first 3 years. Once this riparian exclosure has reached the desired conditions, livestock grazing will be allowed with a prescribed grazing plan, and the AUMs removed would be reinitiated. Due to the size of the exclosure and topography of the pasture, distribution of livestock would change because they would have to find alternate routes. There would be costs associated in installing fences and in annual maintenance.

Adaptive Options – Installing hardened stream crossing/watering areas along Whitetail Creek in Section 6 would not improve livestock distribution. However, it would reduce use of existing livestock creek crossings along Whitetail creek.

Constructing a 5- to 20-acre riparian exclosure above the headcut along Whitetail Creek would not have any effect on the distribution of livestock. A reduction in AUMs available in this pasture would have to be adjusted to the size of the exclosure because the forage would no longer be available to livestock. A 5-acre exclosure would have minimal effects (3 AUMS) and a 20-acre exclosure would require an adjustment in approximately 13 AUMS within Allotment 128 pasture 1.

The installation of a stream structure below the headcut on Whitetail Creek to dissipate stream energy would not have any effect on livestock grazing.

Constructing 9- and 22-acre riparian exclosures along Whitetail Creek, in Allotment 128 pasture 1, Sections 6 and 31, respectively would not have an effect on the distribution of livestock. There would be a need to adjust the available AUMs within Allotment 128 pasture 1 because of the size of the exclosures and to compensate for the amount of AUM reductions from the pasture. A 9-acre exclosure would have minimal effects (6 AUMS), and a 20-acre exclosure would require an adjustment in approximately 14 AUMS within Allotment 128 pasture 1.

Distribution would be affected in pasture 1 if all exclosures were built. The exclosures would limit where livestock stock could cross Whitetail Creek to reach either the north or south side of the pasture. This would create additional grazing pressure in areas where livestock cross. Initial losses in AUMs from installing three exclosures, would range from 30 to 49 AUMs. Once the exclosures reach the desired conditions, the AUMs would again become available under a prescribed grazing plan. This could be as soon as 3 years.

Riparian

Initial Actions – Reducing Authorized Use to 1,227 AUMs should help improve the uplands vegetation, which reduces overland flow further benefitting the riparian conditions along Whitetail Creek. A reduction in overland flow would result in reduced stream velocities and allow for the establishment of riparian vegetation and the building of stream banks.

The proposed 35-acre riparian exclosure immediately above and below the knickpoint on Whitetail Creek in Sections 6 and 31 would have the most direct effect on riparian condition. This would provide the best opportunity for riparian vegetation to reestablish itself in the least amount of time due to the exclusion of livestock grazing and related effects such as trailing and trampling. Planting native trees and shrubs and the construction of sediment traps and channel stabilizing structures along Whitetail Creek would accelerate restoration of this reach and better ensure a positive outcome.

It is expected that desired conditions on Whitetail Creek in pasture 1 would be achieved in 5 to 10 years.

Adaptive Options – The effects on riparian condition along Whitetail Creek from the construction of multiple riparian exclosures would be the same as described for the proposed 35-acre exclosure in the initial actions. Planting native trees and shrubs and the construction of sediment traps and channel stabilizing structures along Whitetail Creek would not occur, but it is expected that native trees and shrubs would grow naturally over time from protection.

It is expected that desired conditions on Whitetail Creek in pasture 1 would be achieved in 5 to 10 years.

Woody Draws

Initial Actions – Combining Allotments 126 and 128 and implementing a complementary rest/deferred rotation with one combined livestock herd would have positive and negative effects on woody draw conditions in Allotment 128. Although the intensity of browsing and trampling impacts would increase as a result of increased livestock numbers, the duration of grazing individual pastures would decrease. The shortened grazing seasons in individual pastures might increase opportunities for woody species regeneration, but would probably not be sufficient for woody plants to replace tissue lost to browsing. Increased disturbance of invasive grass layers in At Risk woody draws would have the potential to improve seedbed conditions for seedling establishment of desired woody species, and the once-over rest/deferred rotation might increase opportunities for seedlings to become established relative to twice-over grazing that presently occurs. The availability of five or more summer/fall pastures in the proposed rotation would also increase opportunities for woody seedling establishment by deferring seasons of use when livestock are apt to spend less time among woody draws. Woody draw conditions in pasture 4 would have the potential to decrease as a result of more consistent use and disturbances than presently occurs, but limited water availability in this pasture may impede consistent use and the number of summer pastures.

Decreasing Authorized Use 36 percent according to initial estimated carrying capacity after adjusting for cow size would result in potential levels of use two percent greater to 25 percent less

than the current range of reported use, thereby decreasing the level of browsing and trampling disturbances and facilitating the regeneration of desired trees and shrubs.

Adaptive Options – Constructing as many as five riparian exclosures or pastures along Whitetail Creek would increase the potential for improved riparian conditions and any included woody draws as a result of decreased browsing and trampling disturbances. Grazing in the exclosures would primarily be conducted over short intervals, often during the dormant season, in order to maintain PFC. Decreased access to the corridor of Whitetail Creek would have the potential to contribute to increased disturbances and decreased conditions of woody draws and riparian areas outside the exclosures.

Reducing Authorized Use would increase the potential for improved woody draw conditions by decreasing browsing and trampling disturbances and increasing opportunities for the regeneration of desired trees and shrubs. Increasing Authorized Use would have the opposite effect.

Herbaceous Structure

Initial Actions – The initial action of adjusting Authorized Use to more closely approximate the initial estimated carrying capacity would improve the potential to increase the proportion of High herbaceous structure within Allotment 128 through an increase in residual standing crop. However, the proposed 24 percent increase in Authorized Use on Allotment 126 would be counter-productive to improving the herbaceous structure distribution within that allotment. The effects of fencing the developed spring site and moving the tank would depend on the new location of the tank. There would be a shift in the spatial arrangement of herbaceous structure from being centered on the current tank location to being centered on the new tank location. Rotating livestock distribution using water management would not be effective in pasture 1 because of the lack of controlled water sources (Whitetail Creek and unfenced reservoirs/dugouts). In pasture 2, management flexibility could be realized to alter use levels through management of the tank; however, because of a natural management tendency to manage towards the middle (Fuhlendorf and Engle 2004 and Toombs et al. 2010), it is projected that moderate use would maintain a relatively homogenous herbaceous structure distribution on the landscape. In pasture 1, constructing a 35-acre riparian exclosure and installing stream structures below the headcut on Whitetail Creek plus planting native trees within the exclosure would have no appreciable effect on the herbaceous structure distribution because of the small size relative to the allotment, the configuration, and purpose of the riparian exclosure. The effects of a seven-pasture rest/deferred rotation system would depend partly on what happens to the AUMs deferred/displaced during the rest period of a particular pasture. In terms of a growing season rest, the rested pasture could potentially increase the proportion of High structure within the rested pasture and the allotment(s). But if the deferred AUMs from the rested pasture are displaced to the other pastures, there could be high use in the remaining grazed pastures that would be carrying a larger grazing burden. This could increase the occurrence of Low structure in the grazed pastures. Under this scenario, the repeated heavy use could eventually impact the ability of a pasture to produce Moderate to High structure. Some of the earlier grazed crested wheatgrass pastures in Allotment 126 could have time to regrow higher levels of herbaceous structure.

On the other hand, in the assumed spirit of Alternative 4, if the AUMs are deferred to other uses and not displaced to increase the grazing pressure on the other pastures, with all grazed pastures only

stocked to their appropriate initial estimated carrying capacity level, then there could potentially be more diverse herbaceous structure across the allotment(s) as a result.

Adaptive Options – The water and fencing actions described earlier would tend to homogenize herbaceous structure in the uplands. Utilizing rest to improve the riparian area would depend on the size and location of the rested area relative to the size of the pasture. Resting the entire pasture would have the largest positive impact on herbaceous structure within the pasture. If a small fence is used around the area of concern, then the effects to the surrounding uplands would be similar to using the water and fencing tool discussed above. The most effective tool for herbaceous structure is manipulating the Authorized Use level.

Seral Stages

Initial Actions – The initial actions would have an overall positive effect on the maintenance of native plant communities and potential development of late seral stages in Allotment 128. Combining Allotments 126 and 128 and implementing a seven-pasture complementary rest/deferred rotation with one livestock herd would increase the intensity and evenness of grazing disturbances within individual pastures as a result of greater livestock numbers. This would decrease the mosaic of grazing pressure and increase grazing disturbances in secondary range with potential decreases of late seral stages. However, once-over rather than twice-over grazing that occurs at present, as well as greater changes in the season of use, would provide greater opportunities for plants to complete critical growth stages, increase in vigor, and shift towards late seral stages. Decreasing Authorized Use by 36 percent in Allotment 128 according to initial estimated carrying capacity after adjusting for cow size would result in potential stocking levels 2 percent greater to 25 percent less than currently reported levels of use and would assist increased plant vigor by decreasing the level of grazing disturbance. Delaying turn-in until range readiness would assist the vigor of cool season grasses by removing premature grazing disturbances that frequently occur at present. Collectively, these proposals would facilitate the maintenance of native plant communities with an increased potential for achieving the desired mosaic of seral stages.

Impediments to increasing the maintenance of native plant communities would include the estimated 6-10 percent of pasture acreage dominated by invasive grasses that would be underutilized as a result of low palatability during the primary seasons of use. There would be some potential for decreased levels of Authorized Use to assist bluegrass expansion in portions of the allotment, but high livestock densities should impede the development of excessive litter that can assist bluegrass. Potential hay feeding in Allotment128 would maintain the introduction of invasive species and adverse impacts associated with high trampling and winter grazing that is not counted towards the level of Authorized Use.

Adaptive Options – Constructing as many as five riparian exclosures/pastures ranging from 5 to 35 acres in size would contribute to a small amount of increased grazing disturbances outside the exclosures. Four potential exclosures in pasture 1 would constitute only a little more than 2 percent of the pasture acreage and light grazing would eventually occur inside the exclosures as riparian conditions improve. The potential would exist for a shift towards late seral stage herbaceous communities along the perimeter of the exclosures but increased dominance of invasive grasses may occur with decreased grazing and increasing plant litter.

Sharp-tailed Grouse

Initial Actions – The initial action of adjusting Authorized Use to more closely approximate the initial estimated carrying capacity would enhance the nesting and brooding habitat for sharp-tailed grouse within Allotment 128 through an increase in residual standing crop. However, the proposed 24 percent increase in Authorized Use on Allotment 126 would be counter-productive to enhancing nesting and brooding habitat for sharp-tailed grouse within that allotment. In pasture 1, constructing a 35-acre riparian exclosure and installing stream structures below the headcut on Whitetail Creek plus planting native trees within the exclosure would have no appreciable effect on nesting and brooding habitat for sharp-tailed grouse because of the small size relative to the allotment, the configuration, and purpose of the riparian exclosure. However, it could provide winter forage opportunities on a small scale. The effects of a seven-pasture rest/deferred rotation system would depend partly on what happens to the AUMs deferred/displaced during the rest period of a particular pasture. In terms of a growing season rest, the rested pasture could potentially enhance the nesting and brooding habitat for sharp-tailed grouse within the rested pasture and the allotment(s). But if the deferred AUMs from the rested pasture are displaced to the other pastures, there could be high use in the remaining grazed pastures that would be carrying a larger grazing burden. (The differences in pasture sizes could be an issue in this system.) This could increase the occurrence of Low structure in the grazed pastures. Under this scenario, the repeated heavy use could eventually impact the ability of a pasture to produce quality nesting and brooding habitat. Some of the earlier grazed crested wheatgrass pastures in Allotment 126 could have time to regrow higher levels of herbaceous structure for spring nesting needs.

On the other hand, in the assumed spirit of Alternative 4, if the AUMs are deferred to other uses and not displaced to increase the grazing pressure on the other pastures, with all grazed pastures stocked only to their appropriate initial estimated carrying capacity level, then there could potentially be more diverse grouse habitat conditions across the allotment(s) as a result.

Adaptive Options – The water and fencing actions described earlier would tend to homogenize grouse habitat conditions in the uplands. Utilizing rest to improve conditions within the riparian area would depend on the size and location of the rested area relative to the size of the pasture. Resting the entire pasture would have the largest positive impact on grouse habitat within the pasture. If a small fence were to be used around the area of concern, then the effects to the surrounding uplands would be similar to using the water and fencing tool discussed above. The most effective tool for grouse habitat conditions would be by manipulating the Authorized Use level, all other things being equal.

Allotment 129

Table 129.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 129 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 1.31 — Backcountry Recreation Non-motorized	3169	64	
Management Area 2.2 — Research Natural Areas	78	2	
Management Area 3.65 — Rangelands With Diverse Natural-Appearing Landscapes	1668	34	
Total allotment acres	5544	100	
NFS acres	4915	89	
State land acres	292	5	
Private land acres	337	6	
Current permitted livestock grazing (AMs) on NFS lands			1090
Initial Estimated Carrying Capacity (AUMs) On NFS Lands			1519
Number of pastures containing NFS lands			4

Table 129.2 — Allotment 129 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	Surveys conducted in 1998/99 and 2004 show downward trend from PFC to FAR for portions of Magpie Creek located in the allotment. 2006 surveys rated the stream reach in pasture 2 and 0.7 miles in pasture 1 as PFC. The remaining reach in pasture 1 was rated as FAR-D for 0.6 miles, declining to NF for 1.55 miles before entering Allotment 282.	Initiate action to start the degraded reach in pasture 1 on an upward trend towards PFC.
Woody draws	56 percent of sampled woody draws were Healthy; 44 percent were At Risk due to insufficient regeneration.	Increase the successful recruitment of woody species.
Herbaceous Structure	Transect Results: Low — Meeting Objectives Moderate — Exceeding Objectives High — Below Objectives 2004 Transects: 1.55; 2.94; 1.00; 2.09; 3.06; 2.19; 3.05 2004 Stations percent: Low-32.14/Moderate-67.86/High-0 2005 Transects: 2.19; 1.84; 2.46; 3.49; 4.29 2005 Stations percent: Low-12/Moderate-85/High-3.	Manage for additional High structure on biologically capable habitats.
Seral stages	Of eight sample sites, six were at mid seral stages, one was at an early stage, and one was at a late stage, thereby approximating the desired proportion of seral stages. Invasive grasses are common along the major drainage corridors.	Maintain native plant communities with a range of seral stages and limit or decrease the extent of invasive grasses.
Sharp-tailed grouse	There is one known lek in the southern portion of pasture 4. In addition, the key areas associated with two leks have significant overlap with Allotments 129 and 131. The key areas associated with three other leks overlap slightly with these two allotments.	
Remarks	Less than 5 acres of Canada thistle, burdock, and leafy spurge (*Euphorbia esula* L.) noted in allotment. 2004 Magpie Fire burned through area, monitor for new noxious weed infestations.	

Table 129.3 — Allotment 129 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action	Alternative 3A	Alternative 4
• Authorized Use is 1,090 federal AMs (1,000 federal AMs are summer use and remainder are winter use). • Three-year average permitted use is 916 summer federal AMs.* • Permit type: Inventory (12 months). • Rotation: Four-pasture modified deferred rotation. • Class(s) of livestock: Cow/calf pairs and yearlings. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 1,090 of which 1,000 AMs are summer use and the remainder are winter use. • Reallocate Allotment 131 pastures 1 and 2 to Allotment 129. Reallocate Allotment 129 pasture 2 to Allotment 131. • Extend range water pipeline from well in Allotment 131 pasture 3 into Allotment 131 pasture 1. • Reclaim two reservoirs in Allotment 131 pasture 1. • In Section 3, develop water on fenceline between Allotment 129 pasture 1 and Allotment 131 pasture 1. • To eliminate the bottleneck in Allotment 131 pasture 3, remove the fenceline (Sections 11 and 12) between Allotment 129 pasture 2 and Allotment 131 pasture 3. • Create a riparian pasture by installing a northwest to southeast fence in pastures 1 and 2 (Sections 10 and 11). To establish/enhance willows along Magpie Creek, rest pasture one year, and then annually rotate the season of use beginning with dormant season grazing. • In Allotment 129 pasture 4, extend the existing range water pipeline from Section 15 to the northwest quarter of Section 23, T144N, R101W. • Reclaim developed spring	**Initial Actions** • Authorized federal AMs: 1,090 of which 1,000 AMs are summer use and the remainder are winter use. • Reallocate Allotment 131 pastures 1 and 2 to Allotment 129. Reallocate Allotment 129 pasture 2 to Allotment 131. • Extend range water pipeline from well in Allotment 131 pasture 3 into Allotment 131 pasture 1. • Reclaim two reservoirs in Allotment 131 pasture 1. • Extend range water pipeline from well in Allotment 131 pasture 3 into Allotment 129 pasture 2 in Section 11. • In Section 3, develop water on fenceline between Allotment 129 pasture 1 and Allotment 131 pasture 1. • To eliminate the bottleneck in Allotment 131 pasture 3, remove the fenceline (Sections 11 and 12) between Allotment 129 pasture 2 and Allotment 131 pasture 3. • Create a riparian pasture by installing a northwest to southeast fence in pastures 1 and 2 (Sections 10 and 11). To establish/enhance willows along Magpie Creek rest pasture one year and then annually rotate the season of use beginning with dormant season grazing. • In Allotment 129 pasture 4, extend the existing range water pipeline from	**Initial Actions** • Authorized federal AUMs: 1,090 of which 1,000 AUMs are summer use and the remainder are winter use. • Reallocate Allotment 131 pastures 1 and 2 to Allotment 129. Reallocate Allotment 129 pasture 2 to Allotment 131. • In Section 3, develop water on fenceline between Allotment 129 pasture 1 and Allotment 131 pasture 1, reclaim or fence one reservoir in Allotment 131 pasture 1 (west side). (WC, WF) • Remove the boundary fence between Allotments 129 pasture 2 and Allotment 131 pasture 3 in the south half of Sections 11 and 12 to eliminate bottleneck in Allotment 131 pasture 3. • Create a riparian pasture, installing a northwest to southeast fence in pastures 1 and 2 (Sections 10 and 11). To establish/enhance willows along Magpie Creek rest pasture one year and then annually rotate the season of use beginning with dormant season grazing. • In pasture 1, on Magpie Creek, construct a 94-acre riparian exclosure with no grazing for first 3 years, and plant willow, cottonwood or other native species. **Adaptive Options** • Extend range water pipeline from well in Allotment 131 pasture 3 into Allotment 131

Alternative 2 - Current Management	Alternative 3 - Proposed Action	Alternative 3A	Alternative 4
	located in the southwest quarter of the southwest quarter of Section 14, T144N, R101W. **Adaptive Options** • Temporarily fence heavily impacted woody draws. • Adjust Authorized Use. • Harden watering area in the southwest quarter of the southwest quarter of Section 11 to define access to Magpie Creek.	Section 15 to the northwest quarter of Section 23, T144N, R101W. • Reclaim developed spring located in the southwest quarter of the southwest quarter of Section 14, T144N, R101W. **Adaptive Options** • Temporarily fence heavily impacted woody draws. • Adjust Authorized Use. • Harden watering area in the southwest quarter of the southwest quarter of Section 11 to define access to Magpie Creek.	pasture 1 and reclaim one reservoir in Allotment 131 pasture 1 (east side). • In Allotment 129 pasture 4, extend the existing range water pipeline from Section 15 to the northwest quarter of Section 23, T144N, R101W. • Reclaim developed spring located in the southwest quarter of the southwest quarter of Section 14, T144N, R101W. • Riparian exclosure: At end of year 3, conduct vegetation survey. If riparian vegetation has been established on 80 percent of stream banks and stream deposition is occurring then initiate late or dormant season prescribed grazing. Prescribed grazing would be identified in AOI/AW. • Construct 42- and 59-acre riparian exclosures on Magpie Creek in pasture 1 in Section 10. (Reaches 2&3). Adjust Authorized Use.
Monitoring • Review annual planned management identified in Allotment Worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings annually for three years then reevaluate survey frequency. • Complete Properly Functioning Condition survey once every 3 years then once every 5 years if a positive trend has been established. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** Same as Alternative 3.	**Monitoring** • Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 129 — Existing Condition

Range – This allotment is approximately 5,544 acres in total size and contains private, state, and NFS lands with 4,915 acres of NFS lands. Currently this allotment is issued a private allocation inventory permit for 125 head for 8 months by the MGA. With this type of permit there is a high probability of livestock being on NFS lands the entire year, not just the typical May 1st to December 31st. Typically, livestock are wintered on private and intermingled private and NFS lands during the winter months of January through April. This allotment was part of the historic Magpie Common before the 1974 AMP. Since 1974, there have been two amendments added to the 1974 AMP. The allotment was subdivided into five pastures; four of them contain NFS lands. The pastures themselves range from 245 acres to 1,871 acres. Currently 1,090 AMs are provided by NFS lands. Water developments within this allotment include developed springs, reservoirs, dugouts, and a well/stock tank.

The rotation changes from year to year. A summary of the rotation goes as follows: livestock normally begin grazing in pasture 2 to start the grazing season and numbers normally vary between 68 to around 120 head. The class of livestock also varies from year to year depending on climate conditions going into the grazing season. The current permittee may run cow/calf pairs and yearlings one year but then run strictly cow/calf pairs the next year. The number of livestock grazing days in pasture 2 varies from 12 to 31, depending on weather conditions and the growing season.

In one out of four grazing seasons, the permittee will start the grazing season by splitting the yearlings off into pasture 1. The livestock are then rotated to pasture 3 and the headquarter pasture, or to pasture 4 and the headquarter pasture, or the permittee will open the gates in pasture 2 to allow the livestock to drift into the other pastures. The number of grazing days within the pastures varies from 75 to 100 days before they are rotated to pasture 1 or go back to pasture 2. The variation of days in the length of the grazing season is related to the climatic conditions and available forage for that year, and on availability and quality of water in the developments. Normally, livestock end the grazing season in pasture 1. The lower portions of Sections 3 and 4 have Magpie Creek running through them. Use along the creek looks to be moderate in the southwest portion of Section 3 and southeast portion of Section 4.

Pastures 1, 3, and 4 were visited on September 10, 2004 for distribution mapping purposes. The northwest portion of pasture 1 is fairly rough; however, it has pockets that livestock can access. Utilization in these areas looked to be light over the years. The area in the eastern half of Section 4 and western half of Section 3 had good native plant species composition and litter cover. Forb species richness was also good in this area (visual observation). Although it’s a rough area of pasture 1, livestock seem to be getting into these areas; however, use has been light. Portions of pastures 3 and 4 were burned during the 2004 Magpie fire. Due to the topography and location of the fire and a deferred turn-out in these pastures, grazing was allowed during the 2005 grazing season. On July 20, 2004, a vegetative composition transect was read. During this visit, the use in this area was light to moderate.

Utilization around the well in the northwest quarter of the southeast quarter of Section 10 is higher than the surrounding area. This is to be expected. Also, the use along Magpie Creek in Section 10 is high, which, again, is expected. The woody draw along the two-track trail does show signs of use. A browse line was also evident within these woody stands. There is evidence along the old two-track trail of some type of disturbance. Species composition consisted of crested wheatgrass, silver sagebrush (*Artemisia cana* Pursh), plains prickly pear (*Opuntia polyacantha* Haw.), and western snowberry (*Symphoricarpos occidentalis* Hook.).

On September 23, 2004, distribution mapping was performed on pasture 2 which is approximately 1,305 acres in size. Overall, this pasture has good litter cover throughout with evidence of moderate grazing. The eastern half of Section 14 is relatively rough with Rocky Mountain juniper pockets. Species composition was good with a very good mixture of native species. Along Magpie Creek there was a mosaic pattern of green ash (*Fraxinus pennsylvanica* Marsh.), cottonwood (*Populus deltoides* Marsh. subsp. *monilifera* (Ait.) Eckenw.), western snowberry, and some Rocky Mountain juniper. Within this pasture the use seems to be more concentrated along the creek and at the well/tank facility in the northeast quarter of Section 11. Within the moderate use areas in Section 11 there was a mosaic pattern of native vegetation, such as native sedges, forbs, and shrub species.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there are fewer than 5 acres of Canada thistle, burdock, and leafy spurge in this allotment. Through recent weed inventories of the 2004 Magpie Fire area and communication among the Forest Service, Billings County Weed Officer, and the permittee, other infestations have been identified. Herbicides have been the primary control agent for noxious weeds within this allotment. The threat of salt cedar (*Tamarix* spp.) and leafy spurge is high along Magpie Creek.

Oil and gas development on NFS lands in this allotment has removed a total of approximately 42.3 acres from livestock access. A total of approximately 20.6 acres of oil and gas pads and access roads have been reclaimed and are, or will be, available for livestock access. Associated forage from these acres is approximately 12.7 and 6.2 AUMs, respectively.

Riparian –

Magpie Creek flows through Allotment 129. The upstream reach (Reach 4) in Allotment 129 pasture 2 has a functionality rating of PFC. In Allotment 129 pasture 1, the functionality rating progressively declines downstream, changing from PFC (0.7-mile reach; reach 4) to FAR-D (0.6-mile reach; reach 5) to NF (1.55-mile reach; reach 5; see table below).

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
129-01	Magpie Creek (4)	0.66					0.66
129-02	Magpie Creek (4)	1.81					1.81
129-01	Magpie Creek (5)				0.58	1.55	2.13

The condition along this reach of Magpie Creek is of concern, because it was rated as PFC during riparian surveys in 1998 and 1999, but FAR or NF in 2004 and 2006 surveys. Some of the problems noted in the 2006 survey include:

- extensive livestock trailing along banks,
- high forage consumption (>50 percent) on bottomlands,
- sparse riparian vegetation,
- lack of moisture storage in banks and loss of base flow,
- vertical banks along downstream end of reach suggest recent channel incision, and
- general absence of riparian vegetation on point bars.

Figure 129.1 — Reaches 4 and 5 of Magpie Creek have incised since the 1980s. The high width/depth ratio is indicative of high sediment transport, excessive channel energy, and flashy hydroperiod. Riparian vegetation is poorly established along most of these reaches. Efforts to establish riparian vegetation should lead to increased bank stability, decreased erosion and sediment transport, and greater conservation of stream discharge through bank storage of moisture.

Woody Draws – Of nine sampled woody draws in three pastures, 56 percent were Healthy and 44 percent were At Risk. Rocky Mountain juniper occurred in significant amounts in portions of some woody draws, and comprised the dominant woodland type along steep north aspect slopes in all pastures. Woody draws along the drainage valley of Magpie Creek tended to be At Risk, while those among more rugged topography and first order drainages tended to be Healthy.

Herbaceous Structure – There were seven randomly sampled VOR transects measured in 2004. One was Low structure, and six were Moderate structure. Station averages showed Low structure at approximately 32 percent, and Moderate structure at 68 percent. No High structure transects or stations were recorded.

Five transects were resurveyed in 2005. Four of the five transects were Moderate, and one was High. Station averages showed approximately 12 percent in Low, and 85 percent in Moderate, and 3 percent in High structure.

Current management under the current allotment configuration is providing diverse proportions of herbaceous structures at the transect level but it appears it is still providing inadequate proportions of High herbaceous structure at transect and station levels.

On September 12, 2006, members of the ID team made a field trip to assess the herbaceous structure because the permittee had raised a challenge to the results of the previous survey (2004). The team conducted four transects in areas that appeared to hold High structure. The four transects had VORs of 3.15, 2.95, 2.96, and 4.80. Three were Moderate structure and one was High structure. After further assessment, the IDT determined that there was not enough High structure for the allotment to address the herbaceous structure objectives.

Seral Stages – Of eight sample plots, six were at mid seral stages, while one site was at an early stage and one site was at a late stage. Native grass communities generally dominated all four pastures but only one of the sample sites was without invasive grasses. One site was approaching an Invaded Grass State. Invasive grasses were most prominent along the major drainage valleys that receive a high proportion of the livestock use due to rugged topography away from the valleys. Oil and gas developments that include fourteen active or reclaimed well sites and almost four miles of access road have contributed to invasive grass occurrences. The only broken land in the allotment includes a 40-acre parcel in pasture 4 that constituted less than 3 percent of the pasture. A portion of the Two Top–Big Top RNA occurs in pasture 1 but receives no significant livestock use due to topographic constraints.

An NDSU plot along a tributary on the eastern side of pasture 1 was at an early seral stage with dominance of blue grama and sedge and 25 percent frequency of cheatgrass. A sere plot 0.5 miles to the west along another tributary was at a mid seral stage with high amounts of blue grama and light amounts of bluegrass. Another NDSU plot along a tributary near the center of the pasture was at a mid seral stage with Kentucky bluegrass comprising 25 percent of the total grass production. An ecoplot overlain by a belt transect on the west side of the pasture along Magpie Creek indicted similar plant composition with the addition of crested wheatgrass. Several Robel transects supported the dominance of native grass communities with varying amounts of invasive grasses. The north end of the pasture exhibits rugged topography where livestock use is concentrated along prominent second-order channels that drain south to Magpie Creek. A high potential exists for the occurrence of late seral communities in secondary habitat types on slopes and benches above first-order drainages in this area.

Broad valleys associated with Magpie Creek occurred in the north half of pasture 2. A sere plot along a broad lowland swale away from Magpie Creek was at a mid seral stage with blue grama and western wheatgrass dominance and infrequent patches of bluegrass. An NDSU sample plot located about 800 feet to the west was also at a mid seral stage but with overwhelming dominance of western wheatgrass and no invasive grasses. Of two Robel transects along Magpie Creek, Kentucky bluegrass was the dominant species along one transect and occurred in trace amounts along the second transect. The south half of the pasture increased in ruggedness and a sere plot on a narrow ridgeline was at a mid seral stage with high amounts of blue grama and scattered patches of bluegrass and annual brome.

Pasture 3 was the smallest of the pastures and contained 47 percent NFS land. An NDSU sample plot located on rugged uplands on state land was suggestive of a late seral stage with light amounts of crested wheatgrass likely derived from a nearby oil well site.

An NDSU sample plot along the head of a drainage valley on the east side pasture 4 was at a mid seral stage with light amounts of Kentucky bluegrass. An ecoplot on the west side of the pasture was dominated by crested wheatgrass but affected by a reclaimed oil well site. Three Robel transects and one belt transect suggested the predominance of native grass communities at mid seral stages with invasive grass occurrences increasing along improved roads.

Sharp-tailed Grouse – There is one lek in the southern portion of Allotment 129 pasture 4. In addition, the key areas (the area ≤one mile of a lek) associated with two other leks have significant overlap with the allotment. The key areas associated with three other lek areas overlap slightly with the allotment. Though the transect data reflects a diverse proportion of herbaceous structure, station data indicates a low proportion of High structure stations important for nesting and brooding grouse.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed two years later.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian condition along Magpie Creek as described in the existing condition would improve and evolve toward desired riparian conditions over time. Improvement would result from the establishment of riparian vegetation which would capture sediment and build stream banks.

Woody Draws – Woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate increased tree and shrub regeneration. However, increased plant litter resulting from the removal of livestock grazing would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock, there would be increased opportunity for the development of High and Moderate structure, and a decrease in the amount of Low structure.

Seral Stages – The removal of livestock grazing disturbances would facilitate a shift towards late seral stage communities. Plant diversity and the desired range of seral stages would decrease with the shift towards late seral stages. The removal of livestock grazing would facilitate the accumulation of plant litter that would in turn facilitate the expansion of invasive grasses that are intermixed among most of the plant communities. Increasing invasive grasses would impede the development or maintenance of late seral stages and result in transitions to Invaded Grass States. Transitions would occur relatively quickly along the major drainage valleys where invasive grasses are currently most prominent and would continue spreading along numerous tributary drainages.

Sharp-tailed Grouse – The increase in High structure from removal of livestock disturbance of habitat would benefit nesting and brooding habitat for sharp-tailed grouse. However, over time the decrease in forb diversity would decrease foraging opportunities. To a lesser extent, nesting and

brooding quality would also decrease because of lower quality habitat associated with invasive grasses that may invade local habitats.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by an inventory grazing association permit, and Authorized Use is 1090 federal AMs of which 1,000 are summer use and the remainder are winter use.
- Cow/calf pairs and yearlings are run in a four-pasture modified deferred rotation.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian condition along Magpie Creek as described in the existing condition would continue.

Woody Draws – Present woody draw conditions would persist with the continuation of current grazing management because livestock browsing and trampling disturbances were the main factor of At Risk conditions occurring in 44 percent of the sampled sites. Although the allotment is under-stocked compared to initial estimated carrying capacity, steep slopes, rugged topography, and high proportions of secondary range that were not incorporated in the estimate would decrease the value of carrying capacity. Topographic constraints increase or concentrate the degree of livestock utilization and woody draw disturbances in primary use areas characterized by relatively gentle and accessible drainage valleys.

Herbaceous Structure – Reflective of the Authorized Use level below the initial estimated carrying capacity by 21 percent, after accounting for cow size, the herbaceous structure distribution, as evidenced by the VOR transect samples, was approaching meeting the herbaceous structure objectives in 2004, though still short of High herbaceous structure at the transect and station scale. The 2005 subsample indicates that at least in pasture 4, that the allotment was providing some High structure at the transect level consistent with objectives. However, station data indicate that station level herbaceous structure is still dominated by Low and Moderate structure classes. Retaining similar Authorized Use levels in conjunction with a modified deferred rotation system contribute to existing herbaceous structure levels. If the proposed drought strategy had been in place in 2004, it is possible that this allotment may have met the desired herbaceous structure distribution consistent with the drought strategy.

Seral Stages – Continuation of current management would maintain the current proportion of seral stages among the sample sites that approximate desired conditions. However, invasive grasses

would have the potential to continue spreading along the primary use areas of Magpie Creek and tributary drainages, and would facilitate premature grazing of native grasses during late winter/early spring and potential hay feeding during years of high snow cover. Twice and thrice-over grazing rotations increase the frequency of disturbance and decrease opportunities for plant recovery and the completion of critical growth stages, with potential decreases in plant vigor assisting the spread of invasive grasses. Potentially increased stocking to the level of Authorized Use that exceeds reported use by 7 to 31 percent would increase grazing disturbances and contribute to shifts towards early seral stages and/or increasing invasive grasses.

Sharp-tailed Grouse – Under the current allotment configuration, current management is approaching meeting herbaceous structure objectives on a transect scale. However, station data indicate that station level herbaceous structure is still dominated by Low and Moderate structure classes. Therefore, there is still a need to improve the proportion of High herbaceous structure component in the allotment and current management is not meeting it at this time. Dormant season use reduces herbaceous structure from fall readings, thus, affecting spring grouse nesting and brooding habitat potential.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 1,090 federal AMs of which 1,000 AMs are summer use and the remainder are winter use.
- Reallocating Allotment 131 pastures 1 and 2 to Allotment 129 and reallocating Allotment 129 pasture 2 to Allotment 131.
- Extending the range water pipeline from the well in Allotment 131 pasture 3 into Allotment 131 pasture 1.
- Reclaiming two reservoirs in Allotment 131 pasture 1.
- In Section 3, developing water on the fenceline between Allotment 129 pasture 1 and Allotment 131 pasture 1.
- To eliminate the bottleneck in Allotment 131 pasture 3, removing the fenceline (Sections 11 and 12) between Allotment 129 pasture 2 and Allotment 131 pasture 3.
- Creating a riparian pasture by installing a northwest to southeast fence in pastures 1 and 2 (Sections 10 and 11), to establish/enhance willows along Magpie Creek; resting pasture 1 year and then annually rotate the season of use beginning with dormant season grazing.
- In Allotment 129 pasture 4, extending the existing range water pipeline from Section 15 to the northwestern quarter of Section 23.
- Reclaiming a developed spring located in the southwest quarter of the southwest quarter of Section 14.

ADAPTIVE OPTIONS:

- Temporarily fencing heavily impacted woody draws.
- Adjusting Authorized Use.
- Hardening the watering area in the southwestern quarter of the southwest quarter of Section 11 to define access to Magpie Creek.

Range

Initial Actions – Under this alternative Authorized Use would be 1,090 federal AMs, of which 1,000 federal AMs would be available for the summer grazing season and 90 federal AMs would be available for winter grazing. The action outlined below of exchange of pastures between Allotments 129 and 131 would result in an adjusting Authorized Use due to the loss of AMs and NFS acreage.

The exchange of Allotment 131 pastures 1 and 2 for Allotment 129 pasture 2 would provide additional flexibility to the permittees and improve livestock distribution in the northwestern portion of Allotment 131 pasture 1. Allotment 129 would lose approximately 84 acres of NFS lands and approximately 30 to 35 federal AMs in the exchange resulting in a decrease in the Authorized Use. Since this allotment is an inventory permit and carries 90 AMs in the winter, grazing the AMs would be removed from the summer or the winter grazing seasons.

Development of a range water pipeline from a well in Allotment 131 pasture 3 into Allotment 131 pasture 1 would change the distribution within pasture 1 because of the unreliable livestock water provided by the existing reservoirs. Reclaiming the two reservoirs in Allotment 131 pasture 1 would have little to no effect on the distribution of livestock since the reservoirs are currently seasonal to nonfunctional. No adjustments in AUMs would be needed due to the size of the reclamations.

The development of water on the fenceline between Allotment 129 pasture 1 and Allotment 131 pasture 1, Section 3, would change livestock distribution in the area of the new stock tank because livestock are not attracted to this area currently.

The current shape and size of pasture 3 in Allotment 131 has created a bottle neck which has had an effect on livestock distribution and has increased grazing pressure in this location. By removing this bottle neck (the boundary fence between Allotment 129 pasture 2 and Allotment 131 pasture 3 in the southern half of Section 11), livestock will no longer be confined to the smaller area because the size of the pasture would increase. Over time, the grazing pressure would be less in areas currently being heavily grazed. Heavier grazing will still occur within 1/8 of a mile from the existing water development in pasture 1 of Allotment 131.

Creation of a riparian pasture by installing a fence from the northwest to the southeast in pastures 1 and 2 (Sections 11 and 12), and annually changing the season of use within the created riparian pastures, would change the distribution of livestock in both pastures due to the change in the size of the pastures and seasonality of grazing. This action would allow more control of the grazing pressure along Magpie Creek because livestock would no longer have free access to the riparian areas when grazing the northern half of the two pastures.

The establishment and enhancement of willows along Magpie Creek by resting riparian pastures for 1 year then annually rotating the season of use, beginning the rotation with a dormant season grazing, would initially affect the amount of forage available to livestock in this allotment. Adjustments would need to be made in the number of livestock stocked in the remaining pasture to assure extra grazing pressure is not applied to these pastures. The number of livestock would be reduced in the first year of implementation because the allotment is currently being permitted through the MGA as an inventory allotment.

Extending the existing range water pipeline from Section 15 to the northwestern quarter of Section 23, T144N, R101W and reclaiming an existing spring development in the southwestern quarter of the southwest quarter of Section 14, T144N, R101W would not affect the available federal AMs; however, it would improve the distribution of livestock because of the existing condition of the spring development.

Adaptive Options – Fencing high-value woody draws would have little to no change in livestock distribution across the allotment if the exclosures are kept to a small acreage. Forage within the exclosures would no longer be available for livestock grazing. A large woody draw exclosure would increase livestock grazing pressure on the remaining forage and change the distribution of livestock. As a result, adjustments in available AMs would need to be changed accordingly because of the AMs excluded from livestock grazing. There will be a cost to install these fences and as a result there will be additional cost to maintain the fence to prevent livestock access to the woody draws.

Adjusting Authorized Use downward would result in fewer livestock numbers because of the inventory permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock. However, the amount of forage harvested would be less than the existing forage harvested.

Hardening the creek bottom in the southwestern quarter of the southwest quarter of Section 11 to define access to Magpie Creek would not have any effects on livestock grazing.

Riparian

Initial Actions – The reallocation of pastures from Allotment 129 to Allotment 131, and vice versa, would have no effect on riparian conditions along Magpie Creek, Reach 5. There is no riparian habitat in the Allotment 131 pastures to be reallocated, and desired riparian conditions in Allotment 129 pasture 2 are being met.

The development of off-stream water sources in pasture 1 would benefit the riparian condition of Magpie Creek in Reach 5 by reducing livestock pressure on the creek for a water source. Riparian conditions would improve by minimizing trailing and trampling in the riparian area allowing for herbaceous and woody riparian vegetation recovery.

Reclaiming the two reservoirs in Allotment 131 pasture 1 would have little to no effect on the distribution of livestock since the reservoirs are currently seasonal to nonfunctional, so there would be no effect on riparian conditions along Magpie Creek, Reach 5, in Allotment 129 pasture 1.

The removing of a bottle neck (the boundary fence between Allotment 129 pasture 2 and Allotment 131 pasture 3 in the southern half of Section 11) would have no effect on riparian condition along

Magpie Creek in Allotment 129 pasture 1, which is a separate pasture. It is expected that desired conditions along Magpie Creek in Allotment 129 pasture 2 would continue due to the distance of separation from the bottleneck area.

The proposed riparian pasture in pastures 1 and 2 should improve riparian function along Magpie Creek. The change in grazing rotation is intended to improve the establishment of riparian willows, which greatly strengthens channel banks and entraps stream sediment. Although the riparian area would benefit from the creation of a riparian pasture, complete recovery is unlikely in the short term because the local topography funnels livestock into the creek bottom. Also infrastructure, such as corrals, water developments, and feeding stations are concentrated near Magpie Creek and the most palatable vegetation is located along the creek.

The reclamation of the spring in Section 14 would result in the re-establishment of lentic riparian habitat associated with the spring. The addition of a water source in pasture 4 is intended to replace the reclaimed spring.

It is expected that desired conditions on Magpie Creek in pasture 1 would be achieved in 5 to 10 years.

Adaptive Options – Temporarily fencing heavily impacted woody draws would not have an effect on riparian conditions along Magpie Creek because there would be little to no change in livestock distribution across the allotment, if fenced woody draws were kept to a small acreage.

Reducing Authorized Use should help improve the uplands vegetation which in turn reduces overland flow benefitting the riparian condition along Magpie Creek. A reduction in overland flow delivered to the creek would result in reduced stream velocities allowing for the establishment of riparian vegetation which would build stream banks.

Hardening the watering area of Magpie Creek in Section 11 should benefit stream conditions through this reach by protecting banks from livestock trampling and trailing.

It is expected that desired conditions on Magpie Creek in pasture 1 would be achieved in 5 to 10 years.

Woody Draws

Initial Actions – Exchanging Allotment 129 pasture 2 for Allotment 131 pastures 1 and 2 would slightly increase the percentage of Healthy woody draws and decrease At Risk draws in Allotment 129, with an opposite effect in Allotment 131. Woody draw conditions in Allotment 131 pastures 1 and 2 would have the potential to decrease after the exchange because the frequency of summer use would increase compared to the predominance of winter management under Allotment 131. Allotment 129 would still consist of four pastures because the fenceline/natural boundary between Allotment 131 pastures 1 and 2 is poorly functioning. Multiple rotations would continue in Allotment 129 under the 12-month inventory permit and contribute to the level of woody draw disturbances. Potentially increased stocking to the level of Authorized Use compared to reported use would increase woody draw disturbances and decrease conditions.

Creation of a riparian pasture along Magpie Creek by constructing fences along the north side of the creek in Allotment 129 pastures 1 and 2 could increase the potential for improved riparian and

woody draw conditions by decreasing livestock browsing and trampling disturbances sufficiently to achieve PFC conditions. Woody draws along the creek margins as well as along upland drainages at the south end of pastures 1 and 2 would experience decreased browsing and trampling disturbances, particularly when the riparian pastures are utilized during the winter. However, the decreased pasture sizes would increase the evenness of livestock distribution with the potential for increased woody draw disturbances and decreasing conditions. This would be most apt to occur in the north halves of pastures 1 and 2 outside the riparian pasture, but would also have the potential to occur within the riparian pasture depending on the seasons and level of use. No adjustments in Authorized Use are proposed to accommodate decreased use within the riparian pastures, so the potential would occur for increased use and woody draw disturbances in other portions of the allotment. Decreasing pasture sizes would conflict with Grasslands Plan goals for increasing the size of pastures within the Badlands Geographic Area (p 2-14), but some of the decrease in pasture size would be offset by removing fencelines and adding the north portion of Allotment 129 pasture 2 with Allotment 131 pasture 3.

Extending water pipelines to three new water tanks to replace two dugout reservoirs in Allotment 131 pasture 1 (now part of allotment 129) and one developed spring in Allotment 129 pasture 4, all of which would be reclaimed, would have a slightly negative effect on the extent of woody draw disturbances. Reclamation of a 0.5-acre shallow reservoir at the south end of Allotment 131 would result in the loss of a small wetland with relatively good condition cottonwood and willow trees around the shoreline. The watershed of the pond is relatively small and restoring the natural hydrology would have little benefit for downstream woody draw habitat compared to maintaining the riparian trees. Reclamation of a smaller reservoir at the north end of the pasture would affect a surrounding woody draw community, but it would have a greater potential to persist after reclamation disturbances because green ash and other woody species in this area are not dependent on riparian conditions of the reservoir.

Replacing the reservoirs with pipeline-supplied water tanks would maintain livestock disturbances within adjacent or different woody draws depending on the final tank locations. The tank proposed to replace the north reservoir would be situated along the pasture fenceline of Allotment 129 pasture 1 and Allotment 131 pasture 1, and would increase livestock disturbances in woody draws occurring in secondary range at the north end of Allotment 129 pasture 1. Although numerous Rocky Mountain juniper communities in this area would disperse livestock disturbances throughout woodland communities to some extent, topography would funnel livestock trailing along the lower end of several first order drainages where woody draws are concentrated, thereby ensuring increased woody draw disturbances. The pipeline supplied water tanks could be managed to control livestock distribution, but would nonetheless result in a net increase of woody draw disturbances. The more reliable water tanks might assist greater implementation of a deferred rotation, but would not sufficiently decrease or limit woody draw disturbances due to the continued frequency of grazing each pasture during the warm summer months.

Reclamation of a developed spring in pasture 4 and construction of a water tank in open grassland as much as 0.5 miles to the north would assist improved conditions of adjacent small woody draw

patches by decreasing livestock disturbances around the spring. Reclamation of the spring would contribute to Grasslands Plan goals for restoring or improving 80 percent of spring habitat.

Adaptive Options – Fencing woody draws and/or reducing Authorized Use would facilitate improved woody draw conditions by increasing the potential regeneration of desired woody species by removing or decreasing livestock browsing and trampling disturbances. However, increased plant litter resulting from the removal of livestock grazing in fenced exclosures would facilitate increased development of existing invasive grasses that have the potential to decrease woody species regeneration. Hardening water crossing sites along Magpie Creek could alleviate or concentrate livestock browsing and trampling disturbances to specific locations, thereby decreasing disturbances along other portions of the creek with the potential to facilitate the development or increase the extent of woody draw patches.

Herbaceous Structure

Initial Actions – The proposed actions of this alternative would encourage a more even distribution of livestock on the uplands using increased or improved water in the uplands to increase even utilization. Replacing nonfunctional/seasonal reservoirs with water tanks would extend the grazing season in this pasture at the expense of potential secondary range which could depress potential High herbaceous structure in Allotment 131 pasture 1 and Allotment 129 pasture 1. The effects of placing water on the fenceline in Section 3 would result in minor changes in Allotment 131 pasture 1 due to an already existing water source (to be reclaimed) in this portion of the pasture. Conversely, in Allotment 129 pasture 1, the tank would introduce a new water source at the far north end of the pasture. Much of the area around the proproposed tank location in Allotment 129 pasture 1 is dominated by trees or nonvegetated badlands terrain. The effects from the tank (off the pipeline) replacing the eastern reservoir would depend on its location. The closer the tank is to the reservoir, the less likely there would be differences in livestock distribution and its effects to herbaceous structure. Replacing the spring development (southwest Section 14) with a tank (northwest Section 23) on a water line could also homogenize distribution, but the degree would depend on the distance between the two facilities and other watering facilities. Therefore, the effects from the new tanks are that they will generally contribute to a more homogenized landscape, particularly within the context of the Authorized Use of this alternative. The effects from creating a riparian pasture would be relative to the size and configuration of the riparian exclosure. However, it appears, superficially at least, that there should be an improvement in the diversity of herbaceous structure due to the amount of habitat potential outside the riparian zone but within the riparian pasture. On the other hand, the nonriparian pasture may experience even more pressure with the deferred AMs from the riparian management guidelines creating a more homogenous herbaceous structure distribution within that pasture. Retaining the current level of Authorized Use is projected to contribute to the retention of the existing herbaceous structure distribution. Since even distribution appears to be an objective of the proposed actions, then it can be expected that herbaceous structure would reflect those same objectives.

Adaptive Options – The most efficient tool to manipulate herbaceous structure is adjusting the Authorized Use level for the allotment. Downward adjustments can increase the amount of residual cover, therefore potentially increasing the proportion of High structure grasslands and improving

the herbaceous structure distribution in the allotment. The effects of temporarily fencing heavily impacted woody draws would be relative to the size, location, and length of time of the woody draw fence. But it is expected impacts would be minimal due to the small amount of draws projected to be fenced though there may be an increased temporary use on the immediately adjacent biologically capable habitats.

Seral Stages

Initial Actions – Exchanging pastures with Allotment 131 would result in changing the season of use in the exchanged pastures compared to current management. More consistent implementation of a deferred rotation in Allotment 129, as facilitated by the proposal of new water tanks, would result in greater changes in the season of use for Allotment 131 pastures 1 and 2 after the exchange. Greater summer use of Allotment 131 pastures 1 and 2 compared to current management might contribute to increased livestock distribution into secondary range with the potential to decrease the occurrence of late seral stages, and multiple pasture rotations in Allotment 129 would decrease the potential for increased seral development. The potential for winter hay feeding and the spread of invasive grasses would continue in both allotments. A sere plot in Allotment 129 pasture 2 at a mid seral stage would be exchanged for a plot in Allotment 131 pasture 1 that was at an earlier range of a mid seral stage with increased dominance of blue grama. Bluegrass and other invasive grasses appeared to occur at similar amounts in each pasture.

Creation of a riparian pasture along Magpie Creek and the southern portions of Allotment 129 pastures 1 and 2 would result in decreased pasture sizes and increase livestock density with the potential for increased evenness of livestock distribution. The mosaic of grazing pressure and seral stages would therefore have the potential to decrease. This effect would be most pronounced in the north half of these pastures that would be utilized similar to current management. Utilization of the riparian pastures would be expected to decrease in order to achieve and maintain PFC conditions along the creek, thereby increasing the potential for shifts to late seral stages among upland plant communities south of the creek. However, no adjustments are proposed for levels of Authorized Use to accommodate potentially decreased use in the riparian pastures, so the potential would occur for increased use and decreased seral stages in other pastures. Creation of the riparian pastures would conflict with Grasslands Plan goals for increasing pasture sizes in the Badlands Geographic Area, but some of the decrease would be offset by adding Allotment 131 pasture 3 to the north portion of Allotment 129 pasture 2 outside the riparian pasture.

Extending water pipelines to three new water tanks to replace dugout reservoirs and a developed spring would have a neutral or slightly negative effect on plant composition or seral stage proportions. There would be a high potential for invasive grasses to dominate around the reclaimed sites due to their present occurrence and additional disturbances involved in reclamation. There would also be a high potential for disturbances associated with pipeline construction to assist the spread and establishment of invasive grasses. Decreased livestock disturbances around reclaimed water developments would be countered by increased disturbances around the new water locations. Secondary range at the far north end of Allotment 129 pasture 1 with the potential for supporting late seral stages would experience increased grazing disturbances and decreasing seral stages as a result of locating one of the tanks along the fenceline with Allotment 131 pasture 1. Effects of the

second water tank at the south end of Allotment 131 pasture 1 could be minimized by placing the tank near the existing reservoir proposed for reclamation. The general location of a new water tank in pasture 4 to replace a developed spring likely experiences a moderate degree of current use due to its proximity near the spring and a prominent road corridor that contributes to livestock trailing patterns.

Positive effects of the new stock tanks would include the ability to control water flow to manage the timing and distribution of livestock grazing throughout the pasture and alleviate excessive use around favored water locations. This could contribute to the maintenance of native plant communities, but could also decrease the mosaic of grazing pressure and a range of seral stages. More reliable pipeline-supplied water should assist greater seasonal rotations of grazing individual pastures, thereby increasing opportunities for plants to complete critical growth stages, increase in vigor, and shift towards late seral stages. However, multiple pasture rotations, premature spring grazing, hay feeding, and potentially increased stocking to the level of Authorized Use would impede the development or maintenance of late seral stages.

Adaptive Options – Decreasing Authorized Use would facilitate shifts towards late seral stages by decreasing livestock grazing disturbances. Sufficiently decreased levels of use would facilitate the accumulation of plant litter that would increase conditions for the establishment and spread of invasive grasses. Fencing woody draws and hardening water crossing sites along Magpie Creek would not have an appreciable effect on upland seral stages due to the small size of the developments.

Sharp-tailed Grouse

Initial Actions – The initial actions would not enhance grouse nesting and brooding habitat because the apparent focus of the proposed initial actions is to even out the distribution. The Authorized Use level is approximately 21 percent under the initial estimated carrying capacity, after accounting for cow size. However, Authorized Use is appreciably less than the initial estimated carrying capacity and, in recent years, planned use of the permit has been typically at lower numbers than Authorized Use (Preference). Also, as a result of the exchange with Allotment 131, a reduction in Authorized Use of approximately 30-35 AMs will occur. The proposed actions of this alternative would encourage a more even distribution of livestock on the uplands using increased water distribution in the uplands for increased even utilization. Replacing nonfunctional/seasonal reservoirs with water tanks could extend the grazing season at the expense of potential secondary range in Allotment 131 pasture 1 and Allotment 129 pasture 1 while at the same time permit management flexibility. The effects of placing water on the fenceline in Section 3 for Allotment 129 pasture 1 would introduce a new water source at the far north end of the pasture. Much of the area around the proposed tank location in Allotment 129 pasture 1 is dominated by trees or nonvegetated badlands terrain. Due to an existing reservoir (to be reclaimed) in Allotment 131 pasture 1, the new tank would not have appreciable effects on distribution though seasonal use may be expanded. The effects from the tank replacing the eastern reservoir would depend on its location. The closer the tank is to the reservoir, the less likely there would be differences in utilization patterns and its effects to herbaceous structure. Replacing the spring development (Section 14) with a tank (Section 23) on a water line could also homogenize distribution by placing it in a more central location while maintaining the

same water density. Therefore the initial effects from the new tanks are that they will contribute to a more homogenized landscape, due to a more reliable source and increased distribution. The effects from creating a riparian pasture would be relative to the size and configuration of the riparian exclosure. However, it appears, superficially at least, that there should be an improvement in the diversity of herbaceous structure due to the amount of habitat potential outside the riparian zone but still within the riparian pasture. On the other hand, the nonriparian pasture may experience more livestock grazing pressure due to the deferred AMs from the riparian pasture, thus creating a more homogenous herbaceous structure distribution within that pasture. Since even utilization is an apparent objective of the proposed actions, which is coupled with no initial change in the Authorized Use, then it can be expected that herbaceous structure and its implications for grouse nesting habitat, would reflect those same objectives. The apparent flip side, however, is that an even distribution should not result in an over-abundance of Low or Low-Moderate structure, but rather a more mid-Moderate range.

It is unclear how the rotation will change in light of the new allotment configuration with Allotment 131. Allotment 129 pasture 2, which is consistently used early and in the winter, will be exchanged with Allotment 131. Allotment 131 focuses on winter use, which can have a greater impact on potential grouse nesting habitat. Allotment 131 pastures 1 and 2 will be exchanged with Allotment 129 but the change in system is unknown at this time but some combination of winter and summer use is expected, consistent with previous management of Allotment 129. Based on existing VOR readings, previous management does not appear to be conducive to producing a fully diverse herbaceous structure distribution.

Adaptive Options – The most efficient tool would be to adjust the Authorized Use level to increase the proportion of High structure to enhance nesting and brooding habitat. Hardening a watering area would have no effect on the herbaceous structure distribution. Temporarily fencing woody draws could create more grazing pressure on the herbaceous areas outside the temporary fencing adversely affecting potential habitat for the time the fence is in place. But the effects are expected to be minimal due to the limited amount of fencing projected to take place and the temporary nature of exclosure(s).

Effects of Alternative 3A

The effects of Alternative 3A are the same as Alternative 3 with the following exceptions:

INITIAL ACTIONS:

- Extending the range water pipeline from the well in Allotment 131 pasture 3 into Allotment 129 pasture 2, Section 11.

ADAPTIVE OPTIONS:

- The adaptive options and effects in Alternative 3A are the same as Alternative 3.

Range

Initial Actions – Adding water in pasture 2, Section 11, would add an additional livestock tank to

the pasture. Livestock distribution has already been altered with the initial action of splitting the pasture north of Magpie Creek. Adding the livestock tank would assist in evenly distributing livestock through the northern portion of pasture 2 because Magpie Creek and the well are the primary sources of water here.

Riparian

Initial Actions – The effects of Alternative 3A are the same as Alternative 3 with the following exception, a water pipeline extension with the installation of a stock tank in pasture 2. The development of an off-stream water source in pasture 2 would further benefit the riparian condition of Magpie Creek in reach 4, which is at desired condition, by reducing livestock pressure on the creek for a water source.

Woody Draws

Initial Actions – As a result of topographic influences and to maximize the spatial distance with existing water sources, an additional water tank in pasture 2 would likely be located at the south end of the northeast quarter of Section 11. Locating the tank in this area would have an adverse effect on several small but almost insignificant woody draw patches due to increased livestock disturbances.

Herbaceous Structure

Initial Actions – The effects of adding another water source would result in homogenizing herbaceous structure within the pasture by increasing livestock distribution.

Seral Stages

Initial Actions – A sere plot and an NDSU sample plot in the east central portion of Section 11 consisted of native grass communities at mid seral stages with low occurrences of invasive grasses. The proposed water tank would be located relatively close to these sample sites and facilitate a shift towards early seral stages as a result of increased livestock grazing and trampling disturbances. Winter use and hay feeding would have a high potential to assist the establishment of invasive grasses around the tank location if the pasture is exchanged with Allotment 131 as proposed, thereby contributing additional adverse effects to native communities in this area. Splitting the south half of the pasture to create a riparian pasture would increase the evenness of livestock distribution in the north pasture, and the proposed and existing water tanks in the newly configured pasture would further add to the evenness of grazing disturbances. However, some of the decrease in pasture size would be offset by removing the fenceline between Allotment 131 pasture 3 and the north half of Allotment 129 pasture 2.

Sharp-tailed Grouse

Initial Actions – The effects of adding another water source would result in homogenizing herbaceous structure, and reducing the quality of potential grouse nesting habitat within the pasture by increasing livestock distribution.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the changes listed below. The analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set at the level of Alternatives 2, 3, and 3A but adjusted for cow size.
- In Section 3, developing water on fenceline between Allotment 129 pasture 1 and Allotment 131 pasture 1, reclaiming or fencing one reservoir in Allotment 131 pasture 1 (west side).
- In pasture 1, on Magpie Creek, constructing a 94-acre riparian exclosure. No grazing of exclosure for first 3 years. Plant willow, cottonwood or other native species in exclosure.

ADAPTIVE OPTIONS:

- Extending range water pipeline from well in Allotment 131 pasture 3 into Allotment 131 pasture 1 and reclaiming one reservoir in Allotment 131 pasture 1 (east side).
- Riparian Exclosure: At end of year 3, conduct vegetation survey. If riparian vegetation has been established on 80 percent of streambanks and stream deposition is occurring, then initiate late or dormant season prescribed grazing. Prescribed grazing would be identified in AOI/AW.
- Constructing 42- and 59-acre riparian exclosures on Magpie Creek in pasture 1, Section 10 (Reaches 2 and 3).

Range

Initial Actions – Authorized Use for this allotment would be 1,090 federal AUMs, of which 1,000 AUMs would be summer use and the remainder would be winter use because of winter needs associated with the permit through MGA. The existing Authorized Use of 1,090 federal AMs converted to AUMs by adjusting for cow size is 1,254 federal AUMs. The effect of this authorization equates to a 13 percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment. This would result in fewer livestock numbers because of the inventory permit for this allotment.

The development of water on the fenceline between Allotment 129 pasture 1 and Allotment 131 pasture 1, Section 3, was discussed under Alternative 3 and would have the same effects. Fencing one of the reservoirs would not have any effect on livestock distribution or available AUMs in this pasture because of the size of the area fenced from livestock.

Installing an approximately 94-acre riparian exclosure would fence out approximately 40 to 42 federal AUMs of pasture 1 that are currently available for livestock grazing. Livestock grazing would not be allowed for the first 3 years, which would mean a reduction in the number of livestock authorized for those years because the allotment is currently being permitted through the MGA as an inventory allotment. After 3 years, if the desired conditions have been reached, the 40 to 42 federal AUMs would be reauthorized, and the riparian pasture would be grazed under a prescribed grazing plan starting with a late to dormant season grazing.

Adaptive Options – Constructing 42- and 59-acre exclosures on Magpie Creek would eliminate livestock from having access to the forage within the exclosure and because of the size of the

exclosures, available AUMs within pasture 1 would need to be adjusted to account for the amount of livestock forage being removed from the pasture by the two exclosures.

Riparian

Initial Actions – In pasture 1, on Magpie Creek, construct a 94-acre riparian exclosure and plant riparian vegetation within the exclosure. The riparian exclosure would provide the best opportunity for riparian vegetation to reestablish itself in the least amount of time because of the exclusion of livestock grazing, trailing, and trampling. The planting of native willow and cottonwood, which greatly strengthens channel banks and entraps stream sediment, would accelerate restoration of this reach and better ensure a positive outcome. It is expected that desired conditions on Magpie Creek in pasture 1 would be achieved in 2 to 5 years.

Adaptive Options – Construct 42- and 59-acre riparian exclosures on Magpie Creek in pasture 1, Section 10. The effects would be the same as described for the 94-acre riparian exclosure in the initial actions. It is expected that desired conditions on Magpie Creek in pasture 1 would be achieved in 2 to 5 years.

Woody Draws

Initial Actions – Reducing Authorized Use by 13 percent after adjusting for cow size could facilitate improved woody draw conditions by decreasing the level of livestock browsing and trampling disturbances. However, the effect would be decreased by the level of potential use that ranges from 7 percent less to 14 percent greater than currently reported use that includes winter use.

Rather than constructing two pipeline-supplied water tanks and reclaiming two reservoirs as discussed under Alternative 3, only one water tank would be constructed along the fenceline between Allotment 129 pasture 1 and Allotment 131 pasture 1, and a nearby reservoir in Allotment 131 would be fenced or reclaimed. Livestock disturbances in secondary range at the north end of Allotment 129 pasture 1 would increase as a result of the new water tank and the condition of small woody draw patches in this area would decrease. Although numerous Rocky Mountain juniper communities in this area would disperse livestock disturbances in woodland communities to some extent, topography would funnel livestock trailing along the lower end of several first drainages where woody draws are concentrated, thereby increasing woody draw disturbances. Management of water tanks to control livestock distribution would limit excessive utilization around the tanks but the extent of woody draw disturbances would nonetheless increase. Management of the water tank would result in increased variability in the season and period of livestock disturbances in Allotment 131 pasture 1 compared to current management under Allotment 131, but the level of woody draw disturbances in Allotment 131 pasture 1 would remain similar to current conditions.

The second reservoir at the south end of Allotment 131 pasture 1 with a shoreline of riparian trees would be left as is. Thus, water would be available to livestock whenever the reservoir holds water and the potential for controlling livestock disturbances and improving At Risk woody draw conditions in the surrounding area would be reduced.

The effects of creating a riparian pasture in the south portions of Allotment 129 pastures 1 and 2 were discussed under Alternative 3. Constructing a second riparian pasture along Magpie Creek west of the first pasture would decrease livestock disturbances and increase the development of

riparian communities and woody draw patches in the pasture. Planting native riparian species in the pastures would increase the potential rate of improved riparian conditions. However, decreased livestock access to the creek corridor would have the potential to increase woody draw disturbances outside the riparian pastures.

Adaptive Options – The effects of constructing two additional water tanks at the south end of Allotment 131 pasture 1 and north of a developed spring in Allotment 129 pasture 4 that would be reclaimed were discussed under Alternative 3. Reclaiming rather than fencing the south reservoir would result in the loss of riparian trees that are sufficiently dense to protect much of the reservoir shoreline.

Construction of two additional riparian exclosures in pasture 1 would result in decreased livestock disturbances and improvement of riparian communities with the potential for assisting the development or increasing the extent of woody draw patches along the margins of the exclosures. Increasing plant litter resulting from decreased livestock grazing within portions of the exclosures would facilitate the increase of invasive grasses that could impede the regeneration of desired woody species. Decreasing access along the creek corridor would contribute to increased livestock disturbance and decreased conditions of woody draws located outside the riparian pastures/exclosures.

Further decreasing Authorized Use would facilitate improved woody draw conditions as a result of decreased livestock disturbances.

Herbaceous Structure

Initial Actions – Adjusting Authorized Use to account for cow size would increase the potential to improve residual cover by decreasing the intensity of livestock use and help offset the increased distribution of livestock with the increased and improved water distribution. Creating a 94-acre riparian pasture could increase the amount of High structure but would be offset by the planting of shrubs and trees within the pasture, decreasing the overall effectiveness of the potential improvement in the herbaceous structure distribution. Lastly, 94 acres constitutes only approximately 5 percent of pasture 1 and would provide a small fraction of herbaceous plant communities to the herbaceous structure distribution. This alternative would reclaim or fence one nonfunctional or seasonal reservoir rather two as in alternative 3. The new tank on the fenceline could alter the distribution of livestock use at the expense of secondary range within Allotment 129 pasture 1. Those impacts should be somewhat less in Allotment 131 pasture 1 due to the location of the tank along the fenceline and the distance to the proposed reclaimed reservoir. Much of the area around the proposed tank location in Allotment 129 pasture 1 is dominated by trees or nonvegetated badlands terrain and would not contribute an appreciable amount of herbaceous dominated habitats at this time.

Overall, the effects of the initial actions are that there could be an improvement in the herbaceous structure distribution under the new allotment configuration. If the Authorized Use was established on the “initial estimated carrying capacity,” as stated in the proposed actions, then there could be a 20 percent increase in use which would run counter to improving herbaceous structure. However, if the proposal is to adjust the current Authorized Use number (1,090) to be based on an AUM rather

than an AM, this would effectively reduce the use and potentially increase residual cover on the allotment. However, the 3-year average indicates the allotment may already be operated at or below the initial estimated carrying capacity level. Hence, establishing the Authorized Use at the 1,090 AUM level may have no real effect on herbaceous structure and grouse nesting cover.

Adaptive Options – The adaptive actions under this alternative fully adopt the water replacement initial actions of Alternative 3: extend pipeline into Section 2 and reclaim the eastern reservoir and extend the pipeline from Section 15 to Section 23 and reclaim spring development in Section 14. See the discussion under Alternative 3 regarding the full implementation of water sources. It is assumed that the two potential riparian exclosures (42 and 59 acres) will have no grazing since no general strategy is outlined for them. The AUMs should be adjusted to account for the deferred forage; therefore, the effects to herbaceous structure are expected to be neutral outside the two grazing exclosures. Inside the riparian exclosures there could be improvement in herbaceous structure on biologically capable habitats. However, this is expected to be minimal because of the expected generally linear configuration of the exclosures and prevalence of shrubs and trees within the riparian zones. Manipulating the Authorized Use level downward would be the most efficient means to increase the proportion of High herbaceous structure and improve the herbaceous structure distribution.

Seral Stages

Initial Actions – A 13 percent reduction in Authorized Use after adjusting for cow size would increase the potential for shifts towards late seral stages, but the potential level of use would remain 7 percent less to 14 percent greater than reported use that includes winter use. Multiple grazing rotations would continue under the 12-month inventory permit, potentially impeding increased plant vigor by decreasing opportunities for the completion of critical growth periods. Adverse impacts associated with winter hay feeding and premature grazing of native grasses would also continue and assist the spread of invasive grasses.

The effects of exchanging pastures with Allotment 131 and replacing the reservoir at the north end of Allotment 131 pasture 1with a pipeline-supplied water tank were discussed under Alternative 3.

The effect of creating a riparian pasture in the south portions of Allotment 129 pastures 1 and 2 were discussed under Alternative 3. Constructing a second riparian pasture with decreased livestock access along the corridor of Magpie Creek would increase grazing disturbances in upland herbaceous communities that could contribute to shifts towards early seral stages.

Adaptive Options – Construction of two additional riparian pastures would increase the proportion of pasture acreage with decreased livestock access, thereby increasing livestock disturbances among upland herbaceous communities with potential shifts towards early seral stages.

The effects of constructing two additional pipeline supplied water tanks at the south end of Allotment 131 pasture 1 and north of a developed spring in Allotment 129 pasture 4 that would be reclaimed were discussed under Alternative 3.

Decreasing levels of Authorized Use would facilitate a shift towards late seral stages as a result of decreased livestock grazing and trampling disturbances. Sufficiently decreased levels of use would

facilitate the accumulation of plant litter that would assist the establishment and spread of invasive grasses in portions of some pastures.

Sharp-tailed Grouse

Initial Actions – Adjusting Authorized Use (1,090 AUMs) to account for cow size would increase the potential to improve residual cover, enhancing grouse nesting habitat, by decreasing the intensity of livestock use and help offset the increased distribution of livestock with the increased water distribution. Creating an approximate 94-acre riparian pasture could increase the amount of potential grouse nesting habitat in absolute terms, particularly after the 3-year rest period, but would be offset by the planting of shrubs and trees and may create an ecological trap for nesting hens and broods (Manzer and Hannon 2005) decreasing the effectiveness of the improved habitat conditions on the biologically capable habitat types. This riparian pasture encompasses only 5 percent of pasture 1, so any improvement in potential grouse nesting habitat afforded by the riparian pasture would be very minimal overall. This alternative would reclaim or fence one nonfunctional or seasonal reservoir. Since the replaced reservoir is nonfunctional and/or seasonal, the new tank on the fenceline in Section 3 could alter the distribution of livestock use at the expense of secondary range within Allotment 129 pasture 1. Those impacts should be somewhat less in Allotment 131 pasture 1 because of the distance of the new tank and the reclaimed reservoir. Conversely, in Allotment 129 pasture 1, the tank would introduce a new water source at the far north end of the pasture but which could have only a marginal effect to grouse habitat. Much of the area around the proposed tank location in Allotment 129 pasture 1 is dominated by trees or nonvegetated badlands terrain and does not provide highly suitable grouse nesting habitat at this time.

Winter use would continue to reduce herbaceous structure from fall levels, reducing residual cover for spring grouse nesting needs. However, residual cover levels under Alternative 4 are expected to be reduced less than Alternative 3.

Overall, the effects of the initial actions are that there could be an enhancement of grouse nesting habitat in the new allotment configuration. If the Authorized Use was established on the initial estimated carrying capacity, then there could be a 20 percent increase in use which would run counter to improving herbaceous structure and enhancing grouse habitat. Adjusting the current Authorized Use number (1,090) to be based on an AUM rather than an AM effectively reduces the use, thus potentially increasing residual cover on the allotment. However, the 3-year average indicates the allotment may already be operated at or below the initial estimated carrying capacity level. Hence, establishing the Authorized Use at the 1,090 AUM level may have no real effect on herbaceous structure and grouse nesting cover.

Adaptive Options – The adaptive actions under this alternative fully adopt the water replacement initial actions of Alternative 3: extend pipeline into Section 2 and reclaim the eastern reservoir and extend the pipeline from Section 15 to Section 23 and reclaim spring development in Section 14. See the discussion under Alternative 3 regarding the full implementation of water sources. It is assumed that the two potential riparian exclosures (42 and 59 acres) will have no grazing since no strategy is outlined for them. The AUMs should be adjusted to account for the deferred forage; therefore, the effects on grouse nesting habitat are expected to be neutral outside the two exclosures. Inside the riparian exclosures there could be enhancement in grouse nesting habitat on biologically

capable habitats. However, this is expected to be minimal because of the expected generally linear configuration of the exclosure, the prevalence of shrubs and trees within the riparian zone rather than biologically capable herbaceous habitats, and the size of exclosures relative to the pasture and allotment. Manipulating the Authorized Use level downward would be the most efficient means to increase the proportion of High herbaceous structure and improve the herbaceous structure distribution.

ALLOTMENT 130

Table 130.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 130 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 3.51b – Bighorn Sheep Habitat With Non-Federal Mineral Ownership	905	44	
Management Area 6.1 – Rangeland With Broad Resource Emphasis	1151	56	
Total allotment acres	2875	100	
NFS acres	2056	72	
State land acres	0	0	
Private land acres	819	28	
Current permitted livestock grazing (AMs) on NFS lands			833
Initial estimated carrying capacity (AUMs) on NFS lands			891
Number of pastures containing NFS lands			6

Table 130.2 — Allotment 130 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	1998/99 and 2004 surveys rate the portion of Whitetail Creek in this allotment at PFC.	Maintain PFC.
Woody draws	27 percent of sampled woody draws are Healthy, 67 percent are At Risk, and 7 percent are Unhealthy. At Risk and Unhealthy woody draws exhibit a lack of tree and shrub regeneration, grass understories, and headcutting.	Increase successful recruitment of tree and shrub seedlings.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Below Objectives High – Below Objectives 2004 Transects: 1.3; 1.01; 1.4; 1.28; 1.29 2004 Stations percent: Low-81/Moderate-19/High-0 2005 Transects: N/A 2005 Stations percent: N/A.	Manage for additional Moderate and High structure on biologically capable habitats.
Seral stages	Predominance of mid seral stages but prominent invasive grass occurrences in all six pastures.	Increase the maintenance of native grass communities and manage for additional late and early seral stages while limiting or decreasing the spread of invasive grasses.
Sharp-tailed grouse	One lek is known within the allotment. Plus there are two other key areas associated with known leks that intersect with allotment.	Manage for increased High vegetative structure on biologically capable sites to enhance habitat.
Remarks	Approximately 63 acres of Canada thistle and burdock located along Whitetail Creek.	

Table 130.3 — Allotment 130 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
Authorized Use is 833 federal AMs (634 federal AMs are summer use and remainder is winter use). Three-year average permitted use is 593 summer federal AMs.* Permit type: Inventory (12 months). Rotation: One herd seasonlong in one pasture, another herd twice-over in two pastures, third herd goes to Allotment 302 for summer months, all herds winter in this allotment. Class(s) of livestock: Cow/calf pairs and yearlings. See allotment map in Appendix B for current range developments.	**Initial Actions** Authorized federal AMs: 833 of which 634 AMs are summer use and the remainder are winter use. Winter graze pastures 1, 2, and 6 on a rotating annual basis. Create three pasture deferred rotation system between pastures 7, 8, and 9. Recommend moving winter feeding activities from NFS to private in pastures 1 and 2. **Adaptive Options** Fence high-value woody draws. Utilize herding. Adjust Authorized Use.	**Initial Actions** Authorized federal AUMs: 891 of which 634 AUMs are summer use and the remainder are winter use. Winter graze pastures 1, 2, and 6 on a rotating annual basis. Use pastures 8 and 9 as crested wheatgrass pastures and graze early 2 out of 3 years before rotating to Allotment 302. In third year start in Allotment 302 early on the crested wheatgrass areas temporarily fenced out in pastures 1 and 2. Recommend moving winter feeding activities from NFS to private in pastures 1 and 2. **Adaptive Options** Fence high-value woody draws. Remove fence between 8 and 9 if combined herds are too confined in each pasture and resource conditions do not meet objectives. Adjust Authorized Use.
Monitoring Survey woody draws every third year. Gather Visual Obstruction Readings (VOR) every 3 years. Complete Properly Functioning Condition (PFC) survey every fifth year. Collect vegetative composition and production data annually for 3 years then every fifth year. Monitor Canada thistle in pasture. 1	**Monitoring** Survey woody draws once every 3 to 5 years. Gather Visual Obstruction Readings once every 3 years. Complete Properly Functioning Condition survey once every 5 years. Collect vegetative composition data once every 3 to 5 years.	**Monitoring** Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 130 — Existing Condition

Range – This allotment is approximately 2,875 acres in total size and contains private and NFS lands with 2,056 acres of NFS lands. Currently, this allotment is issued an inventory permit for 62 head for 8 months and an additional 138 head for 1 month (the additional 138 head come from Allotment 302) by the MGA. With this type of permit, livestock are on the allotment for the entire year, not just the typical May 1st to December 31st. Livestock are currently being wintered on private and intermingled private and NFS lands during the winter months of January through April in pastures 1, 2, and 7.

This allotment has been subdivided into nine pastures. Only six contain NFS lands. Four contain only NFS land and the other two consist of both private and NFS lands. The pastures range from 66 to 643 acres in size. Current AMs provided by NFS lands can be found in Table 130.1. Water developments within this allotment include developed springs, reservoirs, dugouts, and a well/stock tank.

The current rotation is as follows: pasture 1 is normally used from the middle of September to the end of December and during January through April by a varying number of livestock. In review of 2004 through 2007's allotment worksheets, this pasture is usually stocked with approximately 25 yearlings and an additional 38 to 54 mature cows. Pasture 2 is normally treated as a bull pasture when they are not with the cow herd. Pasture 6 is normally used as a yearling pasture and is stocked with approximately 25 yearlings. The yearlings are normally turned out around May 15th and graze until the middle of September when they are rotated to pasture 1. Pasture 7 is normally used from May 1st to May 15th with 138 cow/calf pairs and from December 15th to December 31st with 138 mature cows. This pasture is also used during the winter months of January through April; however, the exact numbers and dates are unknown. Upon reviewing 2004 through 2007's AWs, two out of four grazing seasons the permittee brought the 138 cow/calf pairs back into this pasture during the months of June and July for about 20 days. Pastures 8 and 9 are stocked with about 38 cow/calf pairs under a modified twice-over/switch-back rotation. Livestock begins grazing around May 10th starting in pasture 9 for approximately 25 to 30 days. The livestock are then rotated to pasture 8 and graze between 50 to 60 days. Livestock return to pasture 9 and normally graze until the second week of October when they are then rotated to pasture 1. In the 4 years of allotment worksheets, the permittee started in pasture 8 one year.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there are approximately 63 acres of Canada thistle and burdock located primarily along Whitetail Creek. Through recent weed inventories and communication among the Forest Service, Billings County Weed Officer, and permittee, other infestations have been identified. In 2004, the Billings County weed board released biocontrol agents to control the Canada thistle with limited success. Prior to this and currently, herbicide continues to be the primary control agent for noxious weeds within this allotment. The threat of salt cedar is high along Whitetail Creek because of the infestations found downstream.

Oil and gas development on NFS lands in this allotment has removed a total of approximately 2.7 acres from livestock access. Approximately 0.0 acres of oil and gas pads and access roads have

been reclaimed and are or will be available for livestock access. Associated forage from these acres is approximately 1.9 and 0.0 AUMs, respectively.

Riparian –
A 2.1-mile segment (reach 4) of Whitetail Creek traverses pastures 1 and 2 in Allotment 130. This reach has a riparian functionality rating of PFC (see table below).

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
130-01	Whitetail Creek (4)	1.84					1.84
130-02	Whitetail Creek (4)	0.27					0.27

Woody Draws – Of 15 woody draws sampled throughout the six NFS pastures, 27 percent were Healthy, 67 percent were At Risk, and 6 percent were Unhealthy. Canada thistle and wormwood infested woody draw communities in pasture 1 to the extent that herbicide control treatments are likely to result in adverse impacts to Healthy communities, which constitute 60 percent of the sample sites in this pasture. Whitetail Creek extends along the bottom of the woody draw communities where smooth brome is dominant along the floodplain. All sampled woody draws in pastures 6, 7, and 9 were At Risk. No woody draws were sampled in pasture 8.

Herbaceous Structure – Five VOR transects were sampled within this allotment in 2004. All five fell into the Low structure class. Consolidated station data from these five VOR transects demonstrated a high proportion of Low structure stations (<1.5 inches) at 81 percent, and Moderate at 19 percent.

Seral Stages – Four sere plots and two NDSU sample plots were at mid seral stages, with invasive grasses beginning to co-dominate in at least two of the plots. Of seven ecoplots from the late 1990s, four were at a late seral stage, two were at mid stages, and one was early. However, re-measurement of one of the ecoplots in pasture 6 with a sere plot resulted in a shift from a late seral stage in 1998 to a mid stage in 2008, with invasive grasses increasing from 0 to 21 percent of the relative grass cover between sample years. Observations around several other ecoplots suggested similar shifts in seral stage and increasing invasive grasses.

An NDSU sample plot and two sere plots at the southeast end of pasture 1 were at mid-early or mid seral stages with relatively high amounts of sedge and/or blue grama. Smooth brome constituted about 12 percent of the grass production in the NDSU sample. Patches of annual brome and typical barnyard weeds such as kochia (*Kochia scoparia*) and pigweed (*Amaranthus* spp.) occurred at the southwest end of the pasture and are attributed to hay feeding (Figure 130.1). Areas of early seral blue grama communities were also present in this area. Occurrences of crested wheatgrass and bluegrass increased at the north end of the pasture where the majority of hay feeding has recently occurred.

Figures 130.1a and 130.1b. — a) Site of past hay feeding at the south end of pasture 1 with accumulated manure, annual brome, and barnyard weeds. b) Conditions at the end of the hay feeding season at the north end of pasture 1.

A 1999 ecoplot on the southern boundary of pasture 2 was at a late seral stage and a belt transect indicated similar plant composition during 2004. Observations indicate invasive grass occurrences in more mesic areas at the north end of the pasture where hay feeding occurs.

Broken land constitutes 31 percent of pasture 6, and patches of crested wheatgrass within unbroken land appeared to be associated with past hay feeding. Of five ecoplots in pasture 6, three were at late seral stages and two were at mid stages, but as discussed above, a sere plot sampled at one of these sites indicated increasing invasive grasses and a shift from mid to late seral stages. An NDSU plot in the southeast corner of the pasture was at a mid seral stage but approaching an Invaded Grass State.

Figure 130.2 — Hay feed storage area on east side of pasture 7 with foreground dominated by smooth brome and crested wheatgrass.

No broken land was identified in pasture 7 but invasive grasses dominated a large area around two hay storage and feeding sites on the east side of the pasture (Figure 130.2). A sere plot on the far west side of the pasture was at a mid-late seral stage and indicated the maintenance of high condition native plant communities with only light amounts of invasive grasses. A nearby Robel transect reported Kentucky bluegrass as the third dominant species. A belt transect at the far northwest end of the pasture reported the three dominant grasses as native.

Broken land constitutes a little more than half of pastures 8 and 9 but field observations indicate an overwhelming dominance of crested wheatgrass with varying amounts of bluegrass and intermixed native grasses across broken as well as unbroken land in both pastures. A few areas with increased western wheatgrass and other native species occur, as well as little bluestem dominated knolls and

upper sideslopes. An ecoplot in pasture 9 was at an early seral stage with light amounts of several native species, and a belt transect reported heavily utilized crested wheatgrass with blue grama and sedges. A Robel transect in each pasture indicated dominance of crested wheatgrass with intermixed native grasses.

Sharp-tailed Grouse – One lek is known within the allotment. There are two other key areas associated with known leks that intersect with this allotment.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed after 2 years.
- Most range infrastructure would be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would now be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian condition along Whitetail Creek as described in the existing condition would continue and progress toward the potential riparian community.

Woody Draws – Woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate increased tree and shrub regeneration and growth. However, existing and potential increases of invasive grasses with the removal of livestock grazing and increasing plant litter would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock, there would be increased opportunity for the development of High and Moderate structure, and a decrease in the amount of Low structure.

Seral Stages – The removal of livestock grazing disturbances would facilitate a shift towards late seral stage communities. Plant diversity and the mosaic of seral stages would decrease with the development of late seral stages. However, the decrease in grazing disturbance would facilitate an increase of plant litter that would in turn facilitate the expansion of invasive grasses that occur in varying amounts among all pastures. Increasing invasive grasses would impede the development and decrease the maintenance of native grass communities with transitions to Invaded Grass States in large portions of the allotment. Transitions would occur relatively rapidly in pastures where invasive grasses are currently high, but could require 10 to 20 years in portions of some pastures with lighter amounts of invasive grasses.

Sharp-tailed Grouse – The increase in High structure from removal of livestock disturbance of habitat would benefit nesting and brooding habitat for sharp-tailed grouse. However, over time the

decrease in forb diversity would decrease foraging opportunities. To a lesser extent, nesting and brooding quality would also decrease because of lower quality habitat associated with invasive grasses that may invade local habitats.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by an inventory grazing association permit, and Authorized Use is 833 federal AMs, of which 634 are summer use and the remainder are winter use.
- Cow/calf pairs are ran as two different herds; one herd is run in a twice-over grazing rotation and the other goes to Allotment 302 for the summer months. Yearlings are in a separate herd seasonlong.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian condition along Whitetail Creek as described in the existing condition would continue.

Woody Draws – Woody draw conditions are unlikely to improve with continuation of current management in which existing conditions developed. Hay feeding has likely contributed to the spread of invasive grasses in some woody draws that can impede the regeneration of woody species. Authorized Use that exceeds initial estimated carrying capacity by 8 percent after adjusting for cow size, as well as some years of reported use that exceeds Authorized Use, contribute to the level of woody draw disturbances.

Several woody draws on steep north and east aspect slopes in pasture 1 are in a Healthy condition, but this is attributed to most of the pasture use occurring on level uplands during winter hay feeding periods when access to the wooded slopes is impeded by drifting snow. The potential exists for Healthy conditions among these sites to decrease as a result of collateral herbicide damage when treating extensive noxious weed populations. Seasonlong grazing in pasture 6 increases the potential for livestock browsing and trampling disturbances that were attributed to the lack of desired shrub and tree sapling layers. Almost 5 months of winter and early spring use in pasture 7 has the potential to contribute to high trampling disturbances within the relatively accessible woody draws when livestock seek thermal cover, and short summer grazing periods contribute another episode of disturbance. The presence of a relatively high number of browsed saplings observed in three of four At Risk woody draws in pasture 7 indicate a high potential for improved conditions with lower degrees of browsing disturbance. Dominance of crested wheatgrass in pastures 8 and 9 along with the summer grazing rotations when palatability of this species is low can contribute to high woody draw disturbances when livestock are apt to seek extended green periods in the understory.

Reservoirs along drainages in pastures 7, 8, 9 can contribute to browsing and trampling disturbances in adjacent woody draws.

Herbaceous Structure – Current management would continue to perpetuate the herbaceous structure distribution with an apparently very limited proportion of High herbaceous structure. Potential management factors include multiple herds, grazing systems (twice-over), poor timing in use of crested wheatgrass, Authorized Use levels may exceed initial estimated carrying capacity, and winter grazing/feeding. The Authorized Use level would be the dominant factor.

Seral Stages – Continuation of current management would result in the persistence of mid seral stages but with a moderately high potential for transitions to Invaded Grass States due to the current extent of invasive grasses and some effects of management that can assist their spread. Specifically, hay feeding and/or hay storage in pastures 1, 2, and 7 that contribute to the introduction of invasive grass seed and high livestock densities typical of hay feeding areas result in high trampling disturbances. Livestock incidentally graze existing forage during hay feeding periods and are free to graze during relatively open winters and early spring. Premature grazing of native grasses and high trampling disturbances can decrease native plant vigor and facilitate the spread of invasive grasses. Additional periods of grazing during mid-summer have the potential to impede plant recovery following premature spring use. Authorized Use that exceeds initial estimated carrying capacity by 8 percent after adjusting for cow size are likely to impede the development of late seral stages, and reported levels of use that sometimes exceed Authorized Use by about 10 percent would increase this effect.

Heavy seasonlong grazing can contribute to the spread and increased dominance of Kentucky bluegrass (NRCS 2009) and has likely been a major factor in the increased amount of invasive grasses in the re-measured ecoplot of pasture 6. Portions of the grazing season in pastures 8 and 9 that occur during mid to late summer when palatability of crested wheatgrass is low contribute to selective grazing of the native grass component, and the level of grazing disturbance relative to the low proportion of native grasses would facilitate the spread of crested wheatgrass and other invasive grasses. Warm season communities of little bluestem are affected by selective grazing to a lower degree than cool season communities (personal observation) and would likely persist in portions of this and other pastures.

Although hay storage and feeding on the east side of pasture 7 facilitates the spread of invasive grasses, the maintenance of high condition native communities on the far west side of the pasture would persist because this area is most distant from high winter livestock concentrations and is primarily subject to short grazing disturbance from mid June to early July. This area along with the south end of pasture 2 represents some of the most intact mid to late seral native communities on the allotment. .

Sharp-tailed Grouse – Given current management, it does not appear that existing levels of sharp-tailed grouse nesting and brooding habitat would be enhanced in the next 10 to 15 years.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 833 federal AMs of which 634 AMs are summer use and the remainders are winter use.
- Winter grazing pastures 1, 2, and 6 on a rotating annual basis.
- Creating a three-pasture deferred rotation system between pastures 7, 8, and 9.
- Recommend moving winter feeding activities from NFS to private in pastures 1 and 2.

ADAPTIVE OPTIONS:

- Fencing high-value woody draws.
- Utilize herding.
- Adjusting Authorized Use.

Range

Initial Actions – Under this alternative, Authorized Use would be 833 federal AMs, of which 634 federal AMs would be available for the summer grazing season and 190 federal AMs would be available for winter grazing. This would not be a change from the existing condition of Alternative 2. The use of the AMs would be different than the existing condition because the initial action identifies the rotation for the NFS pastures on this allotment and is change from the existing rotation.

In the initial action of winter grazing pastures 1, 2, and 6, the permittee would need to choose which class of livestock would be grazed, cow/calf or yearlings, because there would no longer be a pasture available for seasonlong grazing of yearlings. The distribution of livestock within pasture 6 would change because of when livestock grazing would occur, dormant compared to active growing season.

Implementing a summer three-pasture deferred rotation system between pastures 7, 8, and 9 would not change the distribution in two of the three pastures. In pasture 7, distribution would change due to the change in the season of use from the current 15 days in early May, approximately 21 days in June into July, and winter use starting in mid-December. Livestock would not be allowed to return to pasture(s) for a second time during the grazing season. The rotation would allow native herbaceous species to initially grow and/or recover during portions of the grazing season or all of the growing season.

The recommendation of moving winter feeding activities from NFS lands to private in pasture 1 and 2 would have an effect on the distribution during years with heavy snow pack. However, during open winters, distribution would not change because of the size and topography of the pastures. Moving winter feeding activities would not have an effect on available AMs.

Adaptive Options – Fencing high-value woody draws would have little to no change in livestock distribution across the allotment. Forage within the exclosures would no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may

occur on the remaining forage. There will be a cost to install fencing and the additional cost of fence maintenance.

The use of herding would have a slight to no effect due to the size of the pastures, topography of the existing pastures, and distance to existing livestock water developments of the current pastures within this allotment. Proper placement of livestock supplements would have the same results as herding in improving distribution. Herding would also require the permittee to hire a ranch hand or would require time to ride pastures themselves, increasing the costs to their operation.

Adjusting Authorized Use downward would result in fewer livestock numbers because of the inventory permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock. However, the amount of forage harvested would be less than the existing forage harvested.

Riparian

Initial Actions – It is expected that desired conditions along Whitetail Creek would continue with the initial actions proposed.

Winter grazing of pastures 1, 2, and 6 on a rotating annual basis would not affect riparian conditions along Whitetail Creek. The effects of livestock use on the riparian corridor would be minimal due to winter conditions.

Creating a three-pasture, deferred rotation system between pastures 7, 8, and 9 would have no effect on riparian condition along Whitetail Creek due to livestock being located in a different pasture.

The recommendation of moving winter feeding activities from NFS to private in pastures 1 and 2 would result in positive effects to the riparian condition along Whitetail Creek if exposure to invasive species is reduced.

Adaptive Options – It is expected that desired conditions along Whitetail Creek would continue with the adaptive options proposed.

Fencing high-value woody draws should have no effect on riparian conditions along Whitetail Creek because there would be no expected change in livestock distribution and the distance of separation.

Herding livestock out of the riparian area would benefit the riparian corridor by minimizing bank sloughing, trailing, trampling, and loafing in the riparian area allowing for herbaceous and woody riparian vegetation recovery.

Reducing Authorized Use should help improve the uplands vegetation which in turn reduces overland flow which would further benefit the riparian conditions along Whitetail Creek. A reduction in overland water flow delivered to the creek would result in reduced stream velocities allowing for the establishment of riparian vegetation which would build stream banks.

Woody Draws

Initial Actions – Implementing an annual winter rotation among pastures 1, 2, and 6 would perpetuate the adverse effects of hay feeding. Although each of the three pastures would be relieved from these effects 2 of every 3 years, increased livestock densities resulting from combining the

three livestock herds would increase the degree of adverse effects when each pastures is used during the winter. Adverse effects of hay feeding would be transferred from pasture 7 to pasture 6. Three sampled woody draws in pasture 6 that were At Risk are unlikely to improve with 1 year of winter use followed by 2 years of summer use. Increased summer use of pasture 1 in 2 of every 3 years would increase the potential for decreasing woody draw conditions as a result of greater access without deep snow drifts, but the high amount of woody draw acreage in the pasture would help disperse these adverse effects. Potential impacts on woody draws in pasture 1 as a result of collateral herbicide impacts would persist.

A deferred summer rotation among pastures 7, 8, and 9 would result in the persistence of At Risk conditions measured in pasture 9 because the adverse influence of low crested wheatgrass palatability would continue to contribute to woody draw disturbances when livestock seek browse species and extended green periods of the herbaceous vegetation. Increased summer use of pasture 7 would contribute to increased browsing and trampling disturbances within woody draws across the pasture and the persistence or decline of At Risk conditions among three sample sites.

Authorized Use that exceeds initial estimated carrying capacity by 8 percent after adjusting for cow size, as well as levels of reported use that exceeds Authorized Use during some years, would contribute to the level of browsing and trampling disturbances within woody draws.

Adaptive Options – Fencing woody draws and/or decreasing Authorized Use would increase the potential for improved woody draw conditions by removing or decreasing livestock browsing and trampling disturbances that would facilitate the regeneration of desired woody species. Exclusion of livestock impacts through fencing would provide the fastest and greatest degree of woody draw improvement, but increasing litter and invasive grass layers could impede the rate or degree of woody species regeneration. Excluding livestock from fenced woody draws would have the potential to result in increased disturbance and decreasing condition of unfenced woody draws.

Livestock herding that has the potential to decrease livestock disturbances within woody draws is unlikely to be effective because the largest pasture (7) is only 1 square mile, and woody draws are evenly distributed throughout the pasture. Moving livestock from a heavily used woody draw has the potential to result in increased disturbance and decreased condition of other draws and is unlikely to provide sufficient rest of the first draw to increase conditions.

Herbaceous Structure

Initial Actions – The existing level of Authorized Use is 7 percent higher than the initial estimated carrying capacity after accounting for cow size. Retaining the current level of Authorized Use is projected to contribute to the general retention of the existing herbaceous structure distribution. Winter grazing pastures 1, 2, and 6 on a rotating basis may create higher structure readings in the fall if they are not grazed during the active growing season. Because of the small size of pasture 9 and the likely short period of time that livestock would be in the pasture, it could recover some higher herbaceous structure when it is grazed early in the three-pasture deferred rotation with pastures 7 and 8. However, given the Authorized Use level, there may not be any appreciable improvement in herbaceous structure distribution overall. Removing winter feeding activities off the NFS lands may work in concert with the winter grazing rotation. Like other attractants, this

should change the distribution of grazing to contribute to improved herbaceous structure conditions in the fall.

Adaptive Options – Fencing specific woody draws could have effects relative to the size and location of the exclosure but is not expected to be appreciable because of the relative small amount of woody draw habitat projected to be fenced. Herding is typically a tool to control overuse/low use in areas by moving cattle to more evenly forage across the pasture/allotment as a whole with the end result of moderating vegetative structure. The most efficient tool to manipulate herbaceous structure is adjusting the Authorized Use level for the allotment. Downward adjustments can increase the amount of standing crop, therefore potentially increasing the proportion of High structure in the allotment.

Seral Stages

Initial Actions – Annually rotating winter use among three pastures with adverse impacts associated with hay feeding that include the introduction of invasive seed, high livestock concentrations and trampling disturbances, and premature grazing of native grasses, would decrease plant vigor and facilitate shifts towards early seral stages. Subjecting individual pastures to winter use 1 of every 3 years would decrease the level or frequency of adverse impacts, but would be unlikely to halt the eventual increase of invasive grasses that is commonly observed in hay feeding areas. Exchanging winter use from pasture 7 to pasture 6 would transfer adverse impacts that have occurred on the east side of pasture 7 to pasture 6, while doing nothing to repair the transition to Invaded Grass States that have occurred in pasture 7.

Implementing a three-pasture deferred rotation among pastures 7, 8, and 9 would result in excessive grazing disturbances to the native component in pastures 8 and 9 in 2 of every 3 years as a result of low palatability of crested wheatgrass at the time of grazing. This would be a slight improvement to the current modified deferred rotation where native grasses are selectively grazed in both pastures every year, but would be insufficient to improve the maintenance of native grass components or halt the spread of invasive grasses. These effects would also occur during summer use of other pastures, but at a lower degree or rate due to more concentrated occurrences of invasive grass communities.

Continuation of Authorized Use that exceeds initial estimated carrying capacity by 8 percent after adjusting for cow size would exceed the level of grazing that is generally required to achieve an improvement in range or forage conditions (Heitschmidt et al 1989 1996, Holechek 1999). Low palatability of invasive grasses during large portions of the summer grazing season would increase the level of native grass utilization and apparent levels of overstocking, and potentially contribute to the spread of invasive grasses and decreased maintenance of native plant communities.

Adaptive Options – Herding livestock is unlikely to be effective or realistic in reducing excessive grazing in primary use areas or achieving the desired proportion of seral stages. The largest of the three summer pastures is only 1 square mile, the herder's presence would be required nearly full time, and increasing the evenness of livestock grazing across the pasture would conflict with objectives for maintaining a mosaic of grazing pressure.

Decreasing Authorized Use would facilitate a shift towards late seral stages by decreasing livestock grazing and trampling disturbances, but sufficient levels of decreased use would have the potential

to increase plant litter that would facilitate an increase of existing invasive grasses in portions of all pastures. This would impede the development or maintenance of late seral native communities and facilitate potential transitions to Invaded Grass States.

Sharp-tailed Grouse

Initial Actions – The existing level of Authorized Use is 7 percent higher than the initial estimated carrying capacity after accounting for cow size. Retaining the current level of Authorized Use is projected to contribute to the overall retention of the existing low amount of grouse nesting habitat. Winter grazing pastures 1, 2, and 6 on a rotating basis may create higher structure readings in the fall if they are not grazed during the active growing season but due to the winter grazing, grouse nesting habitat would be reduced, or not available, for the following spring nesting needs in these pastures. Because of its small size, pasture 9 could recover some potential grouse nesting habitat when it is grazed early in the three-pasture deferred rotation with pastures 7 and 8. However, given the Authorized Use level, there may not be any appreciable improvement in grouse nesting habitat overall. Removing winter feeding activities off the NFS lands may work in concert with the winter grazing rotation. Like other attractants, this should change the distribution of grazing to contribute to potential grouse nesting conditions in the spring.

Adaptive Options – Fencing specific woody draws could have positive effects relative to the size and location of the grazing exclosure(s) but is not expected to be appreciable because of the relatively small amount of woody draw habitat projected to be fenced. Potential negative effects could occur to biologically capable habitat types outside the woody draw exclosures. Herding is typically a tool to control overuse/low use in areas by moving cattle to more evenly forage across the pasture/allotment as a whole with the end result of moderating vegetative structure, thus limiting potential grouse nesting habitat. The most efficient tool to manipulate vegetative habitat is adjusting the Authorized Use level for the allotment. Downward adjustments can increase the amount of standing crop, thereby potentially increasing the proportion of High structure, and consequently increasing the amount of grouse nesting habitat, in the allotment.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the changes described below. The analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.
- Using pastures 8 and 9 as crested wheatgrass pastures and graze early 2 out of 3 years before rotating to Allotment 302. In the third year, start in Allotment 302 early on the crested wheatgrass areas and temporarily fence out pastures 1 and 2.

ADAPTIVE OPTIONS:

- Removing fence between 8 and 9 if combined herds are too confined in each pasture and resource conditions do not meet objectives.

Range

Initial Actions – Authorized Use for this allotment would be 891 federal AUMs, of which 634 AUMs would be summer use and the remainder would be winter use due to winter needs associated with the permit through MGA. The existing Authorized Use of 833 federal AMs converted to AUMs by adjusting for cow size is 958 federal AUMs. The effect of this authorization equates to a 7 percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment. This would result in fewer livestock numbers because of the inventory permit for this allotment.

Allotment 302 and pastures 8 and 9 have plant communities that consist of both introduced graminoid species and native species. By fencing out the crested wheatgrass, the native communities would have the opportunity to reach range readiness before any grazing pressure would be applied. Two out of 3 years pastures 8 and 9 would be grazed before June 1st. Native graminoid species within pastures 8 and 9 would be grazed before June 1st once in every 3 years before range readiness. Distribution of livestock in pasture 8 and 9 would not change because of the size and topography of the pastures. Distribution of livestock in Allotment 302 would be different than the existing condition in the years livestock graze the fenced off crested wheatgrass. Livestock would be confined to a smaller area until native herbaceous species reach range readiness in which the existing condition allows livestock access to all areas of the pastures.

Adaptive Options – The removal of fence between pastures 8 and 9 would create one pasture approximately 630 acres in size. Livestock distribution would change because livestock would not be restricted by the fence separating the two pastures. There would be fewer recovery periods for herbaceous species in pastures 8 and 9 because of the duration livestock would be grazing the pasture and would have the ability to graze the regrowth. The removal of the fence would eliminate the three-pasture deferred rotation, proposed in the initial action, to a two-pasture deferred rotation.

Riparian

Initial Actions – The effects would be the same as described in Alternative 3.

Adaptive Options – Removing the fence between pasture 8 and 9 if resource conditions do not meet objectives would have no effect on Whitetail Creek as the creek is located within a different pasture.

Woody Draws

Initial Actions – Woody draw conditions in pastures 8 and 9 would have some potential to improve with the proposed rotation with a stand of crested wheatgrass in Allotment 302. Early use (ending by June 15th) of pastures 8 and 9 would occur 2 of every 3 years, while later summer use would occur during the third year rather than portions of every year, which occurs at present when low palatability of invasive grasses, warm temperatures, and insect pests contribute to high woody draw disturbances.

Potential decreases of Authorized Use by 7 percent after adjusting for cow size could contribute to the regeneration of desired woody species by decreasing the level of browsing and trampling disturbances. However, the proposed level of reduction would have a relatively low potential to shift At Risk woody draw conditions to Healthy.

Adaptive Options – Combining pastures 8 and 9 into a single pasture would decrease the evenness of livestock distribution by enlarging the pasture size, thereby decreasing the intensity of browsing and trampling disturbances within some woody draws and assisting the regeneration of desired woody species and increased woody draw conditions. However, a two-pasture deferred rotation would be maintained with Allotment 302, resulting in summer use of pastures 8 and 9 every other year that would impede woody draw improvement in primary use areas after combining pastures.

Herbaceous Structure

Initial Actions – The existing level of Authorized Use is 7 percent higher than the initial estimated carrying capacity after accounting for cow size. Adjusting the current level of Authorized Use to the initial estimated carrying capacity is projected to contribute to improving the herbaceous structure distribution. Winter grazing pastures 1, 2, and 6 on a rotating basis may create higher structure readings in the fall if they are not grazed during the active growing season. Because of the small size of pasture 9 and the likely short period of time that livestock would be in the pasture, it could recover some higher herbaceous structure when it is grazed early in the three-pasture deferred rotation with pasture 8 and with crested wheatgrass pastures of Allotment 302. Removing winter feeding activities off the NFS lands may work in concert with the winter grazing rotation. Like other attractants, this should change the distribution of grazing to contribute to improved herbaceous structure conditions in the fall.

Adaptive Options – Fencing woody draws could have effects relative to the size and location of the exclosure but is not expected to be appreciable because of the relative small amount of woody draw habitat projected to be fenced. Removing the fence between pastures 8 and 9 could increase the patchiness of use with the larger pasture and depending on when the rotation would occur, potential regrowth patterns could emerge, particularly every other year in the rotation with Allotment 302. The most efficient tool to manipulate herbaceous structure is adjusting the Authorized Use level for the allotment. Downward adjustments can increase the amount of standing crop, therefore potentially increasing the proportion of High structure in the allotment.

Seral Stages

Initial Actions – Early season use of pastures 8 and 9 in 2 of every 3 years would improve the utilization of invasive grasses that dominate these pastures and facilitate the increased development of native grasses. Increased vigor and production of the native component would increase its resilience to selective grazing that would continue to occur during the third year of the rotation with mid and late summer use.

The trend of increasing invasive grasses in portions of other pastures would impede the maintenance of native plant communities, and the proposed 7 percent decrease in Authorized Use would minimally affect this outcome. High amounts of invasive grasses would continue to be of low palatability during a large portion of the grazing season in several pastures and contribute to

selective and potentially excessive use of the native component that could assist the spread of invasive grasses. Hay feeding would continue to introduce invasive grass seed in pastures 1, 2, and 7.

The effects of annually rotating winter use among pastures 1, 2, and 6 were discussed under Alternative 3.

Adaptive Options – Combining pastures 8 and 9 and implementing a two-pasture deferred rotation with Allotment 302 would maintain poor coordination of the grazing season with invasive grass palatability every other year in each pasture. This would perpetuate selective and excessive use of the native component and impede development of the broken land community in pastures 8 and 9, while potentially facilitating the spread or increase of bluegrass. A degree of benefit that might be obtained in pastures 8 and 9 as a result of the enlarged pasture size would involve the decreased evenness of livestock distribution with a reduction in selective grazing of the native component. However, increasing plant litter in areas of decreased use would assist the spread of bluegrass.

Sharp-tailed Grouse

Initial Actions – The existing level of Authorized Use is 7 percent higher than the initial estimated carrying capacity after accounting for cow size. Adjusting the current level of Authorized Use to the initial estimated carrying capacity is projected to contribute to improving the potential to enhance grouse nesting and brooding habitat. Winter grazing pastures 1, 2, and 6 on a rotating basis may create higher structure readings in the fall if they are not grazed during the active growing season but due to the winter grazing, grouse nesting habitat could be reduced, or not available, for the following spring nesting needs in these pastures. When pasture 9 is grazed early, and because of the small size of the pasture and the likely short period of time that livestock would be in the pasture, pasture 9 could recover some higher herbaceous structure in the fall and be available for grouse nesting needs that following spring. Removing winter feeding activities off the NFS lands may work in concert with the winter grazing rotation. Like other attractants, this should change the distribution of grazing to contribute to potential grouse nesting conditions in the spring.

Adaptive Options – Fencing specific woody draws could have positive effects relative to the size and location of the grazing exclosure(s) but is not expected to be appreciable because of the relatively small amount of woody draw habitat projected to be fenced. Potential negative effects could occur on biologically capable habitat types outside the woody draw exclosures, although in the spirit of alternative 4 this should be mitigated by adjusting the initial estimated carrying capacity to account for the potential loss of forage. Removing the fence between pastures 8 and 9 could increase the patchiness of use with the larger pasture and depending on when the rotation would occur, potential regrowth patterns could emerge, particularly every other year in the rotation with Allotment 302 when pasture 8/9 is grazed early one year and later the next season. The most efficient tool to manipulate vegetative habitat is adjusting the Authorized Use level for the allotment. Downward adjustments can increase the amount of standing crop, thereby potentially increasing the proportion of High structure, and consequently increasing grouse nesting habitat in the allotment.

ALLOTMENT 131

Table 131.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 131 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 1.31 – Backcountry Recreation Nonmotorized	1403	86	
Management Area 2.1 – Special Interest Areas	1	0	
Management Area 3.65 – Rangelands With Diverse Natural-Appearing Landscapes	229	14	
Total allotment acres	2159	100	
NFS acres	1633	76	
State land acres	0	0	
Private land acres	526	24	
Current permitted livestock grazing (AMs) on NFS lands			273
Initial estimated carrying capacity (AUMs) on NFS lands			530
Number of pastures containing NFS lands			3

Table 131.2 — Allotment 131 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	There are no perennial or intermittent stream reaches in this allotment.	None
Woody draws	Approximately 56 percent of sampled woody draws were Healthy and 44 percent were At Risk due to lack of adequate regeneration and poor structure in the shrub layer.	Increase successful recruitment of woody species.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Meeting Objectives High – Below Objectives 2004 Transects: 3.03; 2.26; 1.09 2004 Stations percent: Low-40/Moderate-58.33/High-1.67.	Manage for additional High structure on biologically capable habitats.
Seral stages	Of five sample sites, four were at mid seral stages and one was at early. Invasive grasses were common, but one of the sample sites was at a Reference State without invasive grasses.	Maintain native plant communities and increase occurrence of late seral stages. Limit or decrease extent of invasive grasses.
Sharp-tailed Grouse	Under the current configuration, there are 4 leks within one mile of this allotment. There are no leks known to occur within the allotment.	Manage to enhance sharp-tailed grouse nesting and brooding habitat by increasing the quality and quantity of High vegetative structure on biologically capable sites.
Remarks	• Trace of Canada thistle and burdock. • 2004 fire burned 15 acres of allotment. • Monitor for weeds.	

Table 131.3 — Allotment 131 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
Authorized Use is 273 federal AMs (48 federal AMs are summer use and remainder is winter use). Three-year average permitted use is 26 summer federal AMs.* Permit type: Inventory (12 months). Rotation: One herd seasonlong in one pasture, another herd goes to Allotment 302 for summer months, all herds winter in this allotment. Class(s) of livestock: Cow/calf pairs. See allotment map in Appendix B for current range developments.	**Initial Actions** Authorized federal AMs: 273 of which 48 AMs are summer use and the remainder are winter use. Reallocate Allotment 131 pastures 1 and 2 to Allotment 129. Reallocate Allotment 129 pasture 2 to Allotment 131. Pastures 1 and 2 would be utilized as summer pasture. To eliminate the bottleneck in pasture 3 remove the fenceline between Allotment 129 pasture 2 and Allotment 131 pasture 3 in Sections 11 and 12. Extend range water pipeline from well in Allotment 131 pasture 3 into Allotment 131 pastures 1 and 2 and install two tanks. Reclaim two reservoirs in Allotment 131 pasture 1. **Adaptive Options** Fence individual woody draws in pasture 2 and 3. Adjust Authorized Use. Replace the fence between pasture 1 and 2.	**Initial Actions** Authorized federal AUMs: 273 of which 48 AUMs are summer use and the remainder are winter use. Reallocate Allotment 131 pastures 1 and 2 to Allotment 129. Reallocate Allotment 129 pasture 2 to Allotment 131. Pastures 1 and 2 would be utilized as summer pasture. Remove the boundary fence between Allotments 129 pasture 2 and 131 pasture 3 in the south half of sections 11 and 12 to eliminate the bottleneck in pasture 3 **Adaptive Options** Fence individual woody draws in pasture 2 and 3. Replace the fence between pasture 1 and 2. Extend range water pipeline from well in Allotment 131 pasture 3 into Allotment 131 pasture 1. Reclaim two reservoirs in Allotment 131 pasture 1. Adjust Authorized Use
Monitoring Review annual planned management identified in Allotment worksheets. Conduct annual allotment inspections to monitor current management. Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** Survey woody draws once every 3 to 5 years. Gather Visual Obstruction Readings annually for 3 years then reevaluate survey frequency. Collect vegetative composition data once every 3 to 5 years.	**Monitoring** Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 131 — Existing Condition

Range – This allotment is approximately 2,159 acres in total size and contains private and NFS lands, with 1,633 acres of NFS lands. Currently, this allotment is issued an inventory permit for 6 head for 8 months and an additional 134 head the months of January through April (the additional 134 head come from Allotment 302) by the MGA. On this particular allotment the majority of the use on NFS lands occurs during the winter, not the typical May 1st to December 31st. Livestock are currently being wintered on private and intermingled private and NFS lands during the winter months of January through April in pastures 1 and 2.

This allotment has been subdivided into five pastures, and of these five only three contain NFS lands. Of the three pastures, two solely contain NFS land and the remaining pasture consists of both private and NFS lands. The pastures themselves range from as small as 167 acres to as large as 1,225 acres (the 1,225 acres is a combination of both pastures 1 and 2). Current AMs provided by NFS lands is 273. Water developments within this allotment include developed springs, reservoirs, dugouts, and a well/stock tank.

Although this allotment is permitted as an inventory permit, the permittee normally delays turn-out to the common associated with this headquarters allotment until the beginning of June and also pulls the livestock off the common allotment the middle of October. This means that from the middle of October through the beginning of June livestock are rotated through the five pastures within this allotment. The numbers of days grazed and the number of livestock for the last four grazing seasons can be found in the AWs (Project Record, Supporting Documentation, Range, L-1).

The allotment has been subdivided into five pastures; however, on September 27, 2004 a visit showed that the natural barrier between pastures 1 and 2 is not truly working. Pasture 1 is approximately 514 acres and pasture 2 is approximately 711 acres. The natural barrier is a steep banked intermittent stream that leads into the main channel of Magpie Creek. Within the main channel of this drainage, observation showed willow species and relatively good cottonwood regeneration along with a very healthy herbaceous cover. The midland/lowland areas within these pastures had relatively good native species diversity and litter cover; however, there are areas within both pastures that show concentrations of livestock. These areas were around the well/tank facility and around the reservoir in pasture 1 just north of the well/tank facility. An old hay yard and cake shack is present just east of the reservoir. This area shows evidence of historical use as livestock were caked and fed in this area. The plant community within this area showed a high expression of blue grama and very low expression of needle-and-thread and western wheatgrass. Plains prickly pear also occurs quite frequently within this area. Smooth brome is also present in the area. The northern end of both pastures 1 and 2 was not totally reviewed.

Pasture 3 is approximately 587 acres of private and NFS lands. Livestock can access almost all areas within this pasture, however, the ridge tops on the north side of this pasture showed very light use. Species composition in the heavier used areas within the western portions of this pasture was dominated by blue grama, and the area was lacking in litter cover. The shape of this pasture is shaped like a bottleneck, with the tip running right into the watering facility on the western edge of this pasture. Desirable vegetative species, needle-and-thread and western wheatgrass, were present

throughout; however, they do not get the opportunity to express themselves within the heavier use areas (visual observation).

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there is a trace of Canada thistle and burdock located within this allotment. However, through recent weed inventories and communication between the Forest Service, Billings County Weed Officer, and permittee, other infestations have been identified. The threat of salt cedar is high along Magpie Creek and its reaches.

Oil and gas development on NFS lands in this allotment has removed a total of approximately 0.0 acres from livestock access. A total of approximately 2.5 acres of oil and gas pads and access roads have been reclaimed and are or will be available for livestock access. Associated forage from these acres is approximately 0.0 and 0.8 AUMs, respectively.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – Of nine woody draw samples, 56 percent were Healthy and 44 percent were At Risk. At Risk draws occurred along relatively open drainages while Healthy sites occurred on steep upland slopes. Rocky Mountain juniper was present in many woody draws and dominated woodlands on steep north aspect slopes.

Herbaceous Structure – The three sampled VOR transects from 2004 indicate that herbaceous structure is relatively diverse. One transect was Low and two were Moderate with one of those two nearing High structure at 3.06 inches. Consolidated station data from the three transects showed 40 percent of the stations were Low structure, 58.3 percent were Moderate, and 1.7 percent was High.

Seral Stages – An NDSU sample on a Claypan ES in the northeast corner of pasture 1 was at a mid seral stage, with 27 percent bare ground and western wheatgrass constituting 93 percent of the grass production. Frequency of Kentucky bluegrass was 14 percent. A sere plot about 0.5 miles to the west on a Sandy ES was at an early-mid seral stage with blue grama comprising 67 percent of the relative grass basal cover. The south end of the pasture contains a water well, stock tank, and old hay yard that exhibits high use with blue grama communities and areas of invasive grasses (Project Record, Specialist Reports and Notes, Range Report).

An NDSU sample on a Thin Claypan ES in the south-central area of pasture 2 was at a mid seral stage with dominances of western wheatgrass and green needlegrass (*Stipa viridula* Trin.) and a high density and diversity of forbs. Frequency of Canada bluegrass (*Poa compressa* L.), cheatgrass, and Kentucky bluegrass was 21 percent, 7 percent, and 7 percent, respectively. Kentucky bluegrass constituted 10 percent of the grass production. Two Robel transects near the west-central pasture boundary recorded sedge and blue grama as the dominant species with western wheatgrass and needle-and-thread. A belt transect in the southwest corner of the pasture recorded western wheatgrass, bluegrass, and green needlegrass as the three dominant species.

An NDSU sample on a Clayey ES near the center of pasture 3 appeared to be at a mid-early seral stage with dominance of blue grama and western wheatgrass and 25 percent frequency of annual brome. A nearby belt transect recorded needle-and-thread as the dominant species. Another NDSU sample on a Sandy Claypan ES in the southeast corner of the pasture was at a mid seral stage with

little bluestem and sedge dominance. Bare ground constituted 44 percent of the ground surface, and Rangeland Health Indicators relating to rills, gullies, and water flow patterns were rated with slight to moderate departures. A Robel transect about 1,000 feet to the northeast recorded dominance of sedge, little bluestem, and western wheatgrass.

Sharp-tailed Grouse – Under the current configuration, there are four leks within 1 mile of this allotment. There are no leks known to occur within the allotment.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed 2 years later.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would now be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – Woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate increased tree and shrub regeneration. However, existing invasive grasses as well as potential increases of these species as a result of increasing litter with the removal of livestock grazing would have the potential for slowing or decreasing the potential degree of improvement in some woody draws.

Herbaceous Structure – With the removal of livestock, there would be an appreciable increased opportunity for the development of High and Moderate herbaceous structure, and a decrease in the amount of Low structure.

Seral Stages – The removal of livestock grazing disturbances would facilitate shifts towards late seral stage communities with an eventual loss in the desired mosaic of seral stages. Plant diversity would decrease with the development of late seral stages, particularly among forb species. However, the decrease in grazing disturbance would facilitate an increase of accumulated plant litter that would in turn facilitate the expansion of invasive grasses in portions of the three pastures. Increasing invasive grasses would impede the development or decrease the maintenance of late seral communities, with the potential for transitioning to Invaded Grass States with reduced maintenance of native plant diversity. Transitions could occur rapidly in portions of the allotment where invasive grasses are currently prominent, but might require 10 or more years where invasive grasses are presently scarce.

Sharp-tailed Grouse – The increase in High herbaceous structure would benefit nesting and brooding habitat for sharp-tailed grouse. However, over time the decrease in forb diversity would decrease foraging opportunities and nesting and brooding quality.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by an inventory grazing association permit, and Authorized Use is 273 federal AMs of which 48 are summer use and the remainder are winter use.
- Cow/calf pairs are run seasonlong in one pasture while another herd goes to Allotment 302 for the summer months. All herds are wintered in pastures 1 and 2.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – The proportion of Healthy woody draws would be unlikely to improve under current management in which present conditions developed. The predominant use in pastures 1 and 2 occurs during the winter, and trampling disturbances are likely when livestock seek woody draws for shelter. Reported livestock numbers in pastures 1 and 2 range from 105 to 128 head for 3 months, and 180 to 220 head in pasture 3 for 0.5 months. Hay feeding during this period concentrates livestock use, so there is high potential for trampling disturbances within adjacent woody draws.

Herbaceous Structure – Reflective of the Authorized Use level below the initial estimated carrying capacity, the herbaceous structure distribution, as evidenced by the VOR transect data, was approaching meeting the structure objectives. Retaining similar Authorized Use levels in conjunction with multiple grazing periods, which also includes dormant season grazing, contribute to existing herbaceous structure levels.

Seral Stages – The predominance of mid and mid-early seral stages would persist under current management with a high potential for increases of invasive grasses. Although Authorized Use is 34 percent less than initial estimated carrying capacity after adjusting for cow size, and reported use has been 27 to 54 percent greater than Authorized Use not including additional winter use. Including the number of livestock on the pasture during the months of January through April would exceed initial estimated carrying capacity by 38 to 52 percent after adjusting for cow size and assuming livestock were grazing throughout the year. Additionally, measurements by NDSU suggest lower production than assumptions of reference plant community production that were used in the initial estimated carrying capacity and would contribute to high levels of utilization resulting

in the persistence of mid and mid-early seral stages with a high potential for shifts to early seral stages.

High livestock concentrations associated with hay feeding result in heavy trampling disturbances that slow the rate of growth the following spring. Heavy trampling can also assist the establishment of invasive grasses introduced in hay. Premature grazing can occur during relatively open winters and early spring and is ensured by frequent grazing periods during May that decrease plant vigor and facilitate shifts towards early seral stages.

Sharp-tailed Grouse – Existing management would not enhance sharp-tailed grouse nesting habitat owing to dormant season use, which would reduce herbaceous structure levels from the fall readings because of trampling and consumption of the forage.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 273 federal AMs of which 48 AMs are summer use and the remainder is winter use.
- Reallocating Allotment 131 pastures 1 and 2 to Allotment 129. Reallocating Allotment 129 pasture 2 to Allotment 131.
- Using pastures 1 and 2 as summer pasture.
- To eliminate the bottleneck in pasture 3, removing the fenceline between Allotment 129 pasture 2 and Allotment 131 pasture 3 in Sections 11 and 12.
- Extending the range water pipeline from well in Allotment 131 pasture 3 into Allotment 131 pastures 1 and 2 and installing two tanks.
- Reclaiming two reservoirs in Allotment 131 pasture 1.

ADAPTIVE OPTIONS:

- Fencing individual woody draws in pasture 2 and 3.
- Adjusting Authorized Use.
- Replacing the fence between pasture 1 and 2.

Range

Initial Actions – Under this alternative Authorized Use would be 273 federal AMs, of which 48 federal AMs would be available for the summer grazing season and 225 federal AMs would be available for winter grazing. This would not be a change from the existing condition of Alternative 2; however, the use of the AMs would be different because the initial action identifies the rotation for the NFS pastures. The exchange of pastures between Allotments 129 and 131 would result in an adjusted Authorized Use due to the loss of AMs and NFS acreage.

The exchange of pastures between Allotments 129 and 131 would provide additional flexibility to the permittees and improve livestock distribution in the northwest portion of pasture 1 in Allotment 131. Allotment 131 would gain approximately 84 acres of NFS lands and approximately 30 to 35 federal AMs in the exchange resulting in an increase in the Authorized Use. Since this allotment is an inventory permit and carries AMs in winter grazing, a decision would need to be determined if the AMs would be added to the summer or the winter grazing season.

Utilizing pastures 1 and 2 as a summer pasture would require a change in winter needs on the MGA permit to the permittee. Distribution of livestock would not change in pasture 1 and 2 because of the size and topography of the pastures. Distribution would be more dependent on the palatability of herbaceous species and timing of grazing.

The current shape and size of pasture 3 in Allotment 131 has created a bottle neck, which has had an effect on livestock distribution and has increased grazing pressure in this location. By removing this bottleneck, livestock will no longer be confined to the area, the size of the pasture would increase, and over time the grazing pressure would be less in areas currently being heavily grazed. Heavier grazing will still occur within 1/8 of a mile from the existing water development in pasture 1 of Allotment 131.

Developing a range water pipeline from a well in Allotment 131 pasture 3 into Allotment 131 pasture 1 would change the distribution within pasture 1 due to the lack of reliable water provided by the existing reservoirs. Reclaiming reservoirs in Allotment 131 pasture 1 would not have an effect on the distribution of livestock since the reservoirs are currently seasonal to nonfunctional. No adjustments in AUMs would be needed due to the size of the reclamations.

Adaptive Options – Fencing high-value woody draws would have little to no change in livestock distribution across the allotment. Forage within the exclosures would no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may occur on remaining forage. There will be a cost to install these fences and as a result there will be additional cost of maintenance of the fence to prevent livestock access to the woody draws.

Adjusting Authorized Use downward would result in fewer livestock numbers because of the inventory permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock; however, the amount of forage harvested would be less than the existing forage harvested.

Replacing the fence between pasture 1 and 2 would change the distribution because livestock would not have access to both pastures and would be confined to one pasture. Livestock currently graze both pastures at the same time since the natural barrier is no longer functional.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws

Initial Actions – Exchanging pastures 1 and 2 for pasture 2 in Allotment 129 would change the proportion of sampled woody draw conditions to 40 percent Healthy and 60 percent At Risk in Allotment 131.

The season of use within pastures 1 and 2 would change from winter to summer if they become part of Allotment 129. Although trampling disturbances in woody draws that can occur during winter hay feeding would decrease, summer use would likely affect a larger portion of the woody draws as a result of increased livestock distribution and amenities of shade and escape from insects with potentially greater levels of disturbance.

Changing the season of use in Allotment 129 pasture 2 from summer to winter after an exchange of pastures would contribute to decreased woody draw conditions near hay feeding sites as a result of

increased trampling disturbances that have the potential to be located along Magpie Creek with the easiest access and terrain. Other woody draws in the pasture that tend to be situated along steep slopes and ravines would likely persist in a Healthy condition.

Reclaiming a reservoir at the north end of pasture 1 and replacing it with a pipeline-supplied water tank on the nearby fenceline between Allotments 129 and 131 would facilitate tank management to control livestock distribution and utilization in this area, but would probably not result in sufficiently decreased use to facilitate shifts from At Risk to Healthy woody draw conditions in this area of pasture 1.

A similar effect would occur at the south end of the pasture with the reclamation of a second reservoir and new pipeline-supplied water tank. However, reclamation of the reservoir would result in the loss of riparian trees around the perimeter that are in good condition as a result of localized access points to the reservoir.

Removing the fenceline between Allotment 129 pasture 2 and Allotment 131 pasture 3 would result in combining the pastures such that Allotment 131 would consist of one pasture containing NFS lands. This would probably not increase adverse effects to woody draw conditions because most disturbances would be confined to woody draws located near hay feeding areas along terraces of Magpie Creek.

Adaptive Options – Fencing woody draws would increase the potential for improved woody draw conditions by removing or decreasing livestock browsing and trampling disturbances and facilitating the regeneration of desired woody species. Exclusion of livestock impacts through fencing would provide the fastest and greatest degree of woody draw improvement, but regeneration of woody species could be impaired by increasing litter and invasive grass layers in many woody draws. Excluding livestock use of fenced woody draws would have the potential of increasing disturbances and decreasing condition of adjacent unfenced draws.

Decreasing Authorized Use would also have the potential of improving woody draw conditions but would be limited by levels of use reported in AOIs/AWs that exceed the level of Authorized Use, as well as additional livestock on the allotment during the winter months that are not counted towards Authorized Use as discussed under Alternative 2.

Replacing the fenceline between pastures 1 and 2 that would be part of Allotment 129 would increase the number of summer pastures to five. However, the water tank discussed above would have to be constructed and placed on the fenceline between pastures to ensure water in pasture 2. The decrease in pasture size would increase the evenness of livestock distributions that could decrease woody draw conditions by increasing browsing and trampling disturbances. Disturbances within woody draws of this pasture would also increase with the change from winter to summer use with more even livestock distribution. However, the length of use within individual pastures would decrease with five rather than four pastures, and the season of use would fluctuate with the deferred rotation of Allotment 129. These factors may assist in decreases in the level of disturbances and maintain existing woody draw conditions.

Herbaceous Structure

Initial Actions – The proposed Authorized Use would be 273 AMs, which would be split between

summer (48 AMs) and winter use (225 AMs). Since management and Authorized Use levels are similar to current management, this would continue the existing herbaceous structure distribution as measured in the fall. Accounting for the new configuration between Allotments 131 and 129, the minor gain in acres and initial estimated carrying capacity associated with the new configuration could help the allotment move towards the herbaceous structure objectives. The reconfiguration of pasture 3 would change the distribution of use within the allotment. The new configuration should be more desirable over the existing condition.

Adaptive Options – Fencing specific woody draws could have effects relative to the size and location of the exclosure but is not expected to be appreciable due to the relatively small amount of woody draw habitat projected to be fenced. Replacing the fenceline between pastures 1 and 2, should have minimal effect if dormant season management is to continue. By adjusting the Authorized Use, an increase in the proportion of High herbaceous structure would be experienced along with improvement in the herbaceous structure distribution.

Seral Stages

Initial Actions – Exchanging pastures 1 and 2 with Allotment 129 would change the season of use for these pastures from winter to summer and remove adverse effects of hay feeding, heavy trampling, and premature spring grazing of native grasses. Herbaceous communities dominated by blue grama in portions of pasture 1 would have the potential to shift towards late seral stages with the change to a summer grazing season and a four-pasture deferred rotation. Invasive grasses in portions of the pastures would persist and have the potential to increase.

Pasture 2 in Allotment 129 that would be conferred to Allotment 131 would be subject to adverse impacts associated with hay feeding such as heavy trampling, premature spring grazing, and the steady introduction of invasive grass seed. These disturbances would facilitate a shift towards early seral stages and/or transitions to Invaded Grass States of relatively high quality native grass communities that were measured in NDSU plots and sere plots.

Reclaiming two reservoirs in pasture 1 and replacing them with pipeline-supplied water tanks would allow greater control of livestock distribution and utilization and an increased potential for achieving the desired proportion of seral stages, and would be assisted by the summer four-pasture deferred rotation after transferring the pasture to Allotment 129.

Removing the fence between Allotment 129 pasture 2 and Allotment 131 pasture 3 would result in one pasture in Allotment 131 and should not have a large influence on the proportion of seral stages because the degree and distribution of livestock disturbances would be more dependent on the location of hay feeding sites.

Continuing the current or similar level of Authorized Use after adjustments for pasture exchanges would maintain the potential for reported levels of use that exceed Authorized Use.

Adaptive Options – Decreasing Authorized Use would be unlikely to facilitate shifts toward late seral stages unless the reduction is in the range of 50 percent due to adverse effects associated with hay feeding, premature grazing, and levels of use reported in AOIs/AWs that exceed the level of Authorized Use, as well as additional livestock on the allotment during the winter months that are not counted towards Authorized Use.

Replacing the fenceline between pastures 1 and 2 that would be transferred to Allotment 131 and used in a five-pasture deferred rotation would increase opportunities for plant recovery and the completion of critical growth stages. Along with the removal of premature spring grazing, there would be an increased potential for shifts towards late seral stages.

Sharp-tailed Grouse

Initial Actions – Since dormant season management is expected to continue, there would likely be none, or little improvement for grouse nesting habitat.

Adaptive Options – By adjusting the Authorized Use, an enhancement of grouse nesting habitat could be experienced. However, since much of the use on this allotment is winter use, potential herbaceous structure gains in the fall would be limited by the time spring nesting occurs due to trampling and consumption by livestock. Fencing specific woody draws could have negative effects relative to the size and location of the exclosure but it is not expected to be appreciable due to the relatively small amount of woody draw habitat projected to be fenced. Replacing the fenceline between pastures 1 and 2 would likely have none, or little effect on enhancing grouse nesting habitat due to the dormant season management would reduce herbaceous structure over the winter.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3; therefore Alternative 3A would have the same effects as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set at the level of Alternatives 2, 3, and 3A but adjusted for cow size.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 4 are the same as Alternative 3.

Range

Initial Actions – Authorized Use for this allotment would be 273 federal AUMs, of which 48 AUMs would be summer use and the remainder would be winter use because of winter needs associated with the permit through MGA. The existing Authorized Use of 273 federal AMs converted to AUMs by adjusting for cow size is 314 federal AUMs. The effect of this authorization equates to a 13 percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the

allotment. This would result in fewer livestock numbers because of the inventory permit for this allotment.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws

Initial Actions – Reductions in Authorized Use of 13 percent after adjusting for cow size would have the potential of improving woody draw conditions by decreasing the level of livestock browsing and trampling disturbances that would primarily occur during winter hay feeding. However, the effects would continue to be limited by levels of use reported in AOIs/AWs that currently exceed Authorized Use, as well as additional livestock on the allotment during the winter months that are not counted towards Authorized Use.

Herbaceous Structure

Initial Actions – Adjusting the Authorized Use based on an AUM, accounting for cow size, would contribute to meeting or moving towards the herbaceous structure distribution objectives through the reduction of use that would leave more residual cover.

Seral Stages

Initial Actions – Potential reductions in Authorized Use of 13 percent after adjusting for cow size would have the potential of facilitating shifts towards late seral stages, but the effects would continue to be limited by levels of use reported in AOIs/AWs that currently exceed Authorized Use, as well as additional livestock on the allotment during the winter months that are not counted towards Authorized Use. In general a potential 13 percent reduction in Authorized Use would probably have less effect on plant composition and seral stages compared to winter hay feeding, concentrated trampling disturbances, the introduction of invasive seed, and premature grazing of native grasses. These practices would have a high potential to contribute to mid and early seral stages and decreased maintenance of high condition native grass communities that were measured in Allotment 129 pasture 2 and that would be transferred to Allotment 131, as discussed under Initial Actions of Alternative 3.

Sharp-tailed Grouse

Initial Actions – Adjusting the Authorized Use based on an AUM, and accounting for cow size, could contribute to enhancing grouse nesting habitat through the reduction of use that could potentially leave more residual cover for spring grouse nesting needs. However, the dormant season use would reduce the residual cover that accrued from the previous growing season.

Allotment 132A

Table 132A.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 132A in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 6.1 – Rangeland With Broad Resource Emphasis	309	100	
Total allotment acres	309	100	
NFS acres	309	100	
State land acres	0	0	
Private land acres	0	0	
Current permitted livestock grazing (AMs) on NFS lands			176
Initial estimated carrying capacity (AUMs) on NFS lands			159
Number of pastures containing NFS lands			1

Table 132A.2 — Allotment 132A – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	There are no perennial or intermittent stream reaches in this allotment.	None
Woody draws	There are no woody draws in the allotment.	None
Herbaceous structure	Transect Results: Low – N/A Moderate – N/A High – N/A 2004 Transects: N/A 2004 Stations percent: N/A.	**Manage allotment to maintain meeting structure objectives.
Seral stages	Half broken land and half unbroken land with high invasive grasses in both areas and areas of Invaded Grass States.	Halt the expansion of invasive grasses and increase the development or maintenance of native grass.
Sharp-tailed grouse	There are no known leks within this allotment. There are no known leks within 1 mile of this allotment.	
Remarks	Need new ADP number for either this allotment or Allotment 132H.	

**** Based on a follow-up field review, the IDT determined that this allotment was meeting structure objectives.**

Table 132A.3 — Allotment 132A by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 176 federal AMs. • Three-year average permitted use is 157 federal AMs.* • Permit type: Turn-in. • Rotation: one pasture with typical turn-in of June 1st. • Class(s) of livestock: Cow/calf pairs or yearlings. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 176. • Continue to provide opportunity for growth and regrowth of native grasses and crested wheatgrass. **Adaptive Options** • Adjust Authorized Use.	**Initial Actions** • Authorized federal AMs: 176. • Continue to provide opportunity for growth and regrowth of native grasses and crested wheatgrass. **Adaptive Options** • Adjust Authorized Use.
Monitoring • Review annual planned management identified in Allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Gather Visual Obstruction Readings once every 3 years. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 132A - Existing Condition

Range – This allotment is approximately 309 acres of NFS lands. Currently this allotment is issued a turn-in permit for 176 AMs to be used anytime between May 1st and December 31st. This allotment and Allotment 132H were managed as one allotment, but were split in 1999. It is also the headquarters allotment associated with a common allotment (Lower Cherry Hollow). In 1999, the base property was split between two association members, and the numbers attached to the common were divided up between the members based on the acres each had purchased. Current AMs provided by NFS lands is 176. This allotment is located in rolling prairie topography, and there are signs of past disturbance of cultivation. There are two developed reservoirs in this allotment, but they are seasonal at best. The permittee has a stock tank on private land with a water lot fence surrounding it accessible to NFS lands. This stock tank is the reliable source of water for the allotment.

The kind of livestock on this allotment varies from year to year between yearlings and cow/calf pairs, but is typically managed with a shortened season with increased numbers with a turn-in date typically around June 1st. The vegetation within this allotment is typical of the rolling prairie where cultivation had historically occurred, crested wheatgrass planted, or the area not seeded and left to grow back. Currently, there is a mixture of introduced species such as crested wheatgrass and Kentucky bluegrass and native species such as western wheatgrass, needle-and-thread grass, green needlegrass, blue grama, and bluegrass species. On the eastern side of the allotment there are clay pan areas that have a lot of clubmoss, fragile prickly pear (*Opuntia fragilis* Nutt.), and bare ground; however, this was where most of the green needlegrass was observed.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there were no known state-listed noxious weeds or county-listed weeds within this allotment.

Oil and gas development on NFS lands in this allotment has removed a total of approximately 0.0 acres from livestock access. A total of approximately 5.6 acres of oil and gas pads and access roads have been reclaimed and are or will be available for livestock access. Associated forage from these acres is approximately 0.0 and 3.3 AUMs, respectively.

Riparian – There are no intermittent or perennial stream reaches in this allotment. There are no riparian issues in the allotment.

Woody Draws – There are no woody draws in this allotment.

Herbaceous Structure – Based on a September 2006 IDT field visit, this allotment was determined to be meeting herbaceous structure distribution conditions consistent with the Grasslands Plan objectives. The west half of the allotment was the focus of the visit to assess the structure conditions. The team broke into two groups and walked through the area. Some VORs were taken but not recorded by at least one team. After getting back together and discussing observations and the management of the allotment, the professional judgment by the team members was that they were comfortable that the allotment was meeting structure objectives. No transects from the 2004 VOR baseline assessment were recorded in this allotment.

Seral Stages – Limited vegetation measurements and field observations indicate a large portion of the allotment is at or approaching an Invaded Grass State of Kentucky bluegrass. The west half of the pasture consists of broken land and a sere plot along a drainage swale below a reservoir was at an Invaded Grass State for a planted site with nearly equal dominance of Kentucky bluegrass and crested wheatgrass (Figure 132A.1). Western wheatgrass and other native grasses comprised less than 30 percent of the relative grass basal cover. Field observations along the western quarter of the pasture indicated greater dominance of crested wheatgrass and lesser amounts of Kentucky bluegrass and native grasses. Low knolls of unbroken land along the east boundary of the pasture contained greater dominance of native grasses, as did occasional clay slicks containing clubmoss, blue grama, Junegrass (*Koeleria pyramidata* (Lam.) Beauv.), and traces of western wheatgrass.

Figure 132A.1 — West-central portion of the pasture downstream from a dugout reservoir. Crested wheatgrass in the foreground and increasing amounts of Kentucky bluegrass in lower-lying area around electric pole indicated by brown hue of seed heads.

Vegetation in unbroken land on the east side of the pasture was dominated by Kentucky and Canada bluegrass with lesser amounts of green needlegrass and other native grasses (Figure 132A.2. Numerous clay slicks or shallow swales where most of the "A" soil horizon has been lost contained increased dominance of native grasses such as blue grama, fragile cactus, Junegrass, western wheatgrass, and high amounts of bare ground. An ecoplot near the center of this area was at a mid-early stage dominated by equal amounts of western wheatgrass and Kentucky bluegrass with small amounts of crested wheatgrass, smooth brome, and green needlegrass. A second ecoplot near the southeast boundary of the pasture and 100 feet from a road edge was overwhelmingly dominated by crested wheatgrass with moderate amounts of green needlegrass and lesser amounts of western wheatgrass and Kentucky bluegrass. The predominance of crested wheatgrass in this area may be the result of an unidentified strip of broken land or disturbances associated with the road edge, but assuming crested wheatgrass was planted the site was generally at a mid-early seral stage.

Figure 132A.2 — East side of allotment dominated by invasive bluegrass with scattered occurrences of crested wheatgrass and native grasses. Brown seed heads of Kentucky bluegrass are especially dense or evident in the background.

Sharp-tailed Grouse – There are no known leks within this allotment. There are no known leks within 1 mile of this allotment.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed after 2 years.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment, so there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – There are no intermittent or perennial stream reaches in this allotment.

Woody Draws – There are no woody draws in this allotment.

Herbaceous Structure – With the removal of livestock, there would be increased opportunity for the development of High and Moderate structure, and a decrease in the amount of Low structure.

Seral Stages – The removal of livestock grazing would facilitate transitions to an Invaded Grass State that would be expressed through increasing dominance of invasive bluegrass at the expense of most native species that would be irretrievably lost without intensive reclamation efforts. Increasing litter without livestock grazing would facilitate the increase of bluegrass that would become the overwhelmingly dominant species across the pasture within ten years. Smooth brome may also increase and crested wheatgrass would remain persistent. Bare ground among clay slicks would gradually fill with increasing blue grama and western wheatgrass but bluegrass would gradually occupy these sites with increasing plant development and litter accumulation. Continued increases in herbaceous litter and shallow root growth of bluegrass would adversely affect ecosystem productivity and rangeland health (Nichols 2010, Prince 2010).

Sharp-tailed Grouse – The increase in High structure from removal of livestock disturbance of habitat would benefit nesting and brooding habitat for sharp-tailed grouse. However, over time the decrease in forb diversity would decrease foraging opportunities. To a lesser extent, nesting and brooding quality would also decrease because of lower quality habitat associated with invasive grasses that may invade local habitats.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by a turn-in grazing association permit, and Authorized Use is 176 federal AMs.
- Cow/calf pairs or yearlings are run in a one-pasture deferred rotation.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing

association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – There are no intermittent or perennial stream reaches in this allotment.

Woody Draws – There are no woody draws in this allotment.

Herbaceous Structure – This allotment is considered to be meeting the desired herbaceous structure distribution as outlined in the Grasslands Plan, based on field measurements taken in 2006.

Seral Stages – Continuation of the current grazing schedules would facilitate transitions to Invaded Grass States across large areas of the allotment where they have not already occurred. The time period for these transitions would be slightly longer than Alternative 1 because grazing would impede the accumulation of plant litter that assists the establishment of invasive bluegrass. The transitions would also be less complete across the allotment because selective grazing of native grasses on clay slicks would impede the development of plant structure and litter that would maintain unfavorable conditions for the establishment of bluegrass.

As described by Sedivec (2006) the most effective grazing system for impeding the increased dominance of Kentucky bluegrass and maintaining native species diversity involves maximizing use of the former and increasing opportunities for the latter to complete critical growth stages and increase in vigor. Kentucky bluegrass and crested wheatgrass decrease in palatability during and after seed production that occurs by mid June. The earliest reported turn-in dates on June 4th during recent years occur during the end of peak palatability for these species, and selective grazing of native grasses is likely to occur proportional to the delay in turn-in. Stocking levels based on the total amount of forage rather than the production of native species experiencing selective grazing contributes to decreased vigor and production of these species that provides feedback for additional increases of invasive grasses. Frequent annual repetition of this situation would continue to result in a competitive disadvantage to native grasses that would assist the spread of Kentucky bluegrass. This concept follows the basic rangeland grazing model of increaser, decreaser, and invader species (Dyksterhuis 1949, Lewis et al. 1956, see also Briske et al. 2008, Trammel and Butler 1995). Current and proposed levels of Authorized Use that are 27 percent above initial estimated carrying capacity would compound the level of excessive native grass utilization. Additionally, the difference between initial estimated carrying capacity and Authorized Use would increase with increasing amounts of Kentucky bluegrass as a result of its lower production relative to the potential climax community (NRCS 2009, Sedivec 2006) used to determine initial estimated carrying capacity.

Despite facilitating the transition to Invaded Grass States across the majority of the allotment, current grazing management would provide for the maintenance of small patches of native grasses where they dominate on clay slicks because selective grazing of these areas would maintain low herbaceous plant cover and impede conditions suitable for the establishment of invasive bluegrass. However, these areas represent a very small portion of the pasture acreage and do not support the objective of maintaining native plant diversity or justify the appropriateness of summer grazing schedules at current levels of Authorized Use.

Although the allotment may exhibit high amounts of residual plant cover at the end of the grazing season that suggest appropriate levels of use that contribute to High structure objectives, the high amount of residual cover is a greater testament to the underutilization of invasive grasses. As summarized in the National Range and Pasture Handbook (NRCS 2006), under-utilization of one forage component does not compensate for over-utilization of other components and does not accurately describe the trend of plant composition or range condition.

Sharp-tailed Grouse – There are currently no known leks within 1 mile of this allotment. Therefore, though managing for game bird nesting is not necessary per Grassland Plan guidance, it would be desirable to help meet the goal to "demonstrate positive trends in…habitat availability, habitat quality, and population distribution within the planning area." Though there are no known leks within 1 mile of this allotment, potential grouse nesting habitat does exist.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 176 federal AMs.
- Continuing to provide opportunity for growth and re-growth of native grasses and crested wheatgrass.

ADAPTIVE OPTIONS:

- Adjusting Authorized Use.

Range

Initial Actions – Continuing to provide opportunity for growth and re-growth of native grasses and crested wheatgrass would not be changed from current management.

Adaptive Options – Adjusting Authorized Use downward would result in fewer livestock numbers, fewer grazing days, or a combination of the two, because of the turn-in permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock. However, the amount of forage harvested would be less than the existing forage harvested.

Riparian – There are no intermittent or perennial stream reaches in this allotment.

Woody Draws – There are no woody draws in this allotment.

Herbaceous Structure

Initial Actions – This allotment is considered to be meeting the desired herbaceous structure distribution as outlined in the Grasslands Plan based on 2006 field measurements.

Adaptive Options – The Authorized Use of this allotment is higher than the initial estimated carrying capacity by 21 percent after accounting for cow size. Adjusting the Authorized Use would help ensure that management practices would meet the desired herbaceous structure distribution.

Seral Stages

Initial Actions – Continuation of current grazing management and levels of Authorized Use are proposed and would result in the same effects as described under Alternative 2.

Adaptive Options – Neither decreases nor increases in the level of Authorized Use would alter the current trend of increasing invasive grasses and decreasing maintenance of native plant diversity without changes in the season of grazing. These changes would be timed to the increased use of invasive grasses and decreased use of the native component.

Sharp-tailed Grouse

Initial Actions – There are currently no known leks within 1 mile of this allotment. Therefore, though managing for grouse nesting is not necessary per Grassland Plan guidance, it would be desirable to help meet the goal to "demonstrate positive trends in…habitat availability, habitat quality, and population distribution within the planning area." Though there are no known leks within one mile of this allotment, potential grouse nesting habitat does exist.

Adaptive Options – Though there are no leks within 1 mile of this allotment, potential grouse nesting habitat exists. Adjusting the Authorized Use would help ensure that management practices meet the desired herbaceous structure proportions and enhance potential grouse nesting and brooding habitat.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The actions both initial and adaptive are the same as Alternative 3 and will not be repeated here.

Allotment 132H

Table 132H.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 132H in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 6.1 – Rangeland With Broad Resource Emphasis	622	100	
Total allotment acres	778	100	
NFS acres	622	80	
State land acres	0	0	
Private land acres	156	20	
Current permitted livestock grazing (AMs) on NFS lands			332
Initial estimated carrying capacity (AUMs) on NFS lands			364
Number of pastures containing NFS lands			2

Table 132H.2 — Allotment 132H – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	There are no perennial or intermittent stream reaches in this allotment.	None.
Woody draws	Only one woody draw in this allotment. The sample taken in this allotment was At Risk due to lack of regeneration, grassed in understory, and head cutting.	Increase successful recruitment of woody species.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Meeting Objectives High – Below Objectives 2004 Transects: 1.55; 1.61; 1.16 2004 Stations percent: Low-65/Moderate-33.33/High-1.67.	Manage for additional High structure on biologically capable habitats.
Seral stages	Mostly broken land with mid seral stages of intermingled crested wheatgrass, invasive bluegrass, and native grasses.	Decrease or limit the expansion of invasive grasses and maintain or increase native grass components.
Sharp-tailed Grouse	There are no leks within the allotment. There is one known lek within one mile of the allotment but there is less than 160 acres of overlap.	Manage for increased High vegetative structure on biologically capable sites to enhance habitat.
Remarks	• Trace of burdock in woody draws.	

Table 132H.3 — Allotment 132H by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 332 federal AMs (322 federal AMs are summer use and remainder is winter use). • Three-year average permitted use is 303 summer federal AMs.* • Permit type: Inventory (12 months). • Rotation: Three-pasture deferred rotation. • Class(s) of livestock: Cow/calf pairs and yearlings. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 332 of which 322 AMs are summer use and the remainder are winter use. • Develop a rangeland well in either pasture 2 or 3. Locate a stock tank on the fenceline separating pastures 2 and 3. • Focus on early use of crested wheatgrass in pastures 2 and 3. This would aid in pulling livestock away from woody draw. • Continue use of temporary fencing to defer use of native grasses intermingled with crested wheatgrass in pasture 2. **Adaptive Options** • Fence the woody draw. • Adjust Authorized Use.	**Initial Actions** • Authorized federal AUMs: 364, of which 322 AUMs are summer use and the remainder are winter use. • Focus on early use of crested wheatgrass in pastures 2 and 3. This would aid in pulling livestock away from woody draw. • Continue use of temporary fencing to defer use of native grasses intermingled with crested wheatgrass in pasture. **Adaptive Options** • Develop a rangeland well in either pasture 2 or 3. Locate a stock tank on the fenceline separating pastures 2 and 3. • Rest crested wheatgrass pastures every other year to achieve High structure objective. • Fence the woody draw. • Adjust Authorized Use.
Monitoring • Review annual planned management identified in Allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every 3 years. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 132H - Existing Condition

Range – This allotment is approximately 778 acres in total size; 622 acres are NFS lands and the rest are privately owned. This allotment is issued an inventory permit for 32 head for 8 months and 22 head for 3 months by the MGA currently. It is also the headquarters allotment associated with a common allotment (Lower Cherry Hollow). With this type of permit, livestock can be on NFS lands for the entire year, not just the typical May 1st to December 31st. Livestock are wintered on private and intermingled private and NFS lands during January through April. This allotment has been subdivided into three pastures, two of which contain NFS lands. These pastures range from 309 acres in pasture 2 to 313 acres in pasture 3. Current AMs provided by NFS lands can be found in Table 132H.1. Water developments within this allotment include two reservoirs.

This allotment and Allotment 132A were managed as one allotment, but were split in 1999. It was also the headquarters allotment associated with a common allotment (Lower Cherry Hollow). In 1999, the base property was split up between two association members, and the numbers attached to the common were divided up between them based on the acres each had purchased. This allotment is located in rolling prairie topography, and there are signs of past disturbance of cultivation. The vegetation within this allotment is typical of the rolling prairie where cultivation had historically occurred, crested wheatgrass planted, or the area not seeded and left to grow back. Within the NFS pastures, there is a mixture of native and introduced species. Species visually observed were western wheatgrass, needle grasses, blue grama, bluegrass species, and crested wheatgrass.

There are areas within the two pastures that were not cultivated, such as the northwest corner of pasture 3, the slope leading down into the woody draw in the eastern portion of pasture 3, and a small portion of the eastern side of pasture 2 along Betsy Creek. At one time, pasture 2 was broken into two separate pastures, and the dead furrow is still evident where the pasture boundary fence was located. Current conditions with quality of water or lack of water within the reservoirs makes it difficult to carry out a proper rotation between pastures 2 and 3. Because of this, the two pastures normally end up being managed together as the season progresses. The permittee has attempted to start the season in the northern pasture in the past, but in the past 3 years he has been running these pastures together because of lack of overland run-off and conditions of the reservoir basin.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there is trace of burdock found within the woody draw in pasture 3 in the eastern portion of this pasture.

Oil and gas development on NFS lands in this allotment has removed a total of approximately 0.0 acres from livestock access. A total of approximately 2.5 acres of oil and gas pads and access roads have been reclaimed and are or will be available for livestock access. Associated forage from these acres is approximately 0.0 and 1.4 AUMs, respectively.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – The single woody draw located at the southern end of the north pasture was At Risk due to a lack of desirable shrub species and low evidence of tree and shrub regeneration. Shrub communities with an occasional green ash tree occur around a second reservoir at the north end of the allotment and experience relatively high levels of livestock disturbance.

Herbaceous Structure – There were three sampled VOR transects in this allotment; two were Moderate and one was in the Low structure class. All transect averages were less than 2 inches in 2004. Station averages were consolidated for the three transects, which shows a strong dominance of Low structure stations, followed by Moderate stations, with one High structure station (≥5.5 inches).

Seral Stages – A sere plot in the south pasture that consists entirely of broken land was at an early-mid seral stage with dominance of crested wheatgrass and Kentucky bluegrass and light amounts of native grasses. Kentucky bluegrass and lesser amounts of smooth brome constituted 41percent of the relative grass basal cover and the plot was at an Invaded Grass State for a crested wheatgrass planted site. Two NDSU sample plots on the west side of the south pasture were at mid seral stages with varying proportions of crested wheatgrass, needle-and-thread, and Kentucky bluegrass. These sites had not transitioned to an Invaded Grass State. Other measurements involving two Robel transects and an ecoplot recorded similar dominance of crested wheatgrass and Kentucky bluegrass with varying amounts of threadleaf sedge (*Carex filifolia* Nutt.) and blue grama.

More than 80 percent of the north pasture consisted of broken land where an NDSU sample plot was at a mid seral stage with plant composition similar to the south pasture. A belt transect and Robel transect recorded similar species composition, but pasture observations also indicated patches of decreased crested wheatgrass dominance with increasing sedge, blue grama, and needle-and-thread. One of two ecoplots from the late 1990s in unbroken land along the west boundary of the north pasture was at a late seral stage while the second plot was at a mid seral stage. However, recent field observations of the unbroken perimeter suggest that invasive grasses have increased since the original measurements, and this is supported by an NDSU sample plot where crested wheatgrass, Kentucky bluegrass, and native grasses respectively constituted 77 percent, 15 percent, and 8 percent of the total grass biomass.

Sharp-tailed Grouse – There are no leks within the allotment. There is one known lek within 1 mile of the allotment but there are fewer than 160 acres of overlap.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed after 2 years.
- Most range infrastructure would be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – Woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate increased tree and shrub regeneration and growth. However, existing invasive grasses and potential increases of these species as assisted by increasing plant litter with the removal of livestock grazing would have the potential for impeding woody regeneration and slowing or decreasing the potential degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock, there would be increased opportunity for the development of High and Moderate structure, and a decrease in the amount of Low structure.

Seral Stages – The removal of livestock grazing would create the potential for increased expression of existing native grasses and shifts towards late seral stages as a result of removing livestock grazing disturbances. However, increasing litter would facilitate the spread and increased dominance of invasive bluegrass and lesser amounts of smooth brome that would result in transitions to Invaded Grass States with a loss of most native plant diversity. The frequent occurrence of Kentucky bluegrass as well as areas where the transition has already occurred suggests that further transitions would occur throughout most of the allotment within 10 years.

Sharp-tailed Grouse – The increase in High structure from the removal of livestock disturbance of habitat would benefit nesting and brooding habitat for sharp-tailed grouse. However, over time the decrease in forb diversity would decrease foraging opportunities, and to a lesser extent, nesting quality could also decrease because of lower quality habitat associated with invasive grasses that may invade local habitats.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by an inventory grazing association permit, and Authorized Use is 332 federal AMs, of which 322 are summer use and the remainder are winter use.
- Cow/calf pairs or yearlings are run in a two-pasture, deferred rotation grazing system.
- See allotment map in Appendix B for current range developments.

Range – The continuation of the existing federal AMs permitted to the grazing association would remain. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – The At Risk condition of the woody draw would continue because it is the only woodland available for livestock use other than small shrub patches located at the northern end of the allotment. Browsing and trampling disturbances resulting from livestock seeking shade, escape from insects, and extended green periods would continue to impede the regeneration of desired woody species. Managing both pastures as a single pasture during most years allows livestock access to the draw throughout the grazing season, and warmer temperatures and decreasing

palatability of invasive grasses after mid June increases the potential for livestock to seek the woody draw.

Herbaceous Structure – The Authorized Use level exceeds the initial estimated carrying capacity by 5 percent. The existing grazing system is also not assisting the development of High structure, which includes some twice-over and seasonlong aspects, and encourages the removal of standing crop. Though winter use is authorized, it is unclear whether it is utilized. Winter grazing could remove herbaceous structure that may remain after the growing season. Maintaining current management would retain existing conditions primarily due to the assumed difference in Authorized Use and the initial estimated carrying capacity in conjunction with the grazing system.

Seral Stages – Plant composition is likely to remain similar to current conditions or slowly trend towards increasing amounts of Kentucky bluegrass with decreasing maintenance of native grasses. Frequent grazing periods during May through June provide for high utilization of the invasive grass component but also overlap critical growth initiation periods for the native component likely impeding further development. As allowed by the inventory permit, the potential extension of grazing periods past mid June, or seasonlong grazing, would facilitate selective and excessive grazing of the native grass component that would assist the spread or increased dominance of invasive grasses and transitions to Invaded Grass States.

Sharp-tailed Grouse – Potential grouse habitat can be found throughout the allotment. However, since the allotment is effectively not within the 1 mile proximity of a known active lek (<10 acres of overlap within the 1-mile buffer), enhancement of nesting habitat is desirable but not necessary at this time. As noted under herbaceous structure, existing management actions would not improve potential habitat for sharp-tailed grouse and thus continue to limit grouse nesting and brooding habitat in this allotment.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 332 federal AMs, of which 322 AMs are summer use and the remainder for winter use.
- Developing a rangeland well in either pasture 2 or 3. Locate a stock tank on the fenceline separating pastures 2 and 3.
- Focusing on early use of crested wheatgrass in pastures 2 and 3. This would aid in pulling livestock away from woody draw.
- Continuing use of temporary fencing to defer use of native grasses intermingled with crested wheatgrass in pasture 2.

ADAPTIVE OPTIONS:

- Fencing the woody draw.
- Adjusting Authorized Use.

Range

Initial Actions – There would be no change from the existing condition in Authorized Use in Alternative 3. Authorized AMs of 332 would remain the same; however, the use of these federal AMs would be different than the existing condition. The available federal AMs would be harvested in a shorter time period compared to the existing 8-month summer grazing season.

Developing a rangeland well in either pasture 2 or 3, and locating a stock tank on the fenceline separating the two pastures would assure that they are grazed separately in a rotational fashion. Livestock distribution may change some from the existing condition in pasture 2 because of the seasonal reservoir and the distance from the proposed tank location. Distribution would not change from the existing condition because of the location of the existing reservoir.

Grazing during the proper time of the year for crested wheatgrass should increase the density of the crested wheatgrass stands. By focusing on early grazing of these crested wheatgrass pastures, the amount of loafing in the woody draw would be reduced. Because of the size of pasture 2, some grazing would continue, but would be less than when grazed for 8 months.

The use of a temporary fence to defer the use of native grasses intermingled with the crested wheatgrass in the northwestern corner of pasture 2 would ensure that the native species would not be grazed prior to range readiness. Livestock distribution would not change because of the size and topography of the pasture.

Adaptive Options – Fencing high-value woody draws would have little to no effect on livestock distribution across the allotment if they are kept to a small acreage. Forage within the exclosures would no longer be available for livestock grazing. A large woody draw exclosure would increase livestock grazing pressure on the remaining forage and change the distribution of livestock. As a result, adjustments in available AMs would need to be changed accordingly because of the AMs excluded from livestock grazing. There will be a cost to install and maintain these fences.

Adjusting Authorized Use downward would result in fewer livestock numbers because of the inventory permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock but the amount of forage harvested would be less than the current harvest.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws

Initial Actions – Focusing on early season use to utilize crested wheatgrass (and Kentucky bluegrass) may slightly improve the woody draw because relatively cooler temperatures and fewer insect pests would provide less incentive for livestock. Potentially decreased browsing and trampling disturbances would facilitate an increased level of desired woody species regeneration but the degree of improvement would depend on the extent or frequency that early season grazing is implemented relative to current grazing schedules. As the season of grazing remains loosely defined by "focus on early season use," proposed grazing schedules are assumed to remain similar to current management with periods of extended or later season use but with greater implementation of deferred rotations. The potential degree of woody draw improvement would decrease with grazing seasons that extend past mid-June in the north pasture containing the draw.

Constructing a new water well and establishing a water tank on the fenceline between the north and south pastures is unlikely to facilitate improvement of the only woody draw in the allotment. The well and tank would facilitate greater implementation of a deferred rotation by increasing the reliability of water and allowing for the separate management of each pasture that would decrease the period that livestock have access to the woody draw. However, increased livestock density with the smaller pasture sizes would increase the intensity of livestock browsing and trampling disturbances that would impede the regeneration of desired woody species. Additionally, livestock use of the woody draw would likely increase every other year when the north pasture is the second pasture of use due to increasing temperatures, insect pests, and decreased palatability of invasive grasses in the uplands during the later grazing period. Greater reliability of water in the north pasture is likely to contribute to increased use with increasing woody draw disturbances.

Temporary fencing unbroken land along the north and west perimeter of the north pasture would have no appreciable effect on conditions of the woody draw because the area constitutes only 40 to50 acres and would account for only a small portion of the total allotment or pasture use.

Adaptive Options – Fencing the woody draw would provide the fastest and greatest potential improvement of conditions by removing livestock browsing and trampling disturbances and would facilitate the regeneration of desired woody species. The degree or rate of woody species regeneration could be impeded by increasing litter and invasive grasses with the exclusion of livestock from the draw.

Decreasing Authorized Use is unlikely to increase tree and shrub regeneration unless the decrease is relatively high. Only one woody draw is present and experiences the full extent of all woody draw disturbances.

Herbaceous Structure

Initial Actions – The Authorized Use level exceeds the initial estimated carrying capacity by 5 percent. The Authorized Use level could limit the potential of increasing the residual standing crop and limit the ability for regrowth thus limiting the potential to address the herbaceous structure distribution. Developing a water source on the fenceline of pastures 2 and 3 would tend to encourage a more even use of the pastures and homogenize herbaceous structure. Early use appears to be occurring currently on these pastures and there doesn't appear to be positive effects to herbaceous structure, perhaps because of the second and sometimes thrice-over events under existing management. If grazing events are restricted to the early season when crested wheatgrass is palatable, then there may be some regrowth. However, under the proposed Authorized Use it is projected that High herbaceous structure would not be prevalent under most growing conditions of most years. Continuing to defer use on the native portion of pasture 2, and in combination with the new water source to the south, could contribute to an improved structure distribution in this portion of the pasture. However, if livestock return later in the summer, it is projected that use of this area would remove some herbaceous structure.

Adaptive Options – Fencing specific woody draws could have negative effects relative to the size and location of the exclosure but is not expected to be appreciable due to the relative small amount of woody draw habitat projected to be fenced. Downward adjustments in Authorized Use would

increase the amount of standing crop, therefore potentially increasing the proportion of High structure in the allotment and improving the herbaceous structure distribution.

Seral Stages

Initial Actions – The proposal to "focus on early season use of crested wheatgrass" is presumed to involve continuation of the current grazing system that tends to extend from May through June and comes close but does not quite maximize use of the invasive grass component while providing for uninterrupted critical growth stages of the native component. Establishing a water tank on the pasture fenceline would facilitate a deferred rotation, but also increases the potential for selective and excessive grazing of the native component within the second pasture of the rotation as a result of decreasing invasive grass palatability. The more reliable late season water source would also increase the potential or desire to extend the grazing season into later months when invasive grass palatability has further decreased. Additionally, the evenness of livestock grazing would increase with the smaller pasture size resulting from closure of the fenceline and this would contribute to high utilization of the native component in the second pasture of use. Conversely, benefits of increased livestock density could involve the control of excessive plant litter.

Temporary fencing areas of unbroken land along the north and west perimeter of the north pasture to defer grazing of native grasses would not provide significant benefit relative to the required effort/maintenance because this area comprised only 15 percent of the pasture, is at the far north end of the pasture that receives a lower degree of use than areas to the south, and is lightly to heavily invaded by invasive grasses that exhibit an increasing trend. Allowing invasive grasses in this area to decrease in palatability would contribute to selective use of the native component later in the season when the area is grazed.

Adaptive Options – As current levels of Authorized Use are relatively close to initial estimated carrying capacity, decreasing the level of use during early season grazing would decrease the utilization of invasive grasses and contribute to their maintenance or increase with potential decreases of the native component. Increasing Authorized Use while maintaining early season grazing would have the potential of increasing utilization of invasive component and assisting increases of the native component if livestock are removed sufficiently early. The potential for increasing degrees of premature or excessive use of the native component would increase proportional to the extent that the grazing season is extended into June and beyond.

Sharp-tailed Grouse

Initial Actions – The Authorized Use level exceeds the initial estimated carrying capacity by 5 percent. The Authorized Use level could limit the potential of increasing the residual standing crop and limit the ability for regrowth, thus limiting the potential to address the grouse nesting habitat needs. Developing a water source on the fenceline of pastures 2 and 3 would tend to encourage a more even use of the pastures and homogenize herbaceous structure negatively impacting spring grouse nesting needs. Early use appears to be occurring currently on these pastures and there doesn't appear to be positive effects to herbaceous structure, perhaps because of the second and sometimes thrice-over events under existing management. If grazing events are restricted to the early season when crested wheatgrass is palatable, then there may be some regrowth. However, under the proposed Authorized Use it is projected that High herbaceous structure would not be

prevalent under most growing conditions of most years and winter loss would further limit grouse nesting habitat. Continuing to defer use on the native portion of pasture 2, and in combination with the new water source to the south, could contribute to an improved structure distribution in this portion of the pasture. However, if livestock return later in the summer into late fall, it is projected that use of this area would remove some potential grouse nesting sites.

Adaptive Options – Fencing specific woody draws could have negative effects relative to the size and location of the exclosure but is not expected to be appreciable because of the relatively small amount of woody draw habitat projected to be fenced. Downward adjustments in Authorized Use would increase the amount of standing crop, therefore potentially increasing the proportion of High structure in the allotment and enhance the potential for grouse nesting sites in the spring.

Effects of Alternative 3A

The actions both initial and adaptive are the same in Alternative 3A as in Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions below. The analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.

ADAPTIVE OPTIONS:

- Resting crested wheatgrass pastures every other year to achieve High structure objective.

Range

Initial Actions – Authorized Use for this allotment would be 364 federal AUMs. The existing Authorized Use of 332 federal AMs converted to AUMs by adjusting for cow size is 382 federal AUMs. The effect of this authorization equates to a 5 percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration when planning the rotation for the allotment. This would result in fewer livestock numbers because of the inventory permit for this allotment.

Adaptive Options – Resting crested wheatgrass pastures every other year to achieve High structure would not change livestock distribution within the pasture because of the size and topography of the pastures. The AUMs associated with these pastures would be reduced from the Authorized Use for the year it will be rested because the forage within the pastures would no longer be available to livestock. This would be a reduction in the livestock number because the allotment carries an inventory permit.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws

Initial Actions – Authorized Use would potentially be decreased by 5 percent depending on the weight of livestock compared to the standard of 1,000 pounds for one AUM. The potential reduction would not be sufficient to facilitate increased regeneration of desirable woody species within the single occurring woody draw.

Adaptive Options – Resting one of the two crested wheatgrass pastures every other year would remove livestock browsing and trampling disturbances within the woody draw when the north pasture is rested. Resting the woody draw pasture every other year would only slightly increase the potential for successful regeneration of woody species because one year of rest would not be sufficient for developing seedlings and saplings to tolerate grazing disturbances in the following year.

Herbaceous Structure

Initial Actions – Adjusting AUMs to the initial estimated carrying capacity would create the potential for an increase of High herbaceous and improve the herbaceous structure distribution. The decrease in grazing intensity would improve the potential for increased residual cover. Early use appears to be occurring currently on these pastures and there doesn't appear to be positive effects to herbaceous structure, perhaps because of the second and sometimes thrice-over events under existing management. If grazing events are restricted to the early season when crested wheatgrass is palatable, then there may be some regrowth. Under the proposed Authorized Use of this alternative, improvement in the herbaceous structure distribution in the fall could occur. Continuing to defer use on the native portion of pasture 2, in combination with the new water source to the south and the reduced Authorized Use, could contribute to an improved potential to address fall herbaceous structure in this pasture. However, if use is not restricted and livestock return later in the summer, it is projected that use of this area would remove some herbaceous structure.

Adaptive Options – Developing a water source on the fenceline of pastures 2 and 3 would tend to encourage a more even use of the pastures and homogenize herbaceous structure. Fencing specific woody draws could have negative effects relative to the size and location of the exclosure but is not expected to be appreciable because of the relative small amount of woody draw habitat projected to be fenced. Downward adjustments in Authorized Use would increase the amount of standing crop, thereby potentially increasing the proportion of High structure in the allotment and improving the herbaceous structure distribution. Resting the crested wheatgrass should improve the herbaceous structure in the fall.

Seral Stages

Initial Actions – Authorized Use would potentially be decreased by 5 percent depending on the weight of livestock compared to the standard of 1,000 pounds for one AUM. This would not have an appreciable effect on the development or long-term maintenance of native plant diversity.

Adaptive Options – Alternately resting one of the pastures every other year would have the potential to increase development of both the native and existing invasive grass components, with minimal benefit to increasing the extent or maintenance of the native component.

Sharp-tailed Grouse

Initial Actions – Adjusting AUMs to the initial estimated carrying capacity would create the potential for an increase of High herbaceous and enhance grouse nesting habitat. The decrease in grazing intensity would improve the potential for increased residual cover. Early use appears to be occurring currently on these pastures and there doesn't appear to be positive effects on herbaceous structure, perhaps because of the second and sometimes thrice-over events under existing management. If grazing events are restricted to the early season when crested wheatgrass is palatable, then there may be some regrowth. It is more likely under the proposed Authorized Use of this alternative, improvement in the herbaceous structure distribution in the fall could occur. Continuing to defer use on the native portion of pasture 2, in combination with the new water source to the south and the reduced Authorized Use, could contribute to an improved potential to address fall herbaceous structure in this pasture. However, if use is not restricted and livestock return later in the summer, it is projected that use of this area would remove some herbaceous structure and potential grouse nesting habitat with it.

Adaptive Options – Developing a water source on the fenceline of pastures 2 and 3 would tend to encourage a more even use of the pastures and homogenize grass structure and not enhance grouse nesting habitat. Fencing specific woody draws could have negative effects relative to the size and location of the exclosure but is not expected to be appreciable due to the relative small amount of woody draw habitat projected to be fenced. Downward adjustments in Authorized Use would increase the amount of standing crop, therefore potentially increasing the proportion of High structure in the allotment and improving the herbaceous structure distribution. Resting the crested wheatgrass should improve the herbaceous structure in the fall and improve the potential for grouse nesting habitat in the spring.

Allotment 133

Table 133.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 133 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 6.1 – Rangeland With Broad Resource Emphasis	399	100	
Total allotment acres	404	100	
NFS acres	399	99	
State land acres	0	0	
Private land acres	5	1	
Current permitted livestock grazing (AMs) on NFS lands			272
Initial estimated carrying capacity (AUMs) on NFS lands			198
Number of pastures containing NFS lands			2

Table 133.2 — Allotment 133 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	Blacktail Creek flows through a portion of this allotment. The 2004 survey rated it as PFC.	Maintain PFC.
Woody draws	33 percent of the sampled woody draws were Healthy and 67 percent are At Risk due to lack of regeneration and impacted shrub layer.	Increase the survival of seedlings/saplings and stimulate shrub layer.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Meeting Objectives High – Below Objectives 2004 Transects: 1.94; 1.36 2004 Stations percent: Low-40/Moderate-60/High-0 2005 Transects: N/A 2005 Stations percent: N/A.	Manage for additional High structure on biologically capable habitats.
Seral stages	Intermixed/intermingled invasive and native grass communities with apparent trends of increasing invasive grasses.	Limit the expansion of invasive grasses and maintain or increase the proportion of native grasses.
Sharp-tailed grouse	There are no known leks within this allotment. There are no known leks within one mile of this allotment.	Manage for increased High vegetative structure on biologically capable sites to enhance habitat.
Remarks	Approx. 5 acres of Canada thistle, burdock located primarily in riparian areas.	

Table 133.3 — Allotment 133 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 272 federal AMs. • Three-year average permitted use is 244 federal AMs.* • Permit type: Turn-in. • Rotation: Late season two pasture modified deferred rotation. • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 272. • As needed graze pastures 1 and 2 early to stimulate crested wheatgrass. • After coming off Blacktail Common implement a fall two-pasture deferred rotation. **Adaptive Options** • Fence high-value woody draws. • Stimulate crested wheatgrass through application of fire, mowing, haying, fertilization, etc. • Adjust Authorized Use.	**Initial Actions** • Authorized federal AUMs: 198. • As needed graze pastures 1 and 2 early to stimulate crested wheatgrass. • After coming from Blacktail Common implement a two-pasture, fall deferred rotation **Adaptive Options** • Fence high-value woody draws. • Stimulate crested wheatgrass through application of fire, mowing, haying, fertilization, etc. • Adjust Authorized Use.
Monitoring • Review annual planned management identified in Allotment Worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every three years. • Complete Properly Functioning Condition survey once every 5 years. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 133 — Existing Condition

Range – This allotment is approximately 399 acres of NFS lands, subdivided into two separate pastures ranging in size from 243 acres to 161 acres. This allotment is issued a turn-in permit for 34 head for 8 months by the MGA. It is also the headquarters allotment associated with a common allotment (Blacktail Common). Current AMs provided by NFS lands can be found in Table 133.1. Currently, the permittee is running increased livestock numbers with a shortened season and typically grazes the two pastures together during the months of October through December. One pasture has a well/stock tank and the other pasture has a developed spring with a stock tank that can freeze up given the typical season of use. These two pastures are both in the rolling prairie geographic area and herbaceous vegetative communities are a mixture of native and introduced graminoid species.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there is approximately 5 acres of Canada thistle and burdock found primarily along riparian areas and within woody draws.

Oil and gas development on NFS lands in this allotment has removed a total of approximately 6.9 acres from livestock access. Approximately 0.0 acres of oil and gas pads and access roads have been reclaimed and are or will be available for livestock access. Associated forage from these acres is approximately 3.4 and 0.0 AUMs, respectively.

Riparian – A 0.4-mile segment of Blacktail Creek (reach 1) traverses pasture 1 in Allotment 133. This reach has a riparian functionality rating of PFC.

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
133-01	Blacktail Creek (1)	0.41					0.41

Woody Draws – One of three woody draws sampled in pasture 1 was Healthy, while two were At Risk (Figure 133.1a and 1b). A beaver pond occurred in the Healthy community and harvest of numerous aspen (*Populus tremuloides* Michx.) and willow saplings occurred shortly after sampling. One of the At Risk woody draws was associated with a developed spring that provided the source of water in pasture 1. Inclusions of big bluestem (*Andropogon gerardii* Vitman) occurred along drainages that involved the upper headwaters of Blacktail Creek. Only fragmented patches of woody draws occurred in pasture 2 and were not sampled.

a) **b)**

Figure 133.1 — Woody draws in pasture 1.

a) Healthy community with beaver pond where willow and aspen saplings were later harvested.
b) At Risk community below developed spring with dense smooth brome understory and no tree/shrub regeneration.

Herbaceous Structure – From the 2004 VOR sample set, two transects were sampled. One transect was Low structure and one indicated Moderate structure. The consolidated station data for the two transects indicated a Low-Moderate dominance as well.

Seral Stages – Broken land extended through the center of pasture 1 and constituted 29 percent of the pasture acreage, but high amounts of crested wheatgrass and bluegrass with varying levels of intermixed and intermingled native grasses comprised most of the pasture (Figure 133.2). A sere plot in broken land of pasture 1 was at or approaching an Invaded Grass State with dominance of crested wheatgrass and bluegrass. Native dominated patches were particularly evident along pasture edges, low knolls, and short hillsides, and a Robel transect and a belt transect reported native grass dominance with light amounts of bluegrass and/or crested wheatgrass in these areas.

Figure 133.2 — Dominance of invasive bluegrass in unbroken land on east side of pasture 1.

The high amount of invasive grasses sharply contrasts with vegetation maps from 1979 (2210 files) that indicated western wheatgrass–green needlegrass communities on the west half of the pasture and needle-and-thread–Junegrass communities on the east half. A well site and access road along the west side of the pasture, as well as a wide east-west pipeline corridor that cut across the center of the pasture, have contributed to the high occurrence of invasive grasses. Past hay feeding may have also contributed to the current extent of invasive grasses.

About 62 percent of pasture 2 was identified as broken land but the lack of extensive crested wheatgrass suggests that these areas were not seeded. Exceptions involved high amounts of crested wheatgrass around a well site in the southeast quarter of the pasture. A hay storage fence was present in the southwest corner of the pasture and past hay feeding may have contributed to the dominance of crested wheatgrass along the west side of the pasture that is not identified as broken land. A Robel transect near the center of the south pasture boundary recorded sedge, western wheatgrass, and crested wheatgrass as the three dominant species.

The north aspect of a ridgeline near the center of the pasture contained high condition native communities dominated by needlegrass species with bluebunch wheatgrass (*Agropyron spicatum* (Pursh) Scribn. & Sm.), thickspike wheatgrass (*Agropyron dasystachyum* (Hook.) Scribn.), and western wheatgrass. Shallow swales extending downslope, as well as a pipeline corridor, contained snowberry with increasing amounts of bluegrass and smooth brome. Invasive bluegrass increased along the toeslope of the ridge and gained dominance across broad gentle slopes above a west flowing drainage in the north half of the pasture (Figure 133.3). Native patches of needlegrass and western wheatgrass of relatively high quality were intermingled among the invasive communities, but the predominance of invasive grasses sharply contrasts with vegetation maps from 1979 (2210 files) that indicate western wheatgrass–blue grama and needle-and-thread–green needlegrass communities.

Figure 133.3 — Invasive bluegrass dominance in the north half of pasture 2. Most of the brown sheen at the top of the grass layer is attributed to seed heads of bluegrass.

Sharp-tailed Grouse – There are no known leks within this allotment and or within 1 mile of this allotment. Potential grouse nesting and brooding habitat exists.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed after 2 years.
- Most range infrastructure would be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian condition along Blacktail Creek as described in the existing condition would continue and evolve toward the potential riparian community.

Woody Draws – Woody draw conditions would have the potential to improve with the removal of livestock browsing and trampling disturbances that would facilitate increased tree and shrub regeneration and growth. Existing invasive grasses, as well as potential increases of these species, would have the potential for slowing or decreasing the potential degree of woody draw improvement because of increasing litter from the removal of livestock grazing.

Herbaceous Structure – With the removal of livestock, there would be increased opportunity for the development of High and Moderate structure, and a decrease in the amount of Low structure resulting in increased nesting opportunities for ground nesting birds requiring or preferring Moderate/High structure habitat. Species that favor Low structure habitat would be expected to decrease in abundance.

Seral Stages – Native grasses are of high vigor and well expressed in portions of both pastures and numerous small patches occur at or near late seral stages where invasive grass cover is low. However, the predominance of invasive grasses and large areas that have already transitioned to an Invaded Grass State result in the conclusion that further transitions and the gradual loss of native species would occur across the allotment with the removal of livestock grazing and increase of herbaceous plant litter. This outcome would occur within 10 years.

Sharp-tailed Grouse – The increase in High structure from removal of livestock would benefit nesting and brooding habitat for sharp-tailed grouse. However, over time the decrease in forb diversity would decrease foraging opportunities, and to a lesser extent, nesting and brooding quality would also decrease because of lower quality habitat associated with invasive grasses that may invade local habitats.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by a turn-in grazing association permit, and Authorized Use is 272 federal AMs.
- Cow/calf pairs are run in a late season two-pasture modified deferred rotation.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance

of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian condition along Blacktail Creek as described in the existing condition would continue.

Woody Draws – Late-season grazing should result in better woody draw conditions than presently occur on the allotment because livestock browsing and trampling disturbances should be relatively low during cooler temperatures of the fall and early winter. However, the low proportion of woody draw communities occurring in the allotment would contribute to increased levels of disturbance within any particular draw. High early winter use might occur from livestock seeking thermal cover. Current levels of Authorized Use that exceed initial estimated by 58 percent after adjusting for cow size would also contribute to high levels of woody draw disturbance. The At Risk woody draw below the developed spring would continue to experience high levels of livestock trailing, and the second At Risk sample site situated adjacent to a trail corridor between the two pastures has an obvious potential to experience high levels of disturbance. Although current conditions might reflect previous use of the allotment and/or infrequent summer use such as occurred in 2005, the predominance of old or decadent trees and occurrence of desired shrubs confined to poorly accessible microsites indicate a trend of decreasing conditions that would be expected to continue under current management.

Herbaceous Structure – The Authorized Use level exceeds the initial estimated carrying capacity by 37 percent. Transect and station data both indicate Low to Moderate herbaceous structure exists on the allotment. Existing management would likely maintain the existing herbaceous structure conditions.

Seral Stages – Both native and invasive grasses are able to fully complete their annual growth cycle during most years under the predominant grazing season of October through December, but the trend of increasing invasive grasses indicates that these species are out-competing the native component with resulting transitions to Invaded Grass States. Although the precise mechanism of increasing invasive grasses under the current grazing seasons is uncertain and may simply be attributed to greater competitive ability, there is no reason to assume the trend will not continue with current management. Transitions to Invaded Grass States would occur at slower rates compared to Alternative 1 as a result of grazing that decreases the accumulation of litter, but the majority of the allotment would be affected within 10 to 20 years.

Areas in both pastures that contain relatively high amounts of plant litter have the potential to continue assisting the establishment of invasive grasses. Potentially greater production of crested wheatgrass relative to production of the potential natural community that was used to estimate carrying capacity would likely decrease the 58 percent difference between Authorized Use and initial estimated carrying capacity, but grazing levels would nonetheless remain high and may be assisting the spread of invasive grasses. The lack of early season crested wheatgrass and bluegrass grazing often appears to result in decreased fall regrowth of these species (personal observation),

and thus, a high proportion of the utilized forage during fall grazing periods may involve native grasses. Decreased shoots or stems of native grasses available to initiate growth in the spring might contribute to the competitive advantage of invasive grasses.

Sharp-tailed Grouse – Since the allotment is not effectively within the 1-mile proximity of a known active lek, enhancement of nesting habitat is desirable but not necessary at this time. As noted under herbaceous structure, existing management actions would not improve potential habitat for sharp-tailed grouse (i.e., High structure grasslands) and thus limit the potential to enhance grouse nesting and brooding habitat in this allotment.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 272 federal AMs.
- As needed grazing pastures 1 and 2 early to stimulate crested wheatgrass.
- After coming off Blacktail Common, implementing a fall, two-pasture deferred rotation.

ADAPTIVE OPTIONS:

- Fencing high-value woody draws.
- Stimulating crested wheatgrass through application of fire, mowing, haying, fertilization, etc.
- Adjusting Authorized Use.

Range

Initial Actions – Under this alternative Authorized Use would be 272 federal AMs and would change the existing condition of Alternative 2. The use of the AMs would be different than the existing condition because of the rotation for the NFS pastures.

Grazing pastures 1 and 2 early would be a change from the current use because livestock are being grazed at the same time of year, in the fall. Because of the size and topography of the pastures, livestock distribution would not change. Livestock would tend to graze areas dominated by crested wheatgrass because of the palatability of the species during this period.

Implementing a two-pasture deferred rotation in the fall would not have an effect on livestock distribution because of the size and topography of the pasture. Livestock would no longer have access to both pastures and would be confined to graze one pasture at a time because gates would be closed between the two pastures.

Adaptive Options – Fencing high-value woody draws would have little to no change in livestock distribution across the allotment. Forage within the exclosures would no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may occur on remaining forage.

Using fire to stimulate crested wheatgrass stands would require resting the burned pasture and adjusting Authorized Use. This is all dependent on the timing of the fire (spring, summer, or fall) because livestock grazing could be allowed to graze in the fall if a spring burn was carried out,

normal climatic conditions occurred, and desired condition of the burn had been reached. Livestock distribution may be more focused on the burn areas initially, but overall won't change because of the size of the pastures. Mowing would have similar effects as fire would have with respect to livestock distribution and available AMs. The use of fertilizer on the crested wheatgrass stands would not require a recovery period; however, grazing pressure would shift towards these areas because of the increased production and palatability of the crested wheatgrass stands. The available AMs may increase with this adaptive option; however, this would depend on the age and health of the crested wheatgrass stand, and available critical growing moisture during the growing season.

Adjusting Authorized Use downward would result in fewer livestock numbers, fewer grazing days, or a combination of the two, because of the turn in permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock, but the amount of forage harvested would be less than the existing forage harvested.

Riparian

Initial Actions – It is expected that desired conditions along Blacktail Creek would continue with the initial actions proposed.

Grazing pastures 1 and 2 early as needed to stimulate crested wheatgrass would have no effect on the riparian condition along Blacktail Creek because livestock use on the creek would not increase.

Implementing a two-pasture deferred rotation would have no effect on desired riparian condition along Blacktail Creek. The rotation would not result in any additional livestock use and occupation on the riparian corridor.

Adaptive Options – It is expected that desired conditions along Blacktail Creek would continue with the adaptive options proposed.

Fencing high-value woody draws should have no effect on riparian condition along Blacktail Creek because there would be no expected change in livestock distribution and the distance of separation.

Stimulating crested wheatgrass through the application of fire, mowing, haying, fertilization, etc. would have no effect on riparian condition along Blacktail Creek because livestock use on the creek would not increase.

Reducing Authorized Use should help improve the uplands vegetation which in turn reduces the overland flow further benefitting the riparian conditions along Blacktail Creek. A reduction in overland flow delivered to the creek would result in reduced stream velocities allowing for the establishment of riparian vegetation to build stream banks.

Woody Draws

Initial Actions – Proposed management largely follows current management with fall and early winter use of the two pastures. However, strict adherence to the proposed deferred rotation would result in decreased access to woody draws that are confined to pasture 1, potentially decreasing browsing and trampling disturbances and facilitating improved conditions. Conversely, Authorized Use would remain 58 percent above initial estimated carrying capacity after adjusting for cow size, and would contribute to high use of woody draws in pasture 1, particularly because it is 50 percent larger than pasture 2 and would receive the greatest proportion of use. Increased livestock density as

a result of maintaining separate pastures with closed gates would also contribute to the potential for increased browsing and trampling disturbances within woody draws.

Early season grazing "as needed" to stimulate crested wheatgrass would have minimal effect on woody draw conditions because livestock should not be particularly attracted to the draws during May as a result of cooler temperatures, fewer insect pests, and high palatability of the invasive grasses.

Adaptive Options – Fencing woody draws would provide the greatest potential for increasing the regeneration of desired woody species through the removal of livestock browsing and trampling disturbances. However, the degree or rate of woody species regeneration would be impeded by existing dominance of invasive grasses in the understory, as well as increasing litter that would result with the exclusion of livestock and that would facilitate additional invasive grass increases. Fencing of one woody draw could result in increased livestock disturbances in other draws.

Decreasing Authorized Use would facilitate increased regeneration of desired woody species by decreasing browsing and trailing disturbances. However, there are only a few woody draws present and the degree of livestock disturbances would remain relatively high unless the reduction in Authorized Use is large.

Stimulating crested wheatgrass through mowing, fire, or fertilization would decrease livestock disturbances within woody draws by drawing them to the flush of fresh herbaceous growth. This would temporarily assist the regeneration of trees and shrubs but is unlikely to be conducted at sufficient frequency to maintain trends of increasing woody draw conditions.

Herbaceous Structure

Initial Actions – The Authorized Use level exceeds the initial estimated carrying capacity by 37 percent, which could limit the development of High herbaceous structure. In addition, the proposed fall rotation would remove potential regrowth, effectively reducing standing crop after fall monitoring. Grazing crested wheatgrass early (May to mid June) could still permit time for regrowth, and perhaps temporarily improve vigor for native species, which could improve fall measurements. But, again, the improved October herbaceous structure distribution would be homogenized by the fall rotation because of removal and mechanical damage from livestock.

Adaptive Options – Managing the Authorized Use level would be the most effective tool to increase the proportion of High structure on the allotment and improve the herbaceous structure distribution overall. Fencing woody draws would have little appreciable effect on herbaceous structure across the allotment because of the projected relatively small scale and local scope of this action. Using fire to manage crested wheatgrass using any one of various tools could contribute to improved herbaceous structure conditions due to an improved density of vegetation. However, the assumed continuation of fall grazing could remove the regrowth after fall monitoring.

Seral Stages

Initial Actions – Early grazing "as needed" to stimulate crested wheatgrass (as well as bluegrass) might facilitate fall regrowth of the species for greater use during the primary late season grazing period. Thus, remaining native grass components might experience decreased fall grazing disturbances with increased growth and vigor the following spring. However, the frequency of this

potential benefit would be insufficient to alter the trend of increasing invasive grasses. Efficient use of the allotment forage and the greatest potential for maintaining or increasing the native plant community would involve consistent early season grazing to accommodate the high proportion of crested wheatgrass and bluegrass.

Adaptive Options – Stimulation of crested wheatgrass through mowing, burning, or fertilization would be the least direct and most uncertain method of increasing utilization of the invasive grass component compared to consistent early season grazing. The above actions would potentially increase the vigor and growth of both the native and invasive components but would not alter the competitive relationship between these species and are more likely to provide greater assistance to the invasive component. Native grasses are adapted to natural or background nutrient levels while invasive grasses tend to exhibit greater responses to increased nutrient levels. Fertilization can have adverse effects on soil organisms that maintain symbiotic relationships with native grasses, therefore decreasing their competitive ability with invasive grasses that have less dependence on soil organisms for obtaining nutrients (Sedivec and Manske 1990).

Decreasing Authorized Use would have the potential of assisting native grass vigor by decreasing the level of grazing disturbances and leaving a greater amount of plant tissue available to initiate growth the following spring. However, invasive grass utilization would also decrease and there would be no change in the competitive relationship between native and invasive grasses or trend of increasing invasive grasses. A greater portion of the decreased level of utilization would likely be conferred to invasive bluegrass due to its lower degree of palatability during the current grazing season, and increased litter accumulation within these communities would facilitate their maintenance or spread.

Sharp-tailed Grouse

Initial Actions – The Authorized Use level exceeds the initial estimated carrying capacity by 37 percent, which could limit the potential development of grouse nesting habitat (Angell 1997). In addition, the proposed fall rotation would remove regrowth from the summer growing season, effectively reducing potential grouse habitat prior to spring nesting needs. Grazing crested wheatgrass early (May to mid June) could permit time for regrowth, and perhaps temporarily improved vigor for native species which could improve fall measurements. But, again, the regrowth could be homogenized by the fall rotation because of removal and mechanical damage from livestock with the result of reduced spring grouse habitat.

Adaptive Options – Managing the Authorized Use level would be the most effective tool to increase grouse habitat. Fencing woody draws would have little appreciable effect on grouse nesting habitat across the allotment because of the projected relatively small scale and local scope of this action. Using fire to manage crested wheatgrass using anyone of various tools could contribute to increased grouse nesting habitat because of an improved density of vegetation. However, the assumed continuation of fall grazing could remove the regrowth after fall monitoring resulting in reduced amounts of grouse nesting habitat in the spring.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of listed below. The analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.

ADAPTIVE OPTIONS:

- The adaptive options and effects are the same as Alternative 3.

Range

Initial Actions – Authorized Use for this allotment would be 198 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 272 federal AMs converted to AUMs by adjusting for cow size is 313 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 37 percent reduction in AUMs from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in cow size when calculating the number of head and the grazing season duration when planning the rotation for the allotment.

Riparian

Initial Actions – The effects would be the same as described previously in Alternative 3.

Woody Draws

Initial Actions – Decreasing Authorized Use by 37 percent according to initial estimated carrying capacity after adjusting for cow size would facilitate increased woody draw conditions by decreasing the level of livestock browsing and trailing disturbances that would assist the regeneration of desired trees and shrubs. However, existing invasive grasses present in the understory of woody draws have the potential to impede or slow the rate of regeneration and increasing conditions.

Herbaceous Structure

Initial Actions – Adjusting the Authorized Use level from AMs to the initial estimated carrying capacity could move the allotment to a more balanced herbaceous structure distribution, assuming that actual use is similar to the preference level. However, the proposed fall rotation would remove regrowth, effectively reducing potential cover after fall monitoring measurements are recorded. The amount removed should be less than Alternatives 3 and 3A.

Seral Stages

Initial Actions – Decreasing Authorized Use by 37 percent would have the potential to increase native grass vigor by decreasing the level of grazing disturbances and leaving a greater amount of plant material available to initiate growth the following spring. However, invasive grass utilization would also decrease and there would be no change in the competitive relationship between native and invasive grasses or trend of increasing invasive grasses. A greater portion of the decreased level of utilization would likely be conferred to the invasive grasses, and increased litter accumulation within these communities would facilitate their maintenance or spread with further transitions to Invaded Grass States.

Sharp-tailed Grouse

Initial Actions – Adjusting the Authorized Use level from AMs to the initial estimated carrying capacity could increase the amount of grouse nesting habitat within the allotment, assuming that actual use is similar to the preference level. However, the fall rotation could limit grouse nesting cover levels because of the removal and mechanical damage from fall livestock use.

Allotment 133D5

Table 133D5.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 133D5 in the North Billings County AMP Revisions project area.

Summary	Acres	Percent	Number
Management Area 6.1 – Rangeland With Broad Resource Emphasis	78	100	
Total allotment acres	78	100	
NFS acres	78	100	
State land acres	0	0	
Private land acres	0	0	
Current permitted livestock grazing (AMs) on NFS lands			49
Initial estimated carrying capacity (AUMs) on NFS lands			35
Number of pastures containing NFS lands			1

Table 133D5.2 — Allotment 133D5 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	There are no perennial or intermittent stream reaches in this allotment.	None
Woody draws	There are no woody draws in the allotment.	None
Herbaceous structure	This is an 80-acre allotment of crested wheatgrass and smooth brome that is hayed. It is assumed that since 25 to 75 percent is not hayed on an annual basis that there is potential for High herbaceous structure.	None (IDT determined that allotment will not be held to structure objectives)
Seral stages	The allotment consists of broken land dominated by crested wheatgrass, smooth brome, and Kentucky bluegrass with trace to light amounts of native grasses.	Limit the expansion or increase of invasive smooth brome and Kentucky bluegrass.
Sharp-tailed grouse	There are no known grouse leks in the allotment or within one mile of the allotment.	None
Remarks	This allotment is not grazed, a portion is hayed annually.	

Table 133D5.3 — Allotment 133D5 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 49 federal AMs. • Three-year average permitted use is 0 federal AMs due to issuance of only hay permits. • Permit type: Hay permit only. • Management involves haying 75 percent (60 acres) of the allotment one year, then haying the remaining 25 percent (20 acres) the next year. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Continue current management, which involves haying 75 percent (60 acres) of the allotment one year, then haying the remaining 25 percent (20 acres) the next year. **Adaptive Options** • If management changes to allow livestock grazing, authorized federal AMs: 49 • Adjust Authorized Use.	**Initial Actions** • Continue current management, which involves haying 75 percent (60 acres) of the allotment one year, then haying the remaining 25 percent (20 acres) the next year. **Adaptive Options** • If management changes to allow livestock grazing, Authorized Use is 35 AUMs. • Adjust Authorized Use.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Gather Visual Obstruction Readings once every 3 years. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 133D5 — Existing Condition

Range – This allotment is approximately 78 acres of NFS lands and administered as an exchange use parcel by the MGA. Two individuals are permitted in this parcel in exchange for other lands that they are not able to utilize. At one point, there was only one individual permitted in this allotment and that permittee was authorized to graze, but he had to utilize water from adjacent private land since the allotment has no developed water source. Since the issuance of permits to two individuals has taken place, authorization was changed to hay permits because of the difficulty in permitting two individuals in such a small allotment. One individual is permitted the eastern half

and the other is permitted the western half of the allotment for haying. Because of the grazing agreement with MGA, the individuals have a choice of haying their entire half one year and resting it the following year, or they can hay half of their parcel one year and the other half the following year. Currently, one permittee hays his entire half one year and rests it the following year. The other permittee hays one half of his portion each year. This means that in one year, 25 percent of the allotment would be rested, and in the following year, 75 percent would be rested. Although hay permits are the current authorization for this allotment, historically it has been assigned 49 AMs. This allotment consists of mostly smooth brome, Kentucky bluegrass, crested wheatgrass, and a very small component of native species.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – There are no woody draws in this allotment.

Herbaceous Structure – There were no sampled VOR transects in this allotment. There is no data to indicate what the herbaceous structure distribution may be. It is assumed that herbaceous structure will be variable but dominated by Moderate and some High in those sites not hayed.

Seral Stages – The pasture is overwhelmingly dominated by crested wheatgrass, smooth brome, and bluegrass. Only trace amounts of native grasses are present that primarily involve needle-and-thread. Plant community development is generally at an early seral stage but is more appropriately regarded as an Invaded Grass State of a crested wheatgrass planted site.

Sharp-tailed Grouse – There are no sharp-tailed grouse leks within 1 mile of this allotment.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed after 2 years.
- Most range infrastructure would be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees, or in this case haying permit fees, would be collected from this allotment, so there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would be the responsibility of the Forest Service. There is potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease because of the removal of livestock as one vector source.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – There are no woody draws in this allotment.

Herbaceous Structure – With the removal of the haying activity, there would be increased opportunity for the development of Moderate to High structure.

Seral Stages – The termination of haying would result in persistence of the Invaded Grass State. Smooth brome and bluegrass would gradually increase over time, while crested wheatgrass would persist but gradually decrease as a proportion of the total plant composition. Trace or insignificant amounts of native grasses might initially increase to a slight degree, but would eventually decrease or persist in only trace amounts with increasing bluegrass and smooth brome.

Sharp-tailed Grouse – Potential grouse nesting habitat would be increased and contribute to the larger landscape of available habitat.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is currently permitted by a hay permit only, but previously a turn-in grazing association permit authorized use of 49 federal AMs.
- See allotment map in Appendix B for current range developments.

Range – This allotment is currently only authorized to be hayed and the proposed action in this alternative is to continue the haying management. There would be no effects to livestock grazing. If management practices change and livestock grazing is applied to this allotment, the Authorized Use proposed would be 49 federal AMs. An effect of livestock grazing would be the need for range water on this allotment.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – There are no woody draws in this allotment.

Herbaceous Structure – With no proposed change in management, existing conditions would continue. It is assumed that removal of vegetation will limit the production of High structure on an annual basis. However, not haying 25 to 75 percent on an annual basis is currently assumed to promote High herbaceous structure in those non-hayed sites.

Seral Stages – The continuation of haying would result in persistence of the Invaded Grass State. Late season cutting should minimize tillering of crested wheatgrass (Manske 1995b, Manske and Onsager 1997) and potentially assist the establishment of other species. However, smooth brome and bluegrass were the primary co-dominant species and are likely to continue increasing, while crested wheatgrass would persist but gradually decrease as a proportion of the total plant composition. Trace or insignificant amounts of native grasses might initially increase to a slight degree, but would eventually decrease or persist in only trace amounts with increasing bluegrass and smooth brome. Haying of the allotment provides a source of invasive plant seed dispersed within the project area.

Sharp-tailed Grouse – The nearest known sharp-tailed grouse lek is approximately 1.5 miles away. Assuming no other nearby lek in the area, this allotment is slightly outside the average distance a hen will travel to nest. Current management is assumed to be already contributing to grouse nesting habitat. However, the size and shape of the remaining non-hayed pasture may be an ecological "sink" because of increased predation risk for individual grouse that may use it.

Effects of Alternative 3

INITIAL ACTIONS:

- The initial actions and effects thereof in Alternative 3 are the same as Alternative 2.

ADAPTIVE OPTIONS:

- If management changes to allow livestock grazing, authorizing 49 federal AMs.
- Adjusting Authorized Use.

Range

Adaptive Options – If management practices change and livestock grazing is applied to this allotment, the Authorized Use proposed would be 49 federal AMs, changing from a hay permit. There are currently no livestock water developments within this allotment; therefore, a water development would be requested.

Adjusting Authorized Use downward would result in fewer livestock numbers, fewer grazing days, or a combination of the two, because of the turn-in permit for this allotment.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – There are no woody draws in this allotment.

Herbaceous Structure

Adaptive Options – Allowing the allotment to be managed with livestock, particularly at 60 percent over the initial estimated carrying capacity, would likely result in a regression of herbaceous structure distribution, particularly the probable loss of potential High herbaceous structure. Adjusting the Authorized Use level downward could help mitigate the loss of cover but may not match the existing "rest rotation" hay management scheme.

Seral Stages

Adaptive Options – Implementing livestock grazing at 60 percent above initial estimated carrying capacity after adjusting for cow size may result in excessive use of the invasive grass component that comprises the allotment, thus assisting the establishment of less desired invasive and/or noxious weeds. However, production of crested wheatgrass can exceed that of the native climax community and may decrease the apparent difference between initial estimated carrying capacity and the level of use. Depending on the season of use, excessive stocking levels could impede the establishment of native grasses in the pasture.

Sharp-tailed Grouse

Adaptive Options – Allowing the allotment to be managed with livestock, particularly at 60 percent over the initial estimated carrying capacity, would likely result in a regression of potential grouse nesting habitat. Adjusting the Authorized Use level downward could help mitigate the loss of cover, but nesting cover levels may not match the existing "rest rotation" hay management strategy.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 2 with the exceptions below. The analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- The initial actions and effects in Alternative 4 are the same as Alternative 2.

ADAPTIVE OPTIONS:

- If management changes to allow livestock grazing, Authorized Use in AUMs is set based on initial estimated carrying capacity.

Range –
Adaptive Options – Authorized Use for this allotment would be 35 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 49 federal AMs (before haying authorization) converted to AUMs by adjusting for cow size is 56 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 38 percent reduction in AUMs from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in cow size when calculating the number of head and the grazing season duration when planning the rotation for the allotment. If management changes to allow livestock grazing, there would be a need for a water development because there are no range water developments within this allotment.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – There are no woody draws in this allotment.

Herbaceous Structure
Adaptive Options – Allowing the allotment to be managed with livestock under the initial estimated carrying capacity could result in a regression of herbaceous structure distribution, particularly the probable loss of potential High herbaceous structure. It is assumed that cattle would disperse throughout the small pasture and homogenize herbaceous structure in the small pasture.

Seral Stages
Adaptive Options – Implementing livestock grazing with a 38 percent reduction in Authorized Use according to initial estimated carrying capacity and cow size could establish appropriate stocking levels while contributing to the potential maintenance or achievement of other resource objectives. The level of reduction might be unnecessarily excessive because of high crested wheatgrass and smooth brome production relative to the native climax community, and underutilization of the invasive grass component might impede the establishment of native grass species and perpetuate the Invaded Grass State. However, lower production of Kentucky bluegrass might decrease the

potential level of understocking. The season of use would also influence the competitive interaction between invasive and native grasses.

Sharp-tailed Grouse

Adaptive Options – Allowing the allotment to be managed with livestock under the initial estimated carrying capacity could result in a regression of potential grouse nesting cover, but this is unknown. It is assumed that cattle would disperse throughout the small pasture and homogenize the grass habitat.

Allotment 134

Table 134.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 134 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 6.1 – Rangeland With Broad Resource Emphasis	479	100	
Total allotment acres	597	100	
NFS acres	479	80	
State land acres	0	0	
Private land acres	117	20	
Current permitted livestock grazing (AMs) on NFS lands			254
Initial estimated carrying capacity (AUMs) on NFS lands			220
Number of pastures containing NFS lands			2

Table 134.2 — Allotment 134 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	Whitetail Ck. 98-99 Survey had two reaches at PFC and one at FAR-U. 2004 Survey – all reaches at PFC.	Maintain PFC.
Woody draws	Of the sampled woody draws, 71 percent were Healthy, 15 percent were At Risk, and 14 percent were Unhealthy. At Risk and Unhealthy woody draws are being affected by a lack of regeneration and understories dominated by herbaceous growth.	Increase the survival of seedlings/saplings.
Herbaceous structure	Transect Results: Low – Below Objectives Moderate – Exceeding Objectives High – Below Objectives 2004 Transects: 1.75 2004 Stations percent: Low-60/Moderate-40/High-0	Manage for additional Low and High structure on biologically capable habitats.
Seral stages	Broken land constitutes 32 and 50 percent of the two pastures, and a mixture of invasive and native grasses characterized most of the allotment with a trend of increasing bluegrass. A sere plot in broken land was at a mid-late seral stage.	Limit the expansion of invasive grasses and maintain or increase the proportion of native grasses.
Sharp-tailed grouse	There are no known leks within the allotment. There are two known leks within 1 mile of the allotment.	Manage for increased High vegetative structure on biologically capable sites to enhance habitat.
Remarks	Approximately 22 acres of Canada thistle and burdock. A sensitive plant, Hooker's Townsendia (*Townsendia hookeri* Beaman.), was identified in pasture 3.	

Table 134.3 — Allotment 134 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 254 federal AMs. • Three-year average permitted use is 240 federal AMs.* • Permit type: Inventory (managed as turn-in). • Rotation: Two pasture thrice-over rotation. • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 254. • Implement a twice-over grazing system, annually changing season of use within the rotation. • Alternate salt placement in pasture 3 from one side of Whitetail Creek to the other at midpoint of grazing season, or as needed. **Adaptive Options** • Adjust Authorized Use. • Implement a once-over deferred rotation.	**Initial Actions** • Authorized federal AUMs: 220. • Implement a twice-over grazing system, annually changing season of use within the rotation. • Alternate salt placement in pasture 3 from one side of Whitetail Creek to the other at midpoint of grazing season, or as needed. **Adaptive Options** • Implement a once-over deferred rotation. • Adjust Authorized Use.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings annually for 3 years, then reevaluate survey frequency. • Complete Properly Functioning Condition survey once every 5 years. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 134 — Existing Condition

Range – This allotment is approximately 597 acres in total size and contains private and NFS lands with 479 acres of NFS lands. Currently this allotment is issued an inventory permit for 56 head for 5 months by the Medora Grazing Association (MGA). It should be noted that although this allotment is permitted with an inventory permit, which typically means that livestock are somewhere on the allotment for a full 12 months, it is actually managed like a turn-in permit. The permittee brings in livestock to graze sometime in the summer months, but brings them home to a separate 'off permit'

location to winter the livestock. This allotment has been subdivided into three pastures, and of these three only two contain NFS lands. The two NFS pastures range from 160 acres to 320 acres in size. Current AMs provided by NFS lands are 254.

Presently there is no developed livestock water within these two pastures, but livestock can water out of a series of beaver dams located along Whitetail Creek that runs through the two pastures. The current rotation for this allotment is a three times over with the same use during the same time of the growing season for each pasture. The allotment is located in the rolling prairie geographic area with Whitetail Creek running through both pastures. Both of these pastures show evidence of homesteading and past cultivation. Therefore, there are areas of introduced grass species such as crested wheatgrass and Kentucky bluegrass, but along Whitetail Creek there is a mixture of native and introduced graminoid species. Some specific species noted were western wheatgrass, blue grama, needle-and-thread, little bluestem, and big bluestem.

Because of Whitetail Creek bisecting both pastures, the livestock distribution can be heavily influenced if the creek is running high. The woody draw along Whitetail Creek consisted of buffaloberry (*Shepherdia argentea* (Pursh) Nutt.), green ash, and aspen. The aspen were affected by the beaver along the creek, and there were several beaver dams along a half mile stretch of the creek in pasture 3 (visual observation during distribution mapping).

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there is approximately 22 acres of Canada thistle and burdock found within this allotment. Increased oil and gas activity and other uses on the Grasslands can provide for the potential of other invasive and noxious weeds to invade in these areas. Within this allotment there is a potential for 10 of the 12 North Dakota state listed noxious weeds and the county listed weeds.

Riparian –

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
134-01	Whitetail Creek (2)	0.76					0.76
134-03	Whitetail Creek (1)	0.73					0.73

A 1.5-mile segment of Whitetail Creek (reaches 1 and 2) traverses pastures 1 and 3 in Allotment 134. This reach has a riparian functionality rating of PFC. Riparian conditions in this reach epitomize desired condition (Figure 134.1).

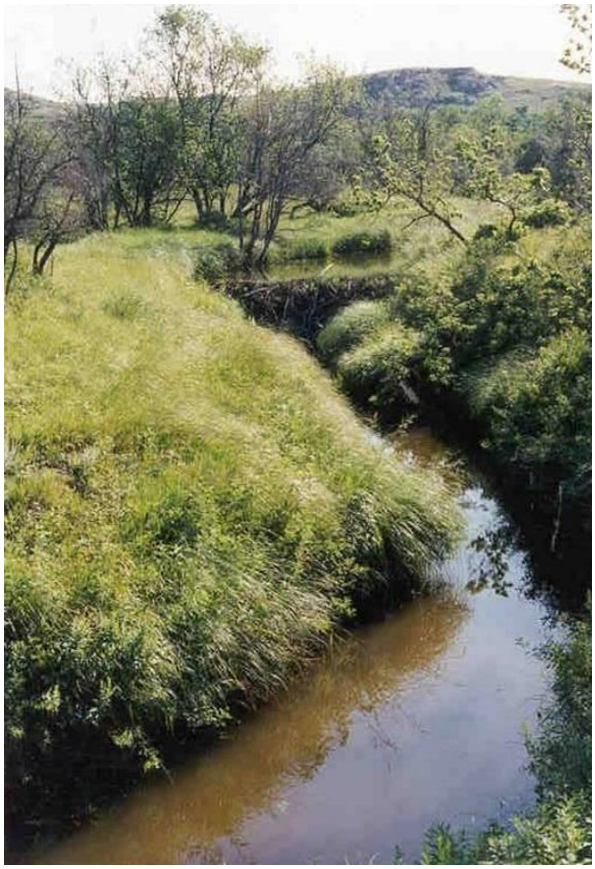


Figure 134.1 — The upstream reaches of Whitetail Creek have a riparian functionality rating of PFC. Note desired vegetative conditions: vegetative canopy of nearly 100 percent along the channel banks; presence of desired native woody species to shade channel, cool water, and add root strength to banks. Note desired geomorphic conditions: low width depth ratio, low sediment load, absence of any visible channel erosion, meandering channel to dissipate stream energy, and fully vegetated point bars. Beavers maintain active dams, which further stabilize channel, trap sediment, and recharge alluvial aquifers.

Woody Draws – Of seven sampled woody draws, 71 percent were Healthy and 29 percent were At Risk or Unhealthy. These general proportions were consistent in both pastures. Healthy sites occurred on moderately steep slopes above Whitetail Creek while less than Healthy sites occurred along the creek terraces that were dominated by smooth brome and experience heavy livestock use. Heavy trampling disturbances also occurred around an ephemeral wetland and several springs on Whitetail Creek in the southeast corner of pasture 3. Large beaver ponds occurred downstream of this area and some adjacent aspen communities had been extensively harvested (Figure 134.2a and 2b). Down logs that impede livestock access increase the potential for regrowth of saplings and basal sprouting.

Figures 134.2a and 134.2b — Large beaver pond along Whitetail Creek in photo a with areas of aspen cut by beaver in photo b.

Herbaceous Structure – There was one VOR sample transect in the allotment. It sampled in the Moderate structure class. Of the 20 stations along the transect, 60 percent were Low and 40 percent were Moderate.

Seral Stages – About 32 percent and 50 percent of the two pastures in this allotment consist of broken land with high proportions of invasive grasses and intermixed native grasses. Invasive grasses including crested wheatgrass also occurred throughout most areas of unbroken land. A sere plot in broken land of pasture 1 was at a mid-late seral stage with moderate amounts of western wheatgrass and needlegrass species mixed with about 22 percent relative canopy cover of Kentucky bluegrass and smooth brome. Other areas exhibited greater dominance of invasive grasses or high proportions of blue grama and earlier seral stages. Relative plant frequency of Kentucky bluegrass and smooth brome increased from about 5 percent to 32 percent between 1980 and 2009 along a pace transect in broken land.

About 50 percent of pasture 3 consisted of broken land and a belt transect and Robel transect in the northeast quarter of the pasture recorded crested wheatgrass, sedge, and western wheatgrass as the dominant species. The belt transect reported high amounts of sedge between wolfy crested wheatgrass plants, and field observations in this area indicated light amounts of use. Field observations in broken and unbroken land at the south end of the pasture indicated intermingled patches of crested wheatgrass, Kentucky bluegrass, and native grasses, with blue grama and buffalo grass (*Buchloë dactyloides* (Nutt.) Engelm.) dominating heavily grazed patches.

Sharp-tailed Grouse – There are no known leks within the allotment. There are two known leks within 1 mile of the allotment.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed 2 years later.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would now be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease because of the removal of livestock as one vector source.

Riparian – The riparian condition along Whitetail Creek as described in the existing condition would continue and evolve toward the potential riparian community.

Woody Draws – Woody draw conditions would have the potential to improve with the removal of livestock browsing and trampling disturbances that would facilitate increased tree and shrub regeneration. However, existing invasive grasses as well as potential increases of these species as a

result of increasing litter with the removal of livestock grazing would have the potential for slowing or decreasing the potential degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock, there would be an appreciable increased opportunity for the development of High and Moderate herbaceous structure and a decrease in the amount of Low structure.

Seral Stages – Trends of increasing invasive grasses would continue or increase with the removal of livestock grazing, which would facilitate the increased accumulation of plant litter and improve conditions for the spread of invasive bluegrass. Transitions to Invaded Grass States would occur within 10 years across most of the allotment due to the current extent and amount of invasive grasses.

Sharp-tailed Grouse – The increase in High herbaceous structure would benefit nesting and brooding habitat for sharp-tailed grouse. However, over time the decrease in forb diversity would decrease foraging opportunities and nesting and brooding quality.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by an inventory grazing association permit, and Authorized Use is 254 federal AMs. Although this allotment is permitted with an inventory permit, which typically means that livestock are somewhere on the allotment for a full 12 months, it is actually managed like a turn-in permit.
- Cow/calf pairs are run in a two pasture, thrice-over rotation grazing system.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian condition along Whitetail Creek as described in the existing condition would continue.

Figure 134.3 — Shrub community with remnant trees of green ash and willow along terrace of Whitetail Creek with relatively open structure resulting from heavy trailing and grazing between shrubs.

Woody Draws – Woody draw conditions are likely to persist at 71 percent Healthy and 29 percent At Risk or Unhealthy under current management. Low levels of livestock disturbance along upland slopes facilitate Healthy conditions, while the predominance of smooth brome and heavy livestock concentrations that impede the regeneration of woody species would result in the persistence of At Risk conditions along terraces of Whitetail Creek (Figure 134.3).

Herbaceous Structure – It is expected that current management would continue to maintain the existing structure distribution under similar climatic conditions. The Authorized Use level is approximately 20 percent higher than the initial estimated carrying capacity after accounting for cow size, which would limit residual cover levels. In addition, the repeated and late season visits under the thrice-over system would limit the production of High structure.

Seral Stages – Invasive grasses that comprise a large portion of the plant composition throughout the allotment would continue increasing under current management. Grazing during the latter half of May in pasture 1 is appropriate for the invasive grass component. However, decreasing palatability of invasive grasses during later grazing rotations in both pastures has a high potential to result in selective use of the native component that comprises a low proportion of the total available forage. The high potential for excessive use of the native component would contribute to low plant vigor and assist the spread of invasive grasses. Annually repeated seasonal grazing of the same pastures is another possible factor contributing to low native plant vigor (Sedivec and Manske 1990), which can facilitate the increase of invasive grasses.

Conversely, distant portions of the pastures away from primary use areas along Whitetail Creek exhibit relatively light use and high plant litter that facilitate the spread of invasive grasses. Appreciable amounts of Kentucky bluegrass in these areas that are of low palatability during most of the grazing season perpetuate low utilization and the accumulation of plant litter.

Sharp-tailed Grouse – The existing thrice-over system would remove and limit residual standing crop after the bulk of the growing season is over, especially when combined with the Authorized Use level. Current management would not enhance grouse nesting and brooding habitat.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 254 federal AMs.
- Implementing a twice-over grazing system, annually changing season of use within the rotation.
- Alternating salt placement in pasture 3 from one side of Whitetail Creek to the other at midpoint of grazing season, or as needed.

ADAPTIVE OPTIONS:

- Adjusting Authorized Use.
- Implementing a once-over deferred rotation.

Range

Initial Actions – Because the initial Authorized Use will remain the same as current management,

the permittee would be allowed to harvest the same amount of forage. By implementing a twice-over rotational grazing system and annually changing the season of use within the rotation, available forage may increase with time, since the proposed rotation is allowing for initial growth or regrowth in the pastures every year instead of rotating back a third time and taking away the opportunity for regrowth. Livestock distribution would have minimal if any change because of the size and topography of the pastures. Alternating salt placement in pasture 3 would draw livestock to these areas, thereby changing livestock distribution so that they would not focus on one side or the other of Whitetail Creek.

Adaptive Options – Adjusting Authorized Use downward would result in fewer livestock numbers, fewer grazing days, or a combination of the two. Adjusting Authorized Use would not change the distribution of the livestock; however, the amount of forage harvested would be less than the existing forage harvested. Implementing a once-over deferred rotation would affect livestock distribution because of the duration of grazing and palatability of herbaceous species.

Riparian

Initial Actions – It is expected that desired conditions along Whitetail Creek would continue with the initial actions proposed.

Implementing a twice-over grazing system, annually changing the season of use within the rotation, would have no effect on desired riparian condition along Whitetail Creek. The rotation would not result in any additional livestock use and occupation on the riparian corridor.

Alternating salt placement in pasture 3 would draw livestock to these areas, thereby changing livestock distribution so that they would not focus on one side or the other of Whitetail Creek, which would benefit riparian condition through better distribution.

Adaptive Options – It is expected that desired conditions along Whitetail Creek would continue with the adaptive options proposed.

Reducing Authorized Use should help improve the upland vegetation, which in turn reduces overland flow and would further benefit the riparian conditions along Whitetail Creek. A reduction in overland flow delivered to the creek would result in reduced stream velocities, allowing for the establishment of riparian vegetation that would build stream banks.

Implementing a once-over deferred rotation system would have no effect on desired riparian condition along Whitetail Creek. The rotation would not result in any additional livestock use and occupation on the riparian corridor.

Woody Draws

Initial Actions – Switching from a non-deferred thrice-over rotation to a deferred twice-over rotation with the same level of Authorized Use would have minimal influence on the current proportion of 71 percent Healthy and 29 percent less than Healthy woody draws because topographic position was the primary factor of current conditions. Woody draws on steep slopes would continue to experience relatively low levels of livestock browsing and trailing disturbance, while woody draws along terraces of Whitetail Creek would continue to experience high levels of disturbance.

Alternating the placement of salt and mineral to the west and east sides of Whitetail Creek in pasture 3 would not have a large influence on woody draw conditions for the reasons stated above. The small pasture size of 320 acres, linear pasture shape bisected by Whitetail Creek, and numerous crossing areas of the creek that allow livestock to graze where they prefer would contribute to minimal influence of salt placement on woody draw conditions.

Adaptive Options – Switching to a once-over deferred rotation would also have minimal influence on woody draw conditions because of topographic influence as the primary factor controlling the level of livestock disturbances. Both pastures would be grazed during a portion of the hot summer months each year, and the once over deferred rotation would not sufficiently increase the period of rest needed to facilitate increased levels of woody species regeneration.

Decreasing Authorized Use would increase the potential for woody species regeneration, but the level of necessary reduction would likely be excessive relative to maintaining or improving other resource conditions. Potential reductions would have to exceed the difference between current levels of Authorized Use and typically reported use (9 to26 percent) to affect a decrease in actual use.

Herbaceous Structure

Initial Actions – The high Authorized Use level relative to the initial estimated carrying capacity may be driving the herbaceous structure conditions at this time. However, the proposed twice-over grazing system rotation would also tend to remove regrowth and limit residual cover that may occur during the deferred periods, effectively homogenizing herbaceous structure. Alternating the salt placement (an attractant) would typically result in an increase in livestock distribution and limit the herbaceous structure distribution.

Adaptive Options – Adjusting the Authorized Use level would tend to improve the potential to diversify the herbaceous structure distribution within the allotment. Decreasing use would have a positive effect on the quantity of standing crop. The adaptive action of a once-over deferred system may improve the potential for regrowth in the early grazed pasture. The limited number of pastures may also be limiting to diversifying the herbaceous structure distribution because of a limited regrowth time.

Seral Stages

Initial Actions – Switching from a non-deferred thrice-over rotation to a deferred twice-over rotation with the same level of Authorized Use would have minimal influence on current trends of increasing invasive grasses. Initiation of grazing in mid-May would coincide with high palatability of invasive grasses in the first pasture of use each year, but the second through fourth rotations would miss all or a large portion of the invasive grass palatability and result in selective grazing of the native component. Grazing during high palatability of invasive grasses would alternate between pastures each year, but a large portion of the annual use would continue to be directed towards the native component. Because the native component is estimated to comprise about half of the total forage production, the degree of selective use would be excessive and result in decreased plant vigor that assists further expansion of invasive grasses.

An exception to selective use of the native component might involve smooth brome along terraces of Whitetail Creek, which retains greater palatability than Kentucky bluegrass through the season. However, concentrated use along the creek would perpetuate low use of distant uplands, thereby contributing to the accumulation of plant litter that assists increases of bluegrass.

Alternating the placement of salt and mineral to the west and east sides of Whitetail Creek in pasture 3 would decrease over-utilization on a local scale and could contribute to greater utilization or increased management of plant litter in low use areas. However, this would not have a large effect on the trend of increasing invasive grasses because of their present extent and selective use of native components that would occur in these areas with increased livestock distribution.

Adaptive Options – Switching to a once-over rotation would have minimal influence on current trends of increasing invasive grasses. Invasive grass palatability would be low during the latter half of the first pasture rotation and all of the second pasture rotation. This situation would be reversed between pastures each year and result in grazing patterns and species selection similar to current conditions.

Decreasing Authorized Use would decrease the level of selective native grass utilization, thereby assisting increased plant vigor and potential seral development. However, high or greater competitive ability of invasive grasses, along with similarly decreased levels of use, would facilitate their continued increase and impede the development of native communities. Sufficiently decreased levels of Authorized Use would contribute to the accumulation of plant litter , which would assist the spread of invasive grasses. Neither decreases nor increases in Authorized Use would facilitate decreasing trends of invasive grasses without coordinating the grazing season with the respective palatability and production of the invasive and native grass components.

Sharp-tailed Grouse

Initial Actions – The Authorized Use level that is approximately 25 percent higher than the initial estimated carrying capacity, after accounting for cow size, would limit any improvement to enhance grouse nesting and brooding habitat by limiting production of residual cover, thus limiting spring nesting habitat. In addition, the proposed twice-over system would tend to reduce residual standing crop with the second rotation, resulting in a homogenized herbaceous structure distribution.

Adaptive Options – The adaptive action of adjusting Authorized Use would be the most efficient tool enhancing grouse nesting habitat. The adaptive action of a once-over deferred system may improve the potential for regrowth in the early grazed pasture. The limited number of pastures may also be limiting to diversifying the herbaceous structure distribution due to a limited regrowth time.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3; therefore Alternative 3A would have the same effects as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carry capacity.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 4 are the same as Alternative 3.

Range
Initial Actions – Authorized Use for this allotment would be 220 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use AMs converted to AUMs is 292 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 25 percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment.

Riparian
Initial Actions – The effects would be the same as described previously in Alternative 3.

Woody Draws
Initial Actions – Decreasing Authorized Use by 25 percent according to initial estimated carrying capacity after adjusting for cow size would establish potential levels of use 5 to 11 percent less than typically reported use, and would facilitate slight improvement of woody draw conditions by reducing livestock browsing and trampling disturbances. However, the reduced level of use would be unlikely to shift At Risk and Unhealthy conditions to Healthy due to topographic influences that concentrate livestock disturbances within a small portion of the woody draws. Thus, regeneration of woody species would be unlikely to increase in woody draws, where it is most needed.

Herbaceous Structure
Initial Actions – The reduction in Authorized Use from current levels down to an initial estimated carrying capacity would help herbaceous structure conditions because of less use of forage resources. However, the proposed twice-over grazing system would tend to reduce the standing crop from the regrowth that may have occurred during the deferred timeframe, effectively reducing the potential to diversify herbaceous structure.

Seral Stages
Initial Actions – Decreasing Authorized Use by 25 percent would establish potential levels of use 5 to 11 percent less than typically reported use and would not have an appreciable effect on the trend of increasing invasive grasses. The competitive relationship and degree of selective utilization for

native and invasive grasses would persist with the proposed reduction in use and switch from thrice to twice-over grazing. The potential degree of selective native grass utilization would continue to be excessive, and lower levels of use in distant range away from Whitetail Creek would perpetuate low utilization and accumulating plant litter that assists invasive grass spreading.

Sharp-tailed Grouse

Initial Actions – The reduction in Authorized Use from current levels to an initial estimated carrying capacity should help grouse habitat conditions. However, the proposed twice-over grazing system rotation would tend to reduce residual cover on the second pass through, effectively reducing the quantity of habitat available for spring nesting needs.

ALLOTMENT 135

Table 135.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 135 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 2.2 – Research Natural Areas	1549	18	
Management Area 3.65 – Rangelands With Diverse Natural-Appearing Landscapes	6739	77	
Newly acquired NFS lands with unassigned management area	431	5	
Total allotment acres	11677	100	
NFS acres	8718	75	
State land acres	0	0	
Private land acres	2958	25	
Current permitted livestock grazing (AMs) on NFS lands			1559
Initial estimated carrying capacity (AUMs) on NFS lands			2147
Number of pastures containing NFS lands			8

Table 135.2 — Allotment 135 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	Surveys conducted in 2006 rated Mikes Creek as Nonfunctional.	Start Mikes Creek on upward trend towards PFC.
Woody draws	All sampled woody draws were Healthy.	Maintain current woody draw conditions.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Below Objectives High – Below Objectives 2004 Transects: 1.12; 1.51; 2.36; 1.31; 1.03; 1.0; 1.24; 1.74; 1.06; 1.53 2004 Stations percent: Low-72.5/Moderate-27.5/High-0 2005 Transects: 2.28; 1.85 2005 Stations percent: Low-45/Moderate-52.5/High-2.5	Manage for additional Moderate and High structure on biologically capable habitats.
Seral stages	Of nine sample sites, seven were at mid seral stages and two were at early stages. Native grass communities dominate, but only three of the nine samples were without invasive grasses.	Maintain native plant dominance to achieve desired seral proportions, and limit or decrease invasive grasses.
Sharp-tailed grouse	There is one lek within 1 mile of the allotment. Habitat within this overlap is not potential or preferred existing habitat.	Manage for increased High vegetative structure on biologically capable sites to enhance habitat.
Remarks	Approximately 20 acres of Canada thistle and burdock inventoried in this allotment.	

Table 135.3 — Allotment 135 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action	Alternative 3A	Alternative 4

• Authorized Use is 1559 federal AMs.
• Three-year average permitted use is 1497 summer federal AMs.*
• Permit type: Inventory (12 months).
• Rotation: Modified deferred rotation (2-pastures with cow/calf herd and 2-pastures with yearling herd.
• Class(s) of livestock: Cow/calf pairs and yearlings.
• See allotment map in Appendix B for current range developments.
	Initial Actions
	• Authorized federal AMs: 1559.
	• Initiate prescribed burning or mechanical treatment of encroaching juniper.
	• Initiate three-pasture deferred rotation with pastures 8, 9, and 10. Improve and/or add boundary fence between pasture 9 and 10.
	Adaptive Options
	• Implement a five-pasture deferred rotation with one herd (eliminate yearling herd) in pastures 6,7,8,9, and 10.
	• Develop rangeland water in pastures 8, 9, and 10.
	• Use herding.
	• Adjust Authorized Use.
		Initial Actions
		• Authorized federal AMs: 1559.
		• Initiate prescribed burning or mechanical treatment of encroaching juniper.
		• Initiate three-pasture deferred rotation with pastures 8, 9, and10. Improve and/or add boundary fence between pasture 9 and 10.
		• Construct a pipeline from pasture 8 to pasture 10 and add one stock tank in Section 28, T143N, R101W.
		Adaptive Options
		• Develop rangeland water in pastures 8, 9, and 10.
		• Use herding.
		• Adjust Authorized Use.
		• Implement a five-pasture deferred rotation with one herd (eliminate yearling herd) in pastures 6,7,8,9, and 10.
			Initial Actions
			• Authorized federal AUMs: 1559.
			• Initiate prescribed burning or mechanical treatment of encroaching juniper.
			• Implement a five-pasture deferred rotation with one herd (eliminate yearling herd) in pastures 6,7,8,9, and 10; Improve and/or add boundary fence between pastures 9 and 10.
			• In pastures 8 and 9, on Mikes Creek, construct 64 and 40 acre riparian exclosures, respectively. No grazing of exclosures for first 5 years.
			Adaptive Options
			• Use artesian well in pasture 8 to supply water in pastures 8, 9, and 10 with pipeline system and tanks; or drill new well with shorter pipeline system and tanks.
			• Adjust Authorized Use.
			• Herding
			• Riparian exclosure: At end of year 5, conduct vegetation survey. If riparian vegetation has been established on 60 percent of stream banks and active stream cutting has ceased, then initiate late or dormant season prescribed grazing. Prescribed grazing would be identified in AOI/AW.
			• Once pasture 9 riparian exclosure has recovered, consider moving exclosure to another unprotected adversely affected reach within the pasture.
			• Mikes Creek:
			  • Pasture 10 - two exclosures 17 and 12 acres. (Reaches 19 and 20).
			  • Pasture 9 – four exclosures 12,19,13,16 acres, respectively. (Reaches 21,22,23,24)
			  • Pasture 8 – two exclosures 20, 23 acres respectively (Reaches 25, 28)

Alternative 2 - Current Management	Alternative 3 - Proposed Action	Alternative 3A	Alternative 4
Monitoring • Review annual planned management identified in Allotment Worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every 3 years. • Complete Properly Functioning Condition survey once every 3 years, then once every 5 years if a positive trend has been established. • Collect vegetative composition and production data once every 3 to 5years.	**Monitoring** • Same as Alternative 3	**Monitoring** • Same as Alternative 3

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 135 — Existing Condition

Range – This allotment is approximately 11,677 acres in total size and contains both private and NFS lands with 8,718 acres of NFS lands. Currently, this allotment is issued an inventory permit for 183 head for 8 months and 117 head for 5 months by the MGA. It is also the headquarters allotment associated with a common allotment (Blacktail Common). With this type of permit, livestock are on the allotment for the entire year, not just the typical May 1st to December 31st. Livestock are currently being wintered on private and intermingled private and NFS lands during the winter months of January through April. The allotment has been subdivided into nine pastures and of these nine pastures seven contain NFS lands. These pastures range from 732 to 2,945 acres. Current AMs provided by NFS lands can be found in Table 135.1. Water developments within this allotment include developed reservoirs, dugouts, and artesian wells/stock tanks.

The majority of this allotment lies within the Mikes Creek watershed, which is a steep, narrow watershed with rough badlands topography. The current rotation consists of pastures 8 and 9/10 being managed as a modified deferred rotation by cow/calf pairs, and pastures 6 and 7 are managed as a deferred rotation with yearlings and cow/calf pairs. The remaining pastures are used for winter grazing, feeding, and calving, and two contain NFS lands. The boundary fence and natural barrier between pastures 9 and 10 currently do not function adequately to prevent livestock from accessing both pastures and are managed as one pasture. Normally these three pastures are grazed with cow/calf pairs starting in pasture 8 in May and then rotating to pasture 9/10 towards the third week of May. Livestock return to pasture 8 during weaning in the first part of October. The number of livestock within these three pastures varies from year to year depending upon the rotation in Allotment 256 pasture 1, where 117 head are turned in around May 15th one year and the following year around August 1st.

Some of the challenges faced in this allotment, especially in pastures 8, 9, and 10, are the topography, location of livestock water developments, historical use, and the existing plant communities. Within these three pastures, topography drives the distribution of livestock. Typically, the north-facing slopes are covered with Rocky Mountain juniper; however, there are isolated areas of herbaceous vegetation within these stands. In visiting with the permittee, the family has noticed the Rocky Mountain junipers moving down closer and closer to Mikes Creek through the years. In the late 1980s, the southeastern portion of pasture 10 burned in the Mikes Creek fire. Distribution of the livestock has changed in pasture 10 due to the fire, and the plant composition has changed to more of an herbaceous community with deciduous shrubs and trees. Topography, however, still limits the distribution of livestock in reaching certain areas.

All but one water source in pastures 8, 9, and 10 are located in the uplands near Mikes Creek. The remaining reservoir is located in the southeastern corner of pasture 10. Only one of the two artesian wells actually flows; it is located in pasture 8. The other artesian well in pasture 10 requires a motor and compressor to pump air into the well to make it flow because of the loss of well head pressure.

The noxious weed analysis (GIS Weed Layer 1992–004) indicated that there are approximately 22 acres of Canada thistle and burdock found within this allotment. However, there have been a variety of state and county listed noxious weeds identified based on field visits, a riparian inventory along Mikes Creek, communication between the Forest Service and the Billings County Weed Board, and permittee meetings. Some of the weeds found are leafy spurge, Canada thistle, black henbane (*Hyoscyamus niger* L.), and hound's tongue (*Cynoglossum officinale* L.). The size and total acreage of each individual noxious weed species is unknown; however, through continued treatment and inventory of this area we will soon have a better understanding of the extent of the infestations. Herbicides continue to be the main method of controlling these infestations.

Oil and gas development on NFS lands in this allotment has removed a total of approximately 66.2 acres from livestock access. A total of approximately 48.4 acres of oil and gas pads and access roads have been reclaimed and are or will be available for livestock access. Associated forage from these acres is approximately 15 and 11 AUMs, respectively.

Riparian –

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
135-08	Mikes Creek (2)					2.79	2.79
135-09	Mikes Creek (2)					1.98	1.98
135-10	Mikes Creek (1)					1.74	1.74

Mikes Creek (reaches 1, 2) flows through pastures 2, 8, 9 and 10 of Allotment 135. A reach through pasture 2 is on private land and was not evaluated. In pastures 8, 9, and 10, a 6.5-mile segment of the stream that has intermittent flow characteristics was evaluated. It has a functionality rating of NF (Figure 135.1). The interdisciplinary team noted the following problems with the functionality of this stream:

- Channel is incised 2 to 8 meters (5 to 25 feet) and shows signs of recent and continued down-cutting.

- Water table has been lost, leading to a sharp reduction in riparian plant species, poor conservation of riparian moisture, and a flashy hydroperiod.
- Plants in the (potential) riparian area are sparse and dominantly obligate to facultative upland plants.
- Deposition on point bars is excessive and prevents establishment of desired riparian plants.
- Noxious weeds are common throughout the (potential) riparian area;
- Upland hydrology has been altered by road construction, which has concentrated runoff and added sediment to the channel. In addition, upland hydrology is dominated by blue grama sod with few native cool-season grasses present. The blue grama sod exhibits a high percentage of bare ground and shows evidence of high overland flow as indicated by flow paths, pedestals, debris dams, and terracettes.
- Early season grazing of native species may be exacerbating overland flow conditions.
- The location and presence of high-flow stage indicators suggest the hydroperiod is short and flashy in Mikes Creek because of poor conservation of moisture in the uplands and high rates of overland flow. Livestock tend to get temporarily trapped within the vertical walls of Mikes Creek and then trail up and down the channel.

Figure 135.1 — Mikes Creek is incised in pastures 8, 9, and 10 of Allotment 135. It has a functionality rating of NF. Notice the encroachment of mesic upland plants (e.g., sagebrush and rabbit brush [*Chrysothamnus nauseosus* (Pall.) Britt.]) down to the channel bed. There is a complete loss of desired riparian vegetation from the incised reaches. Also note cattle hoof prints in channel bed. Livestock tend to get temporarily trapped within the vertical walls of Mikes Creek and then trail up and down the channel. Finally, the water table has been lost, leading to flashy hydroperiod and poor conservation of riparian moisture. Riparian plants will have difficulty establishing along degraded reaches because moisture is limiting.

Woody Draws – All six sampled woody draws were Healthy and these conditions are likely assisted by extensive stands of Rocky Mountain juniper that decrease reliance on woody draws for shade and shelter. A large portion of the green ash woody draws occur as inclusions along the toe slopes of juniper communities, particularly along north aspect slopes that constitute large portions of pastures 8, 9, and 10. Woody draws on the west side of the allotment exhibited less association with stands of Rocky Mountain juniper. There was a relatively high degree of downslope juniper expansion into adjacent grassland habitat.

Herbaceous Structure – In the 2004 data set, of the 10 herbaceous dominated sampled VOR transects, 6 were Low and 4 were Moderate. The consolidated station averages indicated a strong dominance of Low structure (72.5 percent) with the balance in Moderate (27.5 percent).No High structure was observed.

Two of the 2004 transects were resampled in 2005. Both were measured in the Moderate category, and both improved from 2004. The station averages shifted toward Moderate with Low structure stations showing 45 percent; Moderate at 52.5 percent; and High at 2.5 percent.

Seral Stages – Of nine sample sites, seven were at mid seral stages and two were at early stages. The potential exists for late seral stages in distant secondary range primarily involving communities such as little bluestem and prairie sandreed. Native grass communities dominated the allotment, but invasive grasses were present on six of the nine sample sites and dominated in localized areas such as around water tanks and oil- and gas-related developments.

A Robel transect in pasture 2 reported western wheatgrass and silver sagebrush with no invasive grasses. A sere plot in pasture 3 was at a mid seral stage with dominance of western wheatgrass and blue grama and low amounts of Canada bluegrass. A repeated pace transect in pasture 3 indicated an increase in plant basal cover but no appreciable change in plant composition, which was dominated by blue grama and lesser amounts of western wheatgrass.

Seral stage on a remeasured ecoplot in pasture 7 shifted from a mid to mid-late between 1999 and 2008 with increasing cover of western wheatgrass and decreasing cover of blue grama. Another ecoplot from 1999 was at an early seral stage and located closer to a water tank, so is unlikely to have experienced similar shifts in plant composition. Two of three Robel transects measured during 2004 in this pasture were suggestive of early-mid seral stages with dominance of blue grama, while the third transect was suggestive of a mid seral stage with western wheatgrass and blue grama. Invasive grasses were absent or occurred in only trace amounts in the above sample sites.

An NDSU sample plot and an ecoplot on the west side of pasture 8 were at mid-late and mid seral stages respectively, while two additional ecoplots within primary use areas near the center of the pasture were at mid-early seral stages with high amounts of blue grama. Remeasurement of one of the ecoplots with a sere plot in 2007 indicated no appreciable change in plant composition. A belt transect measured on another ecoplot site was suggestive of shifts to an earlier seral stage with increases in sedge and blue grama. Another belt transect as well as two Robel transects indicated varying dominance of blue grama and western wheatgrass and were generally suggestive of mid seral stages.

Two NDSU sample plots in pasture 9 on Thin Claypan ecological sites varied from an early seral stage with the dominant biomass production comprised of blue grama and fringed sage (*Artemisia frigida* Willd.), to a mid seral stage with western wheatgrass and green needlegrass among dense silver sagebrush and western snowberry shrubs. Kentucky bluegrass frequency was 14 percent in both of these sites but comprised small proportions of the plant biomass. Two Robel transects in this pasture were suggestive of early to mid seral stages with dominance of blue grama and sedge.

One NDSU sample plot in pasture 10 was at a mid seral stage with equal production by western wheatgrass and blue grama and 18 percent relative grass production by smooth brome. Two sere

plots were at mid and early seral stages with no invasive grasses. A repeated pace transect was suggestive of decreasing seral stage with a sharp decrease in western wheatgrass frequency and increase of blue grama frequency. Four Robel transects recorded blue grama or sedges as the dominant species. Three ecoplots from 1998 were at late or late-mid seral stages, with two of the sample sites located in secondary range. A belt transect measured near one of the sites was suggestive of decreasing seral stage with a decrease of green needlegrass.

Sharp-tailed Grouse – There is one lek within a 1 mile radius of the allotment. There is approximately 217 acres of overlap within this 1 mile overlap. This area is primarily badlands terrain and juniper and green ash dominate the existing vegetation. Therefore, this area does not provide quality potential habitat for sharp-tailed grouse. However, areas immediately adjacent to the west of the overlap do have potential to provide nesting habitat for grouse.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed 2 years later.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would now be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian condition along Mikes Creek as described in the existing condition would improve and evolve toward desired riparian conditions over time. Improvement would result from the establishment of riparian vegetation, which would capture sediment and build stream banks.

Woody Draws – The removal of livestock grazing would result in the improvement of current woody draw conditions. Although the six sampled sites were Healthy, the removal of livestock browsing and trampling disturbances would facilitate increased regeneration of desired trees and shrubs towards maximum potential conditions. Invasive grasses occurring among some sites would have the potential to impede or slow the rate of regeneration, but invasive grasses would have less effect in other woody draws due to dense canopy cover that limited development of the herbaceous layer.

Herbaceous Structure – There would be increased opportunity for the development of High and Moderate structure and a decrease in the amount of Low structure.

Seral Stages – The removal of livestock grazing disturbances would facilitate a shift towards late seral stages. The lack or low amount of invasive grasses in large portions of the allotment would allow increased expression of late seral species that occur as subordinate species among early and mid seral stage communities. A few heavily utilized areas with low amounts of late seral species

would require greater time to achieve late seral stages, but the desired proportion of early, mid, and late seral stages would be gradually lost with increasing proportions of late seral stages.

Development or long-term maintenance of late seral stages would be impeded in portions of the allotment with greater invasive grass components, and increasing litter with the removal of livestock grazing would facilitate the gradual increase of these species on local scales that would gradually enlarge to greater portions of the allotment.

Sharp-tailed Grouse – The increase in High structure would benefit nesting and brooding habitat for sharp-tailed grouse. However, over time the decrease in forb diversity would decrease foraging opportunities.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by an inventory grazing association permit, and Authorized Use is 1,559 federal AMs.
- Cow/calf pairs are run in a two-pasture modified deferred rotation, and yearlings are run in a two-pasture modified deferred rotation.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weed control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The NF condition of Mikes Creek as described in the existing condition would continue.

Woody Draws – Relatively Healthy woody draw conditions would persist under current management, at least in part due to the large proportion of juniper woodlands that help disperse livestock disturbances among woodland communities.

Herbaceous Structure – Current management would continue to perpetuate the herbaceous structure distribution with a limited proportion of and potential for High herbaceous structure. Retaining the current Authorized Use level, though approximately 20 percent lower than the initial estimated carrying capacity, would limit residual cover (i.e., structure).

Seral Stages – Continuation of current management would perpetuate existing seral conditions. All of the sample sites were at mid and early seral stages, but a moderate to high potential exists for late seral stages to occur in secondary range. Conversely, current levels of use result in high grazing disturbance within primary range, where the contribution of early seral stages has the potential to exceed desired proportions for the allotment. Heavy utilization along the Mikes Creek corridor is contributing to poor range conditions (Figure 135.2) where three NDSU sample plots and a sere plot indicated low herbaceous forage production and departures of rangeland health. A repeated pace transect in this area was suggestive of decreasing seral stage.

Figure 135.2 — Corridor of Mikes Creek in pasture 9/10 that receives heavy livestock use and exhibits early seral stages of blue grama with remnant amounts of western wheatgrass and needlegrass.

Although Authorized Use is 16 percent less than initial estimated carrying capacity, reported use has ranged from 21 percent less to 19 percent greater than Authorized, not counting additional levels of winter use when grazing can occur during periods of low snow cover. Additionally, initial estimated carrying capacity is likely overestimated due to relatively extensive secondary range involving steep slopes, long distances to water, and dense stands of Rocky Mountain juniper with low livestock use. Low amounts of herbaceous production measured in some NDSU samples, as well as inferred from some sere plots, would also decrease the initial estimated carrying capacity compared to the initial estimate that assumed forage production equal to the potential climax community.

Consistent premature grazing in several pastures creates the potential for decreased plant vigor and production, and hay feeding increases the potential for invasive grass introductions and spreading into low condition rangeland. Continued disturbances associated with oil development that contribute to the introduction of invasive grasses increases the potential for their spread into areas of heavy grazing disturbance.

Sharp-tailed Grouse – It is desirable but not necessary to enhance sharp-tailed grouse habitat in this allotment within the mile radius. Given current management, it does not appear that sharp-tailed grouse nesting and brooding habitat would be enhanced in the next 10 to15 years, as evidenced by the current herbaceous structure data.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 1,559 federal AMs.
- Initiating prescribed burning or mechanical treatment of encroaching juniper.
- Initiating a three-pasture deferred rotation with pastures 8, 9, and 10. Improve or add boundary fence between pastures 9 and 10.

ADAPTIVE OPTIONS:

- Implementing a five-pasture deferred rotation with one herd (eliminate yearling herd) in pastures 6, 7, 8, 9, and 10.
- Developing rangeland water in pastures 8, 9, and 10.
- Using herding.
- Adjusting Authorized Use.

Range

Initial Actions – Under this alternative, 1,559 federal AMs would be authorized. This would not be a change from the existing condition of Alternative 2. The use of these federal AMs, however, would be different than the existing condition because of the initiation of a three-pasture deferred rotation grazing compared to a two-pasture deferred rotation.

Prescribed burning would increase the amount of forage available as graminoid communities replace the existing Rocky Mountain juniper communities. Livestock distribution would also change from the existing conditions because livestock would be attracted to the regrowth from the burn. Deferment of livestock grazing or rest of the pasture would occur, depending on the size and intensity of the prescribed burn and its effects on soils and the herbaceous community. Rest would require an adjustment in Authorized Use; because the allotment carries an inventory allotment, the adjustment would be in livestock numbers. Livestock would still concentrate along Mikes Creek because of the location of existing livestock water developments and topography of the pastures.

Using mechanical treatment on encroaching juniper would not require a deferment of livestock grazing or resting of the pastures if isolated junipers are harvested. However, effects would be different if large stands of junipers are removed. Distribution of livestock would change once the desired plant communities return to the areas treated. Topography and location of water developments would still draw livestock back to the valley bottoms of Mikes Creek.

Initiating a three-pasture deferred rotation would be different than the existing condition because livestock would graze each pasture separately and the season of use would change within each pasture. Livestock currently start in pasture 8, move into pastures 9 and 10, which are grazed together, and then return in the fall to pasture 8. Livestock distribution would change because of the change in forage quality of different plant communities, and in one out of three years each pasture would be grazed later in the season after calves have been weaned off of the cows. However, topography and location of existing water developments would still draw livestock to Mikes Creek.

Adaptive Options – Improving or adding boundary fence between pastures 9 and 10 and implementing a five-pasture deferred rotational grazing system would provide for more recovery time for native graminoid species than the current rotation. Pastures would be grazed for a shorter period of time with more livestock numbers and at different times of the year than the existing condition. The increased numbers and shortened grazing period along with changing the season of use would change the distribution of livestock within the pastures because of quality of forage and climatic condition. Additional water developments may be necessary because of the increase in livestock numbers over current management. This adaptive option would require the permittee to run one herd instead of two. The permittee would have to choose which class of livestock to run. Currently there are two herds and normally two different classes of livestock. As a result of this action, there would be a change in livestock distribution because of the behavior of the different livestock classes and a change in pasture rotation normally grazed by the class of livestock.

Developing rangeland water and installing stock tanks in pastures 8, 9, and 10 would not have an effect on livestock distribution because the topography limits where stock tanks can be placed. There would be an initial cost in developing livestock water and stock tanks along with maintenance to keep the improvement functional.

Due to the size of the allotment and pasture, the use of herding would directly affect the distribution of the livestock. Herding would move livestock away from areas currently being heavily grazed to less utilized areas. Over time, this would result in increased forage available for livestock grazing because of the sites recovering from the heavy grazing pressure that currently exists. Initial start-up cost of hiring a rider or the permittee's time would create additional cost above the existing condition. Livestock grazing may occur in areas of secondary range, which is currently providing habitat for wildlife species.

Adjustment in Authorized Use would require reducing the number of livestock, since this allotment carries an inventory permit. Adjusting Authorized Use would not change the distribution of the livestock; however, the amount of forage harvested would be less than the existing forage harvested.

Riparian

Initial Actions – Prescribed burning could induce a short-lived (1 to several years) increase in sediment delivery to the channel because of exposed soil. Mechanical treatment including lop and scatter would provide surface stability during the establishment of an herbaceous plant community by resisting sheet flow and capturing sediment for plant establishment. Prescribed burning or mechanical treatment would eventually replace juniper with an herbaceous plant community, which would improve the riparian conditions in a manner similar to that described in the next paragraph.

The pasture rotation should improve overland flow conditions by limiting early season grazing 1 out of every 9 years plus shorter duration grazing in each pasture. This would allow for increased herbaceous production, which in turn would reduce overland flow. A reduction in overland flow delivered to the creek would result in a reduction in stream velocities, allowing for the establishment of riparian vegetation, which would rebuild stream banks. However, even with

improvement of upland vegetation and shorter grazing duration, livestock would still concentrate in and along the riparian corridor, inhibiting riparian recovery.

The combination of the initial actions would increase potential for recovery of the Nonfunctional stream reaches over a long period of time (several decades).

Adaptive Options – Improving a boundary fence between pastures 9 and 10 and implementing a five-pasture rotation should improve overland flow conditions by limiting early season grazing plus providing for shorter duration grazing in each pasture. This would allow for increased herbaceous production, which in turn would reduce overland flow. A reduction in overland flow delivered to the creek would result in a reduction in stream velocities, allowing for the establishment of riparian vegetation, which would rebuild stream banks. However, even with improvement of upland vegetation and shorter grazing duration, livestock would still concentrate in and along the riparian corridor, thus inhibiting riparian recovery.

Developing rangeland water and the installation of stock tanks in pastures 8, 9, and 10 would move livestock concentration away from the riparian stream corridor and improve riparian conditions. Riparian conditions would improve by minimizing trailing and trampling in the riparian area, allowing herbaceous and woody riparian vegetation recovery.

Herding livestock out of the riparian area would also benefit the riparian corridor by minimizing bank sloughing, trailing, trampling, and loafing in the riparian area and allowing herbaceous and woody riparian vegetation recovery.

Reducing Authorized Use should help improve the upland vegetation, which in turn reduces overland flow and would further benefit the riparian conditions along Mikes Creek. A reduction in overland flow delivered to the creek would result in reduced stream velocities, allowing for the establishment of riparian vegetation which would build stream banks.

The combination of the adaptive options would increase potential for recovery of the Nonfunctional stream reaches. The expected period to achieve desired conditions would be from 5 to 10 years.

Woody Draws

Initial Actions – Control of expanding Rocky Mountain juniper where it is invading grassland habitat might contribute to increased use and disturbance within some woody draws as a result of decreased woodland acreage. Potential benefits to woody draws occurring within or near the burn areas would include decreasing the competitive influence of juniper on deciduous woody species, temporarily improving seedbed conditions for woody seedling establishment, promoting a flush of regrowth as a result of increased nutrients and removal of decadent material, and disruption of disease or pest cycles. Most of the deciduous woody species have the ability to resprout after burning, but the potential exists for high mortality of some desired woody species, depending on the intensity and timing of the burn. Potentially adverse effects of burning on woody draws could be mitigated through avoidance of these habitats. Burning would also have the potential to assist the spread of annual brome or other invasive grasses and noxious weeds. Control of juniper through mechanical means would also have the potential to assist the spread of invasive grasses through greater vehicle travel and ground disturbances, but could selectively remove juniper from portions of woody draws without the potential loss of desired trees and shrubs associated with burning.

Initiating a three-pasture rotation with pastures 8, 9, and 10 would have minimal effect on woody draw conditions because relatively few green ash draws occur in the affected pastures and tend to involve small inclusions among Rocky Mountain juniper. Implementing a three-pasture rotation would involve ensuring that pastures 9 and 10 are grazed as separate units and may require the adaptive action of improving the pasture fenceline and natural break.

Maintaining current levels of reported use should allow for the persistence of Healthy woody draw conditions sampled among the six sites.

Adaptive Options – Developing a new water source and installing stock tanks in pastures 8, 9, and 10 would improve the reliability of water along the corridor of Mikes Creek. The effect on woody draws would be relatively small due to their scarcity in the affected pastures, but the tanks would alleviate some use along the creek channel that could facilitate the development of desired woody species and improved riparian conditions.

Improving the boundary fence and natural barrier between pastures 9 and 10 would likely be required for effectively implementing the proposed three-pasture rotation. Improving the boundary fence along with implementing a five-pasture rotation would assist in maintaining or improving woody draw conditions on the west side of the pasture by decreasing the period that draws in this area are accessible to livestock. Conversely, increased livestock density resulting from combining two herds would have the potential of increasing woody draw disturbances and decreasing current conditions, particularly on the west side of the allotment with less Rocky Mountain juniper.

Herding livestock could be moderately effective in moving livestock out of primary use areas and maintaining Healthy woody draw conditions by decreasing the level of browsing and trampling disturbances. However, herding to increase the distribution of livestock grazing would be most effective in the larger pastures of 8, 9, and 10, where woody draws were relatively scarce.

Decreasing or increasing Authorized Use would facilitate increased and decreased woody draw conditions, respectively, by decreasing and increasing the level of livestock grazing disturbances.

Herbaceous Structure

Initial Actions – The Authorized Use is approximately 20 percent below the initial estimated carrying capacity after accounting for cow size. However, there are not adjustments for terrain and existing vegetative conditions, which would reduce the initial estimated carrying capacity in this allotment. The Rocky Mountain juniper invaded sites on the gentler terrain will be the primary target of burning and mechanical treatments to expand the forage base for livestock. The effects of this action would be relative to the size and location of the area(s) treated. If the overall area of treatment is limited, then effects to improve the herbaceous structure distribution would be limited and conversely so if more juniper area is treated. Repairing the fenceline between pastures 9 and 10 and initiating a three-pasture deferred rotation system under the current Authorized Use level is expected to yield similar results for herbaceous structure. The current Authorized Use level, the seral status, and the generally limited time for regrowth would not allow for an improved herbaceous structure distribution. Depending on the amount of juniper area treated in combination with the implementation of the deferred rotation, some general improvement in seral condition may occur across the allotment, with a minor improvement in the herbaceous structure distribution.

Adaptive Options – Adjusting the Authorized Use level downward would improve the potential to improve the herbaceous structure distribution. Decreasing livestock use would have a positive effect on standing crop. Development of water has the effect of moderating vegetative structure by increasing the relative evenness of livestock distribution within the allotment or pasture. Herding is typically a tool to control overuse and low use in areas by moving cattle to more evenly forage across the pasture or allotment as a whole, with the result of moderating use and moderating vegetative structure. If Authorized Use is manipulated downward concurrently with creating a five-pasture rotation, there should be improvement in the herbaceous structure distribution, mostly in the earliest grazed pasture. In native pastures, June 1st would typically be the earliest turnout and time for regrowth could be minimal, depending on removal date and climate. If Authorized Use is adjusted downward and combined with regrowth time, then the potential to improve herbaceous structure could occur.

Seral Stages

Initial Actions – Control of expanding Rocky Mountain juniper though burning would return a natural ecologic process to the system and increase herbaceous production by removing or reducing the competitive effects of juniper and woody shrubs such as western snowberry and silver sagebrush. Livestock distribution would shift over the short term to the burn areas with new herbaceous growth. Current primary use areas would experience decreased grazing pressure and increased plant vigor and seral development during this period. A mosaic of grazing pressure and seral stages would be retained as a result of the large pasture sizes and different areas of burning over a period of several years or longer. Prescribed burning would also assist in decreasing the accumulation of plant litter in some areas, thereby impeding the potential spread of invasive grasses. However, fire can also assist the spread of invasive or noxious species, so plant composition would be monitored to evaluate the effects of continued burning.

Control of juniper through mechanical means would result in many of the same benefits as burning but at a lower degree or slower rate. Herbaceous plant vigor and production would increase with the removal of juniper, but the effects would be more closely confined to the area beneath the removed tree canopy. A similar or greater potential for assisting the spread of invasive grasses resulting from ground disturbances and vehicle travel might occur with mechanical treatment. Piling and burning of slash material would sterilize the upper soil layers, and establishment of early seral weeds and annual brome is likely.

Initiating a three-pasture deferred rotation with pastures 8, 9, and 10 would differ from current management where pasture 8 is grazed first and sometimes receives a second rotation, and pastures 9 and 10 are grazed as a single pasture. Rotating the season of use among pastures and delaying turn-in until June 1st two out of three years to accommodate critical growth periods of native grasses would increase plant vigor by providing opportunities to complete critical growth periods. Primary use areas along Mikes Creek would continue to experience relatively high levels of use despite the attractant of burning, but there would be an increased potential for shifts towards mid seral stages or increased range health. Secondary range in these pastures would have an increased potential to support late seral stages.

Premature spring grazing would continue or have the potential to increase on the two winter pastures two of three years as a result of delaying turn-in until June 1st in other pastures. This would result in decreased plant vigor and an increased potential for the introduction and spread of invasive grasses associated with hay feeding in the winter pastures.

Two other pastures would continue to be used in a summer rotation with a second livestock herd. No specific rotation is proposed or identified in AOIs/AWs.

Adaptive Options – Improving pasture fencelines and natural breaks between pastures 9 and 10 would likely be necessary to implement the three-pasture rotation among 8, 9, and 10. Implementing a five-pasture deferred rotation with pastures 6 through 10 would further increase opportunities for plants to complete critical or different growth periods each year, with the potential for increasing plant vigor and seral development. Increased livestock density resulting from combining the two herds would increase the evenness of livestock distribution and forage utilization, potentially decreasing the mosaic of seral stages. However, greater opportunities would be available for plant regrowth due to shorter grazing periods in each pasture, and increased livestock distribution could assist improved management of plant litter and decrease opportunities for the spread of invasive grasses.

Developing water in pastures 8, 9, and 10 would improve the reliability of water along the corridor of Mikes Creek, potentially facilitating implementation of the deferred rotation. Livestock distribution in the pastures would not be expected to change appreciably because of topographic limitations associated with potential water tank locations. Therefore, total utilization along the corridor of Mikes Creek would only slightly decrease, but secondary range with the potential for supporting late seral stages would be relatively unaffected. In general, increased grazing and trampling disturbances associated with the new tanks would be countered by decreased disturbances around existing water sources. Soil disturbances associated with construction of the pipelines and increased livestock disturbances around the new tank locations would have the potential for increasing the extent of invasive grasses in the allotment.

The adaptive action of herding livestock would help to decrease excessive grazing disturbances in primary use areas, but would also have the potential to decrease the mosaic of grazing pressure and seral stages.

Decreasing or increasing Authorized Use would facilitate shifts towards late and early seral stages, respectively, by decreasing and increasing the level of livestock grazing disturbances.

Sharp-tailed Grouse

Initial Actions – Due to the low habitat quality within the 1 mile proximity of a known grouse lek, managing for grouse nesting is not necessary per Grasslands Plan guidance. However, managing for improved conditions within the allotment, particularly pasture 10, would be desirable to help meet the goal to "demonstrate positive trends in…habitat availability, habitat quality, and population distribution within the planning area." Implementing a three-pasture deferred rotation in combination with the juniper reduction may create the potential to improve grouse upland habitat, but the Authorized Use level could limit that improvement.

Adaptive Options – The adaptive action of manipulating Authorized Use downward would be the most efficient tool to enhance grouse nesting habitat. This improves the potential to increase residual cover. Development of water typically has the effect of moderating vegetative structure by increasing the relative evenness of livestock distribution. Therefore, increasing the water density would not improve herbaceous structure distribution. Implementing a five-pasture deferred system may allow some regrowth, particularly in the early pasture, but adjustments to the Authorized Use level would allow the tool to be more effective in enhancing grouse nesting habitat.

Effects of Alternative 3A

The effects of Alternative 3A are the same as Alternative 3, with the following stated exceptions.

INITIAL ACTIONS:

- Constructing a pipeline from pasture 8 to pasture 10 and adding one stock tank in Section 28, T143N, R101W.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 3A are the same as Alternative 3.

Range

Initial Actions – Constructing a pipeline from pasture 8 to pasture 10 and adding a stock tank would not have an effect on livestock distribution because the topography limits where stock tanks can be placed. There would be an initial cost in developing a livestock water and stock tank along with maintenance to keep the improvement functional.

Riparian

Initial Actions – Alternative 3A would have the same effects as Alternative 3, with the following exceptions: Developing rangeland water and the installation of a stock tank in pasture 10 would move livestock concentration away from the riparian stream corridor in this pasture and improve riparian conditions but would not benefit riparian conditions in pastures 8 and 9.

Woody Draws

Initial Actions – Woody draw objectives for the allotment are currently met and would not be affected by a water tank in pasture 10 because there were only small woody draw inclusions mixed among larger woodlands of Rocky Mountain juniper in this pasture.

Herbaceous Structure

Initial Actions – Development of water has the effect of moderating vegetative structure by increasing the relative evenness of livestock distribution within a unit. Therefore, increasing the water density would not appreciably improve herbaceous structure distribution in the allotment.

Seral Stages

Initial Actions – Adding a water tank in pasture 10 by extending a pipeline from pasture 8 would facilitate the deferred rotation proposed with pastures 8, 9, and 10 by providing a more reliable source of water. These actions would decrease a degree of use in pasture 8 that would assist

increased plant vigor and range conditions. However, the corridor of Mikes Creek in pasture 10 currently receives a high degree of use (Figure 135.2) and contradicts the need for an additional water source. High grazing and trampling disturbances would persist in this area because the proposed tank would likely be situated along or near the corridor because of topographic constraints and costs associated with placement in more distant secondary range. Placement of the tank in secondary range would decrease the mosaic of grazing pressure and seral stages. Seral conditions along the corridor would only slightly improve because livestock would continue to have access to a reservoir that is not proposed for reclamation. Soil disturbances associated with construction of the water pipeline and increased livestock disturbances around the new tank location would have the potential for increasing the extent of invasive grasses in the allotment

Sharp-tailed Grouse

Initial Actions – Development of water has the effect of moderating vegetative structure by increasing the relative evenness of livestock distribution within a unit. Therefore, depending on the location of the tank, there could be an effect to the some areas where grouse nesting habitat could be enhanced. The further east into pasture 10 the tank is located, the higher the likelihood for negative impacts to potential grouse habitat.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3, with the exception of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set at the level of Alternatives 2, 3, and 3A but adjusted for cow size.
- Implementing a five-pasture deferred rotation with one herd (eliminate yearling herd) in pastures 6, 7, 8, 9, and 10; improve or add boundary fence between pastures 9 and 10.
- In pastures 8 and 9, on Mikes Creek, constructing 64 and 40 acre riparian exclosures, respectively. No grazing of exclosures for first 5 years.

ADAPTIVE OPTIONS:

- Using artesian well in pasture 8 to supply water in pastures 8, 9, and 10 with pipeline system and tanks or drilling a new well with shorter pipeline system and tanks.
- Riparian exclosure: At end of year 5, conduct vegetation survey. If riparian vegetation has been established on 60 percent of stream banks and active stream cutting has ceased occurring, then initiate late or dormant season prescribed grazing. Prescribed grazing would be identified in AOI/AW.
- Once pasture 9 riparian exclosure has recovered, consider moving exclosure to another unprotected, adversely affected reach within the pasture.
- Mikes Creek:

- Pasture 10 – two exclosures 17 and 12 acres (Reaches 19 and 20).
- Pasture 9 – four exclosures 12, 19, 13, and 16 acres (Reaches 21, 22, 23, and 24)
- Pasture 8 – two exclosures 20 and 23 acres (Reaches 25 and 28).

Range

Initial Actions – Authorized Use for this allotment would be 1,559 federal AUMs. The initial estimated carrying capacity is 1,965 AUMsbut there are resource issues on the allotment that need to be addressed. Therefore, the initial action would be to authorize the same numbers as Alternatives 2, 3, and 3A, but as AUMs. The existing Authorized Use of 1,559 federal AMs converted to AUMs by adjusting for cow size is 1,793 federal AUMs. The effect of this authorization equates to a 13 percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment.

Implementing a five-pasture deferred rotation would allow for a longer recovery time for native graminoid species between grazing periods. The distribution of livestock would change in pastures 6 and 7 with the change of livestock class from yearlings to cow/calf pairs. If yearlings are chosen, distribution of livestock would change in pastures 8, 9, and 10. The boundary fence between pastures 9 and 10 is required because a five-pasture deferred rotation would not work without it since livestock would not be able to be isolated in one or the other pasture.

Constructing an exclosure in pasture 8 approximately 64 acres in size would remove approximately 33 to 35 federal AUMs from livestock grazing for 5 years. The pasture 9 exclosure would be approximately 40 acres and would remove approximately 18 to 20 federal AUMs from livestock grazing for 5 years. Authorized Use would be adjusted and the adjustment would be in the number of livestock because of the inventory permit. Once the riparian exclosures reach desired conditions, livestock grazing would be allowed with a prescribed grazing plan for late to dormant season grazing. Due to the size of these riparian exclosures, adjustments would be made in the allowable AUMs harvested within these pastures. The length of the exclosures would cause changes in the distribution of livestock within pastures 8 and 9 because the existing livestock crossing would no longer be available for livestock to move freely across Mikes Creek.

Adaptive Options – Using the artesian well in pasture 8 to supply water in pastures 8, 9, and 10 with a pipeline system and tanks, or drilling a new well with a shorter pipeline system and tanks, would not change livestock distribution within these pastures because of the topography and the limitations of areas where developments can be placed. The proposed action would add additional watering sources to each pasture.

Implementing eight riparian exclosures would remove forage that is currently available to livestock. Because forage is being removed, adjustments in Authorized Use would be made in the number of livestock. Distribution of livestock would change from the existing condition because livestock would not have free access to all existing livestock crossings along Mikes Creek. The fences associated with the exclosures would funnel livestock to unfenced areas.

Riparian

Initial Actions – The riparian exclosures proposed for pastures 8 and 9 would provide the best opportunity for riparian vegetation to reestablish itself in the least amount of time by excluding livestock from the riparian corridor in areas treated and eliminating the related effects such as trailing and trampling. The use of riparian pastures and exclosures has proven to be effective in the Little Missouri Badlands (e.g., note the riparian response within the exclosures along Ash Coulee) in reestablishing desired riparian vegetation and controlling sediment loads. The riparian conditions along Mikes Creek would not improve in pasture 10.

The combination of the initial actions would increase potential for recovery of the Nonfunctional stream reaches. The expected period to achieve desired conditions would be from 3 to 7 years for treated areas in pastures 8 and 9.

Adaptive Options – The riparian exclosures proposed for pastures 8, 9, and 10 would provide the best opportunity for riparian vegetation to reestablish itself in the least amount of time by excluding livestock from the riparian corridor in areas treated and the related effects such as trailing and trampling. Typically, areas recommended for exclosures have been chronically overgrazed or trampled by livestock trailing, and there is currently insufficient vegetation to protect banks and channels from erosion. The use of riparian pastures and exclosures has proven to be effective in the Little Missouri Badlands (e.g., note the riparian response within the exclosures along Ash Coulee) in reestablishing desired riparian vegetation and controlling sediment loads.

The combination of the adaptive options would increase potential for recovery of the Nonfunctional stream reaches. The expected period to achieve desired conditions would be from 2 to 5 years for Mikes Creek.

Woody Draws

Initial Actions – Reducing Authorized Use by 13 percent after adjustments for cow size would maintain or improve existing Healthy woody draw conditions by decreasing livestock browsing and trampling disturbances. However, the effect of the proposed reduction would be reduced by potential levels of use that would range from 10 percent greater to 27 percent less than reported use, not including additional winter use.

Combining the two livestock herds and implementing a five-pasture rotation would be unlikely to have a large effect on existing woody draw conditions. Although increased livestock density would have the potential for increasing browsing and trampling disturbances, the predominance of Rocky Mountain juniper communities result in low reliance of green ash woody draws for shade and shelter and would decrease the potential level of increased disturbances. Increased livestock density would have the greatest potential adverse effect on woody draws in pastures 6 and 7 that exhibited less association with stands of Rocky Mountain juniper. Various changes in the grazing rotation would result in different degrees of annual use within individual woody draws and provide some opportunities for recovery and regeneration. Improving the fenceline and natural barrier between pastures 9 and 10 would facilitate the deferred rotation.

Two small exclosures proposed along Mikes Creek in pastures 8 and 9 would primarily affect hydrologic function of the creek and are discussed in the Watershed Report (Project Record,

Specialist Reports and Notes). However, the removal or sharp decrease of livestock browsing and trampling disturbances would increase the potential development of woody draw patches and riparian communities within the exclosures.

Adaptive Options – Adding additional exclosures along Mikes Creek would facilitate the development of woody draw patches along the exclosure perimeters by removing or decreasing livestock browsing and trampling disturbances.

Herbaceous Structure

Initial Actions – Adjusting the Authorized Use level "downward" based on AUMs would allow for an improved herbaceous structure distribution because of the increased residual standing crop. Initiating a five-pasture deferred rotation system under an Authorized Use level based on AUMs could begin to move the allotment towards a an improved herbaceous structure distribution. The early pasture could have the best potential for High structure. However, this is contingent on mid-grass recovery within the allotment. Creating a small riparian pasture in pasture 8 and one in pasture 9 with no grazing for the first 5 years may promote marginal improvement in the overall herbaceous structure distribution, but the amount would be minor.

Adaptive Options – Adjusting the Authorized Use level downward would continue to improve the potential to improve the herbaceous structure distribution. Decreasing use would have a positive effect on standing crop. The potential riparian exclosures would have a minor effect on the herbaceous structure distribution. Deferred AUMs because of the exclosures will not be displaced to the larger pastures and will not increase the grazing burden in them. Rotating the riparian exclosure in pasture 9 once the exclosure recovers should have no net effect on the herbaceous structure distribution, as the change of distribution patterns should be minor and the minor amount of herbaceous structure from the previous exclosure would be transferred to the new exclosure.

Seral Stages

Initial Actions – Decreasing Authorized Use by 13 percent after adjustments for cow size would facilitate shifts towards late seral stages by decreasing the level of grazing disturbances. The effect of the proposed reduction would be reduced by potential levels of use that would range from 10 percent greater to 27 percent less than reported use, not including additional winter use. However, seral conditions and range health along Mikes Creek would have a slight to moderate potential to improve with the action of combining the two livestock herds and implementing a five-pasture deferred rotation as discussed under Alternative 3.

Construction of riparian exclosures along Mikes Creek in pastures 8 and 9 should have little effect on seral stages because the exclosures would constitute only 4 percent and 2 percent of the pastures and currently contribute little or no herbaceous production.

Adaptive Options – Constructing several additional riparian exclosures along Mikes Creek would not have a large effect on upland seral stages due to the small size of the exclosures and low herbaceous production. The exclosures would decrease or remove grazing disturbances in only small areas of adjacent upland presently dominated by blue grama because of heavy grazing disturbances.

Sharp-tailed Grouse

Initial Actions – Setting Authorized Use levels on an AUM would contribute to moving management in a direction that could begin to enhance grouse nesting habitat. Implementing a five-pasture deferred rotation with one herd could potentially contribute to enhancing grouse nesting habitat, particularly in pasture 10 when it is the early pasture. Creating a small riparian pasture in pasture 8 and one in pasture 9 with no grazing for the first 5 years may promote a marginal improvement in grouse nesting habitat, but the amount would be minor. On the other hand, the riparian pastures may create an ecological trap for grouse (Manzer and Hannon 2005).

Adaptive Options – The adaptive action of continuing to manipulate the Authorized Use downward would be the most efficient tool to enhance grouse nesting habitat. This increases the potential to increase residual cover. The riparian exclosures would have a minor effect on grouse nesting habitat. Deferred AUMs because of the exclosures would not be displaced to the larger pastures and would not increase the grazing burden in them. Rotating the riparian exclosure in pasture 9 once the exclosure recovers should have no net effect on grouse nesting habitat, as the change of distribution patterns should be minor and the minor amount of upland herbaceous structure from the previous exclosure would be transferred to the new exclosure.

ALLOTMENT 136/139

Table 136/139.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 136/139 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 3.65 – Rangelands With Diverse Natural-Appearing Landscapes	154	24	
Management Area 6.1 – Rangeland With Broad Resource Emphasis	487	76	
Total allotment acres	813	100	
NFS acres	641	79	
State land acres	0	0	
Private land acres	171	21	
Current permitted livestock grazing (AMs) on NFS lands			362
Initial estimated carrying capacity (AUMs) on NFS lands			285
Number of pastures containing NFS lands			4

Table 136/139.2 — Allotment 136/139: – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	There are no perennial or intermittent stream reaches in this allotment.	None
Woody draws	40 percent of sampled woody draws were Healthy, 40 percent are At Risk, and 20 percent are Unhealthy. At Risk and Unhealthy woody draws are affected by lack of regeneration and livestock trampling.	Increase the survival of seedlings/saplings.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Below Objectives High – Below Objectives 2004 Transects: 1.29; 1.49 2004 Stations percent: Low-55/Moderate-45/ High-0	Manage for additional Moderate and High structure on biologically capable habitats.
Seral stages	Of five sample sites, two were at mid seral stages, one was at an early stage, and two were at Invaded Grass States.	Maintain or increase the proportion of native grasses and decrease the extent of invasive grasses.
Sharp-tailed grouse	There is one lek within 1 mile of pasture 139-04.	Manage for increased High vegetative structure on biologically capable sites to enhance habitat.
Remarks	Approximately 1 acre of absinth wormwood (*Artemisia absinthium* L.), black henbane, burdock, and Canada thistle. Allotments 136 and 139 are one allotment; need to correct allotment numbering.	

Table 136/139.3 — Allotment 136/139 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 362 federal AMs. • Three-year average permitted use is 337 federal AMs.* • Permit type: Inventory (managed as turn-in). • Rotation: Modified four-pasture twice/thrice-over rotation. • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 362. • Use crested wheatgrass pastures (pasture 136-1 and pasture 139-1) as early season pastures. • Develop range water source and construct a rangeland pipeline in pasture 136-2 to replace lost water source located on adjacent private property. **Adaptive Options** • Fence high-value woody draws. • Adjust Authorized Use.	**Initial Actions** • Authorized federal AUMs: 285. • Use crested wheatgrass pastures (pasture 136-1 and pasture 139-1) as early season pastures. • Develop range water source and construct a rangeland pipeline in pasture 136-2 to replace lost water source located on adjacent private property. **Adaptive Options** • Fence high-value woody draws. • Adjust Authorized Use.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every 3 years. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 136/139 — Existing Condition

Range – This allotment is approximately 813 acres in total size and contains both private and NFS lands with 641 acres of NFS lands. Currently, this allotment is issued an inventory permit for 54 head for 8 months by the MGA. Although this allotment is permitted with an inventory permit, which typically means that livestock are somewhere on the allotment for a full 12 months, it is actually managed like a turn-in permit. The permittee brings in livestock to graze sometime in the summer months, but brings them home to a separate 'off permit' location to winter the livestock. Historically, this was two separate allotments, but in 1996 a permit was written for both allotments,

and since then they have been treated as one. In the future, these need to be treated as one allotment with one allotment number and one allotment file. This allotment has been subdivided into six pastures, and of these six pastures four contain NFS lands. These pastures range from 157 to 178 acres. Current AMs provided by NFS lands is 362. Water developments within this allotment include developed reservoirs and a spring. One of the four pastures currently has no developed water. In the past, this pasture relied on a water development on adjacent private land; however, in 2004 the private land was fenced out of this pasture. This allotment is located in the Rolling Prairie Geographic Area with the very western portion, pasture 2, beginning to transition into the Badlands. There is evidence of historical cultivation that influences the current vegetation. The vegetation in this allotment consists primarily of crested wheatgrass with some Kentucky bluegrass. In the draws, native species such as western wheatgrass, prairie Junegrass, and needle-and-thread tend to dominate. The 1988 Mikes Creek fire burned into pasture 4, and evidence of that was seen in the draw nearby the developed spring in this pasture.

The livestock are rotated through four pastures containing NFS lands as a modified twice-over/three times over. Some of the pastures are rotated through twice and others three times with 54 cow/calf pairs. The rotation is fairly stagnant in that the same pasture is grazed first from year to year. Livestock are turned out around the first week of May and are rotated approximately every 2 to 3 weeks.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there is approximately 1 acre of multiple state and county listed noxious weeds, as follows: absinth wormwood, black henbane, burdock, and Canada thistle.

Oil and gas development on NFS lands in this allotment has removed a total of approximately 0.0 acres from livestock access. A total of approximately 5.0 acres of oil and gas pads and access roads have been reclaimed and are or will be available for livestock access. Associated forage from these acres is approximately 0.0 and 2.0 AUMs, respectively.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – Of five woody draw samples, 40 percent were Healthy, 40 percent were At Risk, and 20 percent were Unhealthy. Two woody draws in pasture 136-1 were At Risk and Unhealthy, while one woody draw in pasture 136-2 was Healthy. There is currently no water source in pasture 136-2 other than possible delivery of water to a temporary tank, so decreased use of this pasture in recent years has likely assisted Healthy conditions of the sampled draw (Figure 136/139.1). No woody draws were present in pasture 139-1. The bottom or downstream half of a sampled woody draw in pasture 139-4 was Healthy, while the upstream half with greater livestock access was At Risk.

Figure 136/139.1 — Healthy woody draw in pasture 136.2 that has lacked a permanent water source in recent years.

Herbaceous Structure – In the 2004 data set, two random sampled VOR transects were measured as Low structure. The consolidated station averages from these two transects showed Low structure at 55 percent; Moderate structure stations at 45 percent; and no High structure stations were observed.

Neither of the two transects were resampled in 2005.

Seral Stages – Invasive grasses heavily affect most of the four pastures of this allotment, and large areas occur at Invaded Grass States. Of five sere plots and NDSU samples, two sites were at mid seral stages, one site was at an early seral stage, and two sites were at Invaded Grass States.

Pasture 136-1 primarily consisted of broken land dominated by crested wheatgrass. Grass production on an NDSU sample plot at the north end of the pasture on the edge of a small fragment of unbroken land was composed of 91 percent crested wheatgrass, 7.5 percent needle-and-thread, and 1 percent Kentucky bluegrass. The site was at an early seral stage. Crested wheatgrass was the only recorded grass species along a Robel transect in the south half of the pasture.

About 18 percent of pasture 136-2 consisted of broken land, but additional invasive grass cover occurs over a larger area associated with a reclaimed oil well site. Relative frequency of crested wheatgrass and bluegrass along a pace transect in this area increased from 3 percent to 58 percent between 1978 and 2009. A sere plot in unbroken land was at a mid seral stage, but invasive grasses constituted 30 percent of the relative grass basal cover.

All of pasture 139-1 was identified as broken land, but a pace transect measured at the north end of the pasture during 1978 was dominated by western wheatgrass with only 15 percent relative frequency of invasive grasses. Remeasurement during 2009 resulted in 85 percent relative frequency of invasive grasses, largely composed of Kentucky bluegrass. Most of the pasture is currently at an Invaded Grass State. A Robel transect in the central portion of the pasture recorded bluegrass and sedge as the dominant species. A sere plot at the south end of the pasture was at a mid seral stage for broken land but exhibited relative grass basal cover of 26 percent Kentucky bluegrass, 21 percent crested wheatgrass, and 18 percent needle-and-thread.

Only 10 percent of pasture 139-4 was identified as broken land, but most of the pasture is at an Invaded Grass State. Relative frequency of invasive grasses along a remeasured pace transect increased from zero to 63 percent between 1978 and 2009, with 92 percent of the increase involving bluegrass. Two NDSU sample plots on a Claypan ecological site at the north end of the pasture were at Invaded Grass States, with average grass production comprised of 51 percent Kentucky bluegrass, 31 percent crested wheatgrass, and 11 percent western wheatgrass.

Sharp-tailed Grouse – There is one lek within a 1-mile radius of the allotment – specifically pasture 139-4. There are approximately 153 acres of overlap within this 1- mile overlap that is primarily suitable habitat for sharp-tailed grouse.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed 2 years later.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would now be the responsibility of the Forest Service. There is potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – Woody draw conditions would have the potential to improve with the removal of livestock browsing and trampling disturbances that would facilitate increased tree and shrub regeneration and growth. Existing invasive grasses and potential increases of these species as a result of increasing litter with the removal of livestock grazing would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock, there would be an appreciable increased opportunity for the development of High and Moderate herbaceous structure, and a decrease in the amount of Low structure due to increased residual cover with the lack of grazing.

Seral Stages – The removal of livestock grazing would facilitate the accumulation of plant litter that would assist further invasive grass expansion and transitions to Invaded Grass States where they have not already occurred. Crested wheatgrass would remain persistent, particularly in pasture 136-1 and portions of 136-2, but bluegrass would gradually constitute greater portions of the total grass production. Remaining native plant diversity would decrease and would be most apparent in pasture 136-2, which contains the largest portion of the remaining native plant diversity.

Sharp-tailed Grouse – The increase in High herbaceous structure would benefit nesting and brooding habitat for sharp-tailed grouse and other ground-nesting birds. However, over time the

decrease in forb diversity would decrease foraging opportunities and nesting and brooding quality would decrease as well but still remain above current conditions.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by an inventory grazing association permit, and Authorized Use is 362 federal AMs. Although this allotment is permitted with an inventory permit, which typically means that livestock are somewhere on the allotment for a full 12 months, it is actually managed like a turn-in permit.
- Cow/calf pairs are run in a modified four pasture twice-over rotation grazing system.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weed control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – Current woody draw conditions with 60 percent less than Healthy sample sites are likely to persist or gradually decrease under current management. Typically reported use that exceeds initial estimated carrying capacity would maintain relatively high levels of browsing and trampling disturbance. Other factors contributing to high woody draw disturbance include the relative scarcity of draws, the close proximity of water sources, grazing periods during the hot summer months, and extended green periods within woody draws relative to unpalatable invasive grasses in the uplands during much of the grazing period. Potentially increased stocking to the level of Authorized Use would increase the degree of woody draw disturbances. The lack of a permanent water source in pasture 136-2 that results in deceased use would contribute to maintaining the Healthy conditions that were sampled in this pasture.

Herbaceous Structure – Current management would continue to perpetuate the herbaceous structure distribution with a limited potential to increase the proportion of High herbaceous structure or improve the overall herbaceous structure distribution. Retaining the current Authorized Use level, which is approximately 32 percent higher than the initial estimated carrying capacity, would continue to promote a lack residual cover.

Seral Stages – Continuation of current management would result in further transitions to Invaded Grass States and decreased maintenance of native species where this has not already occurred. Levels of typically reported use that exceed initial estimated carrying capacity by 7 to 34 percent and low palatability of the invasive grass component during large portions of the grazing season result in selective grazing of the remaining native component that facilitates the transitions. Potentially increased stocking to the level of Authorized Use would compound these effects.

Use of pasture 136-1 in mid-June and early July coincides with poor or decreasing palatability of crested wheatgrass. Selective grazing of native grasses results in minimal potential for development of these species and the pasture would largely remain as a stand of crested wheatgrass.

Mid to late summer and early fall use of pasture 136-2 with the greatest proportion of native grasses would allow full expression of these species prior to grazing. However, the increasing invasive grass component that is of low palatability during the grazing period would contribute to selective and potentially excessive use of the native component and facilitate the spread of invasive grasses. The lack of a water source in this pasture currently limits the degree of use and potential adverse effects of selective native grass utilization.

Grazing of crested wheatgrass in pasture 139-1 is appropriately timed during the May rotation, but low palatability of invasive grasses during the second rotation in August results in selective grazing of the native component and facilitates the spread of invasive grasses and transitions to Invaded Grass States.

Use of pasture 139-4 in mid-June and August results in selective grazing of the remaining native component and facilitates transitions to Invaded Grass States where it has not already occurred.

Sharp-tailed Grouse – Given current management, it does not appear that sharp-tailed grouse nesting and brooding habitat would be enhanced in the next 10 to 15 years because of the high current Authorized Use level, which limits the maintenance of residual cover.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 362 federal AMs.
- Using crested wheatgrass pastures (pasture 136-1 and pasture 139-1) as early season pastures.
- Developing range water source and construct a rangeland pipeline in pasture 136-2.

ADAPTIVE OPTIONS:

- Fencing high-value woody draws.
- Adjusting Authorized Use.

Range

Initial Actions – Because the initial Authorized Use will remain the same as current management, the permittee would be allowed to harvest the same amount of forage. By using two of the four pastures as early season pastures, deferment would occur on the two remaining pastures providing the opportunity for initial growth of native species before livestock grazing occurs. Livestock distribution would have minimal if any change due to the size of the pastures.

Developing a range water source and pipeline in pasture 136-2 to replace the lost water source located on adjacent private property would affect livestock distribution depending upon the placement of the stock tank. Before the adjacent private water source was fenced out from the NFS land, livestock distribution was probably focused more in the bottom lands of the pasture since the

water source was in the bottom on the east/central side of the NFS lands. If the stock tank is placed in the uplands a shift of livestock distribution would be expected, but may be minimal due to the small size of the pasture.

Adaptive Options – Fencing high-value woody draws would have little to no change in livestock distribution across the allotment. Forage within the exclosures would no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may occur on remaining forage. There will be a cost to install these fences and as a result there will be additional cost of maintenance of the fence to prevent livestock access to the woody draws.

Adjusting Authorized Use downward would result in fewer livestock numbers, fewer grazing days, or a combination of the two. Adjusting Authorized Use would not change the distribution of the livestock; however, the amount of forage harvested would be less than the existing forage harvested.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws

Initial Actions – Authorized Use would continue to exceed initial estimated carrying capacity by 46 percent after adjusting for cow size and would continue to limit the potential for the regeneration of desired woody species through high levels of browsing and trampling disturbances.

However, proposed early season use of pastures 136-1 and 139-1 as crested wheatgrass pastures would increase the potential for woody species regeneration in At Risk and Unhealthy woody draws in pasture 136-1. Cooler temperatures during the early once-over grazing period, and increased palatability of the invasive grass component would contribute to decreased browsing and trampling disturbances within woody draws. There were no woody draws in pasture 139-1.

Continued summer use of pasture 136-2 should facilitate persistence of the Healthy woody draw site in this pasture, but the proposed water development would contribute to increased use of the pasture with the potential for increased browsing and trampling disturbances and decreasing conditions. Increasing invasive grasses in this pasture that would be of low palatability during the grazing season also has the potential to contribute to increased browsing/trampling disturbances in the draw.

Grazing seasons in pasture 139-4 would remain similar to current management and conditions of one At Risk and one Healthy woody draw are likely to persist because topography was the primary influence of livestock accessibility and resulting conditions.

Adaptive Options – Fencing woody draws and/or reducing Authorized Use would increase the potential for increased growth and regeneration of woody species by removing or decreasing livestock browsing and trampling disturbances. However, existing and potentially increased invasive grass layers would have the potential to impede or decrease the rate of regeneration and degree of woody draw improvement. Fencing of one woody draw would have the potential to increase browsing and trampling disturbances and decrease conditions of other woody draws.

Herbaceous Structure

Initial Actions – The Authorized Use level, which is approximately 32 percent higher than initial

estimated carrying capacity, would not contribute to improving herbaceous structure within the allotment because of its impact on residual cover. In regards to the proposed crested wheatgrass pastures, Angell (1997) found that high stocking levels on crested wheatgrass negatively impacts tiller density and standing crop under a short-duration grazing system, so the potential advantage provided by a rest period in these pastures may be minimized by the Authorized Use level. Development of water has the effect of moderating vegetative structure by typically increasing the relative evenness of livestock distribution within the unit. The effects of replacement water in pasture 136-02 would depend on the new location relative to the previous one adjacent to the southeastern portion of the pasture. If the water is located near the old location, then effects would not be appreciably different than existing conditions. However, it is a small pasture and the effects of placing the tank anywhere in pasture 136-2 may not appreciably alter the herbaceous structure distribution within the pasture, especially given the initial Authorized Use level.

Adaptive Options – Adjusting the Authorized Use level would improve the herbaceous structure distribution. Decreasing use would have a positive effect on residual cover. Under this alternative and given the difference between the proposed Authorized Use and initial estimated carrying capacity, the time required to get to initial estimated carrying capacity could take longer than the 10- to 15-year planning time frame. Fencing high-value woody draws could have an impact relative to the size and location of the fenced woody but it is not expected to be appreciable because of the small amount of woody draws projected to be fenced.

Seral Stages

Initial Actions – Authorized Use that exceeds initial estimated carrying capacity by 46 percent and reported use by 9 to 36 percent would continue to assist the spread of invasive grasses and impede the development of desired seral stage proportions and the maintenance of native plant diversity.

Proposed early season use of pastures 136-1 and 139-1 is appropriate for the high invasive component in these pastures and would assist increased vigor and development of the small proportion of the native component without a second rotation through these pastures. Potentially increased stocking to the level of Authorized Use would increase the potential for premature use of the native component, but periods for recovery and regrowth would increase compared to current management.

Proposed later season use of pasture 136-2 would facilitate maintenance of the native grass component. However, levels of Authorized Use and reported use, along with an increasing invasive grass component that would be of low palatability during the grazing season, would contribute to high utilization of the native component and assist the further spread of invasive grasses. Adding a water tank to the 160-acre pasture would contribute to increased use of the pasture and high grazing and trampling disturbances around the tank, with decreasing seral stages and an increased potential for invasive grass spreading.

Mid or late season use of pasture 139-4 would occur during low palatability of the invasive grass component that has sharply increased and now constitutes as much as 82 percent of the grass production. Selective grazing of the native component would facilitate or compound transitions to Invaded Grass States and the loss of native species where this has not already occurred.

Adaptive Options – Fencing of woody draws could contribute to slightly increased grazing and trampling disturbances in the uplands because of the relatively small pasture sizes, particularly if there are no other draws for livestock to utilize. However, this would be unlikely to significantly affect existing plant composition and trends.

Decreasing Authorized Use would potentially facilitate the maintenance and development of native plant diversity. However, neither decreases nor increases in Authorized Use would alter the trend of increasing invasive grasses without coordinating the grazing period with the respective palatability and production of the invasive and native grass components.

Sharp-tailed Grouse

Initial Actions – Retaining the Authorized Use level drives the herbaceous structure distribution and would continue to promote the existing grouse habitat conditions. In regards to the proposed crested wheatgrass pastures, Angell (1997) found that high stocking levels on crested wheatgrass negatively impacts tiller density and standing crop under a short duration grazing system so the potential advantage provided by a rest period in these pastures may be minimized by the Authorized Use level. The proposed water development in pasture 136-02 would replace the lost water source. The effects of this water may depend on the location of the new source. The further from the lost source of water and the more central the location, the higher the potential there may be to homogenize the herbaceous structure distribution. However, this is a small pasture and the effects may not be appreciable. The pasture does not fall within the 1-mile radius of a known lek.

Adaptive Options – Adjusting Authorized Use would have the best potential to enhance grouse nesting and brooding habitat. Under this alternative, considering the difference between Authorized Use and initial estimated carrying capacity, the time required to get to initial estimated carrying capacity could take longer than the 10- to 15-year planning time frame. It is not expected that fencing high-value woody draws would have an appreciable effect on grouse nesting habitat because of the minimal amount of woody draw habitat projected to be fenced. There may be some increased grazing intensity in the adjacent area that would affect herbaceous structure.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3; therefore, Alternative 3A would have the same effects as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 4 are the same as Alternative 3.

Range

Initial Actions – Authorized Use for this allotment would be 285 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 362 federal AMs converted to AUMs is 416 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 32 percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws

Initial Actions – Decreasing Authorized Use by 32 percent according to initial estimated carrying capacity and adjustments for cow size would establish potential levels of use 7 to 25 percent less than currently reported use. There would be an increased potential for woody species regeneration and improved woody draw conditions by decreasing the level of livestock browsing and trampling disturbances. Existing and potentially increasing invasive grass layers within woody draws would have the potential for impeding the rate of increased regeneration and improved conditions.

Herbaceous Structure

Initial Actions – The adjustment in Authorized Use level to initial estimated carrying capacity should contribute to improving the herbaceous structure distribution within the allotment. Indications are that a moderate stocking level on crested wheatgrass maintains tiller density and standing crop (Angell 1997). This should be an improvement over existing management, however. Regrowth time on the crested wheatgrass pastures may contribute to diversifying the herbaceous structure distribution within the allotment.

Seral Stages

Initial Actions – Decreasing Authorized Use by 32 percent, 7 to 25 percent less than currently reported use, would facilitate increased vigor of native grasses by decreasing the level of livestock grazing disturbances. However, low palatability of invasive grasses in pastures 136-2 and 139-4 would continue to result in selective grazing and high utilization of the native component that would impede increased vigor and development. The degree of this effect would be sufficient to continue trends of increasing invasive grasses and Invaded Grass States in pasture 136-2. The effect would be an inescapable conclusion in pasture 139-4, where invasive grasses have sharply increased and constitute as much as 82 percent of the total grass production.

Sharp-tailed Grouse

Initial Actions – The adjustment in Authorized Use level to the initial estimated carrying capacity should contribute to enhancing grouse habitat within the allotment. Indications are that a moderate stocking level maintains tiller density and standing crop in crested wheatgrass (Angell 1997). Regrowth time on the crested wheatgrass pastures may contribute to enhancing grouse nesting

habitat in combination with the Authorized Use adjustment. However, some negative impacts may occur due to the presence of livestock in the pasture (Svedarsky et al. 2003).

ALLOTMENT 140

Table 140.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 140 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 3.65 – Rangelands With Diverse Natural-Appearing Landscapes	51	11	
Management Area 6.1 – Rangeland With Broad Resource Emphasis	423	89	
Total allotment acres	1096	100	
NFS acres	474	43	
State land acres	0	0	
Private land acres	622	57	
Current permitted livestock grazing (AMs) on NFS lands			281
Initial estimated carrying capacity (AUMs) on NFS lands			237
Number of pastures containing NFS lands			3

Table 140.2 — Allotment 140 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	A small portion of Blacktail Creek flows through pasture 1. The 2006 survey rated this portion at PFC.	Maintain PFC.
Woody draws	100 percent of the woody draws sampled were At Risk due to lack of regeneration, cattle use, and grass understory. Woody draws are in pasture 1.	Increase successful recruitment of woody species.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Meeting Objectives High – Below Objectives 2004 Transects: 2.39; 1.46 2004 Stations percent: Low-37.5/Moderate-62.5/High-0 2005 Transects: 1.31; 1.08 2005 Stations percent: Low-80/Moderate-20/High-0.	Manage for additional High structure on biologically capable habitats.
Seral stages	Broken land comprises 38, 65, and 100 percent of the three pastures. Three sample plots in broken land were at mid seral stages and there are apparent trends of increasing invasive grasses in two pastures.	Maintain or increase the development of native plants and decrease or limit the spread of invasive grasses.
Sharp-tailed grouse	Pasture 1 contains a known lek. Pasture 1 contributes to the larger lek key area.	Manage for increased High vegetative structure on biologically capable sites to enhance habitat.
Remarks	Burdock in the northwest corner of pasture 1.	

Table 140.3 — Allotment 140 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 281 federal AMs. • Three-year average permitted use is 373 summer federal AMs.* • Permit type: Inventory (12 months). • Rotation: Modified deferred rotation (two different permittees allocated AMs). • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 281. • Annually change season of use between A1lotment 140 pasture 4 and Allotment 230 pasture 2. • Annually change season of use between pastures 1 and 5. **Adaptive Options** • Fence high-value woody draws. • Initiate a three pasture deferred rotation between pastures 1, 4, and 5. • Use a rangeland drill to interseed pasture 4 with native grass species. • Adjust Authorized Use.	**Initial Actions** • Authorized federal AUMs: 237. • Annually change season of use between Allotment 140 pasture 4 and Allotment 230 pasture 2. • Annually change season of use between pastures 1 and 5. **Adaptive Options** • Fence high-value woody draws. • Initiate a three-pasture deferred rotation between pastures 1, 4, and 5. • Use a rangeland drill to interseed pasture 4 with native grass species. Adjust Authorized Use.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every 3 years. • Complete Properly Functioning Condition survey once every 5 years. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 140 — Existing Condition

Range – This allotment is approximately 1,096 acres in total size and contains private and NFS lands, with 474 acres of NFS lands. Currently, this allotment is issued an inventory permit for 42 head for 8 months by the MGA. It is also the headquarters allotment associated with two common allotments (Blacktail and Ash Coulee Commons). There are two individuals permitted in this headquarters allotment but it is not managed as a common; they graze their livestock in separate pastures. This allotment has been subdivided into six pastures and of these six pastures three contain NFS lands. The pastures containing NFS lands range in size from 149 to 320 acres. This allotment is primarily located in the Rolling Prairie geographic area, with the central portion of pasture 1 transitioning into the Badlands.

In review of the AWs, pastures 1 and 5 are typically grazed at the same time every year. Pasture 1 is normally stocked with 42 cow/calf pairs from May 1st to July 18th, and then the livestock are rotated to pasture 5 and graze until September 22nd. Pasture 4 is used by the second permittee typically in the months of November and December. The number of livestock stocked in this pasture has varied from 28 to 50 cow/calf pairs. Current AMs provided by NFS lands can be found in Table 140.1. Water developments within this allotment include developed reservoirs. Pasture 4 has no developed water and relies on a well and stock tank on adjacent private land.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there were no known state listed noxious weeds or county listed weeds within this allotment. However, during field trips and woody draw surveys, burdock was discovered within the northwest corner of pasture 1.

Oil and gas development on NFS lands in this allotment has removed a total of approximately 3.7 acres from livestock access. A total of approximately 5 acres of oil and gas pads and access roads have been reclaimed and are or will be available for livestock access. Associated forage from these acres is approximately 1.8 and 2.5 AUMs, respectively.

Riparian –

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
140-01	Blacktail Creek (2)	0.07					0.07

A 1/10-mile segment of Blacktail Creek (reach 2) was evaluated in pasture 1 of Allotment 140. The interdisciplinary team found this reach in good condition and gave it a functionality rating of PFC.

Woody Draws – Three sampled woody draws in pasture 1 were At Risk (Figure 140.1) and contained high amounts of noxious weeds. A small reservoir below one of the sample sites contributed to high browsing and trampling disturbances. No woody draws were present in pastures 4 or 5.

Figure 140.1, a and b — At Risk woody draws in the northwest and southeast corners of pasture 1 that exhibit minimal tree regeneration and lack of tall shrub layers.

Herbaceous Structure – In 2004, there were two sampled VOR transects. One transect was measured in the Moderate class and the second one was Low. The consolidated station averages for the two transects were 37.5 percent Low; 62.5 percent in Moderate; and none in High.

Both transects were resampled in 2005 and both were measured as Low structure. The station data reflected the Low transect average, with 80 percent of the stations in Low structure and 20 percent in Moderate structure. No High structure stations were measured. It is interesting to note that both transects and station averages decreased appreciably in 2005 from 2004, when drought adjustments from 2004 were in effect for the MGA.

Seral Stages – About 38 percent of NFS land in pasture 1 is identified as broken land but invasive grass dominated areas constituted almost 50 percent of the pasture acreage. Current field observations compared to vegetation maps from 1983 (2210 files) suggest that the area of crested wheatgrass has been expanding along with increased occurrences of bluegrass in the northwest quarter of the pasture. A belt transect within broken land recorded crested wheatgrass as the overwhelmingly dominant species, while a Robel transect on the edge of the expanded invasive grass dominated area recorded western wheatgrass, crested wheatgrass and traces of Kentucky bluegrass.

Figure 140.2 — Central area of pasture 4 with needle-and-thread seed heads visible as light colored vegetation in the background among green crested wheatgrass.

All of pasture 4 consisted of broken land. Crested wheatgrass and needle-and-thread each constituted about 40 percent of the average grass production on two NDSU sample plots on Loamy ecological sites at the north end of the pasture. Kentucky bluegrass frequency averaged 14 percent on one of

the sites but was absent from the second site. Clubmoss cover was high and total herbaceous production was about half of the potential production for a Loamy ecological site. A Robel transect at the south end of the pasture and field observations support similar occurrences of needle-and-thread patches throughout most of the pasture (Figure 140.2), with lesser amounts of bluegrass along the bottom of broad open swales. Vegetation maps from 1983 depict the pasture as crested wheatgrass without note of needle-and-thread, suggesting recent establishment or increases of this species.

About 65 percent of pasture 5 is identified as broken land. Field observations indicate inaccuracies in portions of the identified broken land where high quality native plant communities were observed on the north aspect of a ridgeline that extended across the pasture. However, the toeslope of the ridge and broad gentle slopes along a headwater drainage of Blacktail Creek were composed of bluegrass and other invasive dominated patches intermingled with native patches. Crested wheatgrass was prominent on the north side of the drainage. An oil well and access road contributed to crested wheatgrass and other invasive grasses in the southern portion of the pasture where a sere plot was at a mid seral stage. Vegetation maps from 1983 indicate native grass communities throughout the pasture, suggesting recent establishment and/or increases of bluegrass and crested wheatgrass.

Sharp-tailed Grouse – There is one lek that occurs in this allotment. Because of the scattered nature of the pastures, only one of the pastures (140-01) falls within the key area associated within the 1-mile radius of the lek.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed 2 years later.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would now be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian condition along Blacktail Creek as described in the existing condition would continue and evolve toward the potential riparian community.

Woody Draws – Woody draw conditions in pasture 1 would have the potential to improve with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. Existing invasive grasses and potential increases of these species as a result of increasing litter with the removal of livestock grazing would have the potential for slowing or decreasing the potential degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock, there would be an appreciable increased opportunity for the development of High and Moderate herbaceous structure, and a decrease in the amount of Low herbaceous structure.

Seral Stages – The removal of livestock grazing would facilitate the accumulation of plant litter that would assist further invasive grass expansion and transitions to Invaded Grass States. Crested wheatgrass would remain persistent but bluegrass would gradually constitute greater portions of the total grass production. Remaining native plant diversity would decrease. Transitions to Invaded Grass States would occur relatively rapidly in portions of pasture 1 and pasture 5 because of the current extent of invasive grasses in these pastures, but would occur at a slower rate in pasture 4 where invasive grass patches were smaller and localized.

Sharp-tailed Grouse – The increase in High structure grasslands from removal of livestock disturbance would benefit nesting and brooding habitat for sharp-tailed grouse. However, over time the decrease in forb diversity would decrease foraging opportunities. To a lesser extent, nesting and brooding quality would also decrease because of lower quality habitat associated with invasive grasses that may invade local habitats. Over time, invasive grasses could appreciably reduce the habitat quality.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by an inventory grazing association permit, and Authorized Use is 281 federal AMs.
- Cow/calf pairs are run by two different individuals in separate pastures; one in a two-pasture modified deferred rotation, the other typically late season in one pasture.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment and would contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian condition along Blacktail Creek as described in the existing condition would continue.

Woody Draws – At Risk woody draw conditions in pasture 1would persist or decrease towards Unhealthy conditions under current management. Authorized Use and the range of reported use that exceed initial estimated carrying capacity by as much as 36 percent would contribute to high levels of browsing and trampling disturbances that impede the regeneration of desired trees and shrubs. Grazing periods in pasture 1 that extend into mid July with increasing temperatures and insect pests would also contribute to woody draw disturbances, as would decreased palatability of the invasive grass component that constitutes as much as 50 percent of the upland forage.

Herbaceous Structure – Current management would continue to perpetuate the existing herbaceous structure distribution. Retaining the current Authorized Use level, which is approximately 27 percent higher than the initial estimated carrying capacity after accounting for cow size, would continue to promote a lack of residual cover.

Seral Stages – Grazing schedules in pasture 1 present the potential for livestock to utilize invasive grasses in the north and east portions of the pasture early in the season and gradually shift to native grasses in June and July. The sole water source is located at the south end of the pasture where native grasses dominate and creates the potential for livestock to congregate in this area and prematurely graze native grasses, but relatively good condition native communities were observed in western and southern portions of the pasture and would likely be maintained.

Rotating to pasture 5 during late July through September likely results in minimal use of the invasive component because palatability is low at this time of year. Excessive use of the native component would be compounded by high stocking levels associated with the level of Authorized and reported use compared to initial estimated carrying capacity, with potential decreases in plant vigor assisting the spread of invasive grasses and transitions to Invaded Grass States.

Use of broken land comprising pasture 4 during October through December allows plants to complete their entire growth cycle before grazing disturbances occur. As evidenced by prominent amounts of needle-and-thread, the late fall grazing season appears to facilitate the establishment or maintenance of this native grass and does not appear to be particularly assisting the establishment of other invasive grasses within the stand of crested wheatgrass.

Sharp-tailed Grouse – Given current management, sharp-tailed grouse nesting and brooding habitat would not be enhanced in the next 10 to 15 years because of the Authorized Use level, which limits the amount of residual cover.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 281 federal AMs.
- Annually changing season of use between A1lotment 140 pasture 4 and Allotment 230 pasture 2.
- Annually changing season of use between pastures 1 and 5.

ADAPTIVE OPTIONS:

- Fencing high-value woody draws.
- Initiating a three-pasture deferred rotation between pastures 1, 4, and 5.
- Using a rangeland drill to interseed pasture 4 with native grass species.
- Adjusting Authorized Use.

Range

Initial Actions – Because the initial Authorized Use will remain the same as current management, the permittees would be allowed to harvest the same amount of forage. However, the use of these

federal AMs would be different than the existing condition because forage would be harvested at different times of the grazing season compared to the current stagnant rotation.

Annually changing the season of use between Allotment 140 pasture 4 and Allotment 230 pasture 2 would allow the permittee to change the season of use between the two pastures on different grazing association permits using one herd instead of utilizing the pastures at the same time of year every year with two different herds of livestock. Distribution of livestock would not change because of the small size of each pasture.

Annually changing the season of use between pastures 1 and 5 would have minimal effects on the distribution of the livestock grazing because of the small size of the pastures. Changing the season of use within these pastures would allow livestock to utilize more of the crested wheatgrass earlier thereby providing adequate periods for recovery before being grazed the following season. Because of the existing intermingled introduced herbaceous species and native herbaceous species, range readiness would not be achieved for the native herbaceous species in years grazed early to utilize the introduced species.

Adaptive Options – Fencing high-value woody draws would have little to no change in livestock distribution across the allotment. Forage within the exclosures would no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may occur on remaining forage. There will be a cost to install these fences and as a result there will be additional cost of maintenance of the fence to prevent livestock access to the woody draws.

Initiating a three-pasture deferred rotation among pastures 1, 4, and 5 would not change the distribution of livestock because of the size of the pastures. However, the two individual permittees would now be required to run together, so there would be more livestock numbers in the three pastures compared to current management. More intensive management would be required of the two permittees and the Forest Service. The three-pasture deferred rotation would change the season of use annually. Implementing a three-pasture deferred rotation would also allow for a recovery period of herbaceous species before being grazed the following grazing season.

Using a rangeland drill to interseed pasture 4 with native grass species would require a certain amount of rest until the native grass species have established themselves within the pasture. This would affect the number of livestock authorized on the allotment because of the inventory permit issued by the MGA.

Adjusting Authorized Use downward would result in fewer livestock numbers because of the inventory permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock; however, the amount of forage harvested would be less than the existing forage harvested.

Riparian

Initial Actions – It is expected that desired conditions along Blacktail Creek would continue with the initial actions proposed.

Annually changing the season of use between Allotment 140 pasture 4 and Allotment 230 pasture 2 would have no effect on riparian condition along Blacktail Creek because the creek is located in a different pasture.

Annually changing the season of use between pastures 1 and 5 would have no effect on desired riparian condition along Blacktail Creek because livestock use on the creek would not increase.

Adaptive Options – It is expected that desired conditions along Blacktail Creek would continue with the adaptive options proposed.

Fencing high-value woody draws should have no effect on riparian condition along Blacktail Creek because there would be no expected change in livestock distribution and the distance of separation.

Initiating a three-pasture deferred rotation among pastures 1, 4, and 5 would not change the distribution of livestock because of the size of the pastures and would have no effect on desired riparian condition along Blacktail Creek. The rotation would not result in any additional livestock use and occupation on the riparian corridor.

Using a rangeland drill to interseed pasture 4 with native grass species would have no effect on riparian condition along Blacktail Creek because the creek is located in a different pasture.

Reducing Authorized Use should help improve the uplands vegetation which in turn reduces overland flow which would further benefit the riparian conditions along Blacktail Creek. A reduction in overland flow delivered to the creek would result in reduced stream velocities allowing for the establishment of riparian vegetation which would build stream banks.

Woody Draws

Initial Actions – Implementing a deferred rotation between pastures 1 and 5 would be unlikely to improve woody draw conditions in pasture 1 because use of the draws would not be appreciably different from current use during May through July. The deferred rotation would maintain or increase the period of mid and late summer grazing seasons when browsing and trampling disturbances increase from livestock seeking shade, escape from insect pests, and extended green periods relative to low palatability of invasive grasses in the uplands. Authorized Use and reported use that exceeds initial estimated carrying capacity by as much as 36 percent would continue to contribute to high browsing and trampling disturbances.

Adaptive Options – Initiating a three-pasture deferred rotation may assist slight improvement of woody draw conditions if an October through December grazing period is retained, but the benefits are unlikely to shift At Risk conditions to Healthy conditions. Cooler temperatures during fall/early winter rotations should result in decreased use of woody draws one of every 3 years, but trampling disturbances may remain high in some draws because of livestock seeking thermal shelter. Uresk and Lowrey (1984) found livestock browsing of woody species to increase during the fall months, and this would impede woody species regeneration. Current woody draw disturbances would be maintained or increase 2 of every 3 years and counter any potential benefits of late fall grazing during the third year.

Fencing woody draws and/or reducing Authorized Use would facilitate increased growth and regeneration of desired woody species by removing or decreasing livestock browsing and trampling

disturbances. However, existing and potentially increased invasive grasses with the removal or reduction of livestock grazing would have the potential to decrease the rate or degree of woody species regeneration. Fencing of individual woody draws would have the potential to increase browsing and trampling disturbances and decrease conditions of other woody draws.

Herbaceous Structure

Initial Actions – The current and proposed Authorized Use level would not contribute to improving herbaceous structure within the allotment by limiting the potential retention of residual cover. The potential for regrowth in early grazed pastures is minor, even when grazed early, due to the high Authorized Use level. High stocking levels on crested wheatgrass could negatively impact tiller density and standing crop (Angell 1997). In light of the high Authorized Use level, the proposed rotations would not help in improving the herbaceous structure distribution in the allotment because of the small pastures (even distribution) and the mix of native and introduced species (poor timing relative to forage species).

Adaptive Options – Adjusting the Authorized Use level would improve the herbaceous structure distribution. Decreasing use has the effect of increasing residual cover. Fencing high-value woody draws could have an impact relative to the size and location of the fenced woody. Initiating a three-pasture deferred rotation would need to balance the species mix with the timing and stocking rate, but regardless, herbaceous structure would not respond positively because of the proposed Authorized Use. Interseeding with native species could have the potential of improving herbaceous structure diversity but would require other management changes to be successful such as adjustments to the Authorized Use levels and timing of use.

Seral Stages

Initial Actions – Proposed pasture rotations are unlikely to increase the maintenance of native plant diversity or contribute to seral stage objectives because stocking levels and the season of grazing would not be consistently coordinated with the respective palatability and production of the native and invasive grass components.

Implementing a deferred rotation between Allotment 140 pasture 4 and Allotment 230 pasture 2 would result in selective use of native grass components in both pastures, which consist entirely of broken land. The deferred rotation in Allotment 140 pasture 4 would increase selective grazing of needle-and-thread and lesser amounts of other native grasses because palatability of crested wheatgrass that dominates the pasture would be low during the grazing season every other year. Pasture observations compared to previous vegetation maps suggest that the present grazing season of October through December with an occasional rotation during May is facilitating the establishment of needle-and-thread. Changing the degree of needle-and-thread utilization with increased summer rotations would have a high potential to impede its further establishment. Currently reported and Authorized levels of use would compound the effect of native grass selection while potentially facilitating the spread of invasive grasses.

Switching from a nondeferred to a deferred rotation between pastures 1 and 5 would also result in selective grazing of the native component within each pasture every other year, but the effects would not be appreciably different from current management. The proposed rotation would increase

the degree of selective native grazing in pasture 1 every other year when the pasture is grazed in mid/late summer compared to the current grazing season during May to mid-July that creates the potential for annual use of both the invasive and native components. Utilization of the invasive grass component would increase every other year in pasture 5 compared to current management, but would not be sufficient to alter a strong trend of increasing invasive grasses in large portions of the pasture.

Adaptive Options – Switching to a three-pasture deferred rotation among pastures 1, 4, and 5 would have a greater potential to maintain the native component. Assuming the entire grazing season extends into December, selective use of the native component would be most prominent in each pasture one of every three years during the mid/late summer months and might be sufficient for its continued maintenance or development. Early grazing seasons that coincide or overlap periods of invasive grass palatability, and late fall or dormant season grazing with the potential for equal native and invasive grass utilization, would occur in each pasture 2 of every 3 years. Some potential would therefore occur for decreased use and increased development of the native component. Increased utilization of the invasive grass component would be most pronounced in pasture 5 where invasive grass palatability is currently low during every grazing year. Increased utilization of the invasive component would contribute to decreased litter accumulation in all three pastures that can assist the spread of invasive grasses.

Interseeding native grasses in pasture 4 could increase the rate of native grass establishment and seral development, and could particularly facilitate the three-pasture deferred rotation by equalizing the proportion of native and invasive components in the pasture compared to current conditions. However, this action would likely require decreasing the vigor and cover of crested wheatgrass and clubmoss to assist seedling establishment.

Adjusting Authorized Use could improve or maintain plant composition if it is coordinated with the production and palatability of the invasive and native grass components during the season of use. Neither decreases nor increases in Authorized Use would be effective in altering trends of increasing invasive grasses without coordinating stocking levels and seasons of use with the native and invasive forage components.

Sharp-tailed Grouse

Initial Actions – The current and proposed Authorized Use level, which is approximately 27 percent higher than the initial estimated carrying capacity, would not contribute to enhancing the retention of residual cover. The potential for regrowth in early grazed pastures is minor, even when grazed early, because of the Authorized Use level. High stocking levels on crested wheatgrass could negatively impact tiller density and standing crop (Angell 1997). In light of the high Authorized Use level, the proposed rotations would not help in enhancing the grouse nesting cover in the allotment because of the small pastures (even distribution) and the mix of native and introduced species (poor timing relative to forage species).

Adaptive Options – Adjusting the Authorized Use level could enhance the potential for grouse nesting cover. Decreasing livestock use has the effect of increasing residual cover. Fencing high-value woody draws could have an impact relative to the size and location of the fenced woody.

However, it is expected that the effects will be minimal due to the small amount projected to be fenced. In initiating a three-pasture deferred rotation, grouse nesting habitat would not be enhanced due to the proposed Authorized Use level. Interseeding with native species could have the potential of enhancing grouse nesting habitat but would require other management changes to be successful such as adjustments to the Authorized Use levels and timing of use.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3; therefore, Alternative 3A would have the same effects as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 4 are the same as Alternative 3.

Range
Initial Actions – Authorized Use for this allotment would be 237 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 281 federal AMs converted to AUMs by adjusting for cow size is 323 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 27 percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment.

Riparian
Initial Actions – The effects would be the same as described previously in Alternative 3.

Woody Draws
Initial Actions – Reducing Authorized Use by 27 percent would establish potential levels of use 0 to 28 percent less than currently reported use, and would facilitate some improvement of woody draw conditions in pasture 1 by decreasing the level of browsing and trampling disturbances. However, the deferred rotation that is proposed with pasture 5 would increase the frequency or extent of warm season grazing compared to current rotations, thereby increasing the level of disturbance and impeding increased conditions.

Herbaceous Structure
Initial Actions – The downward adjustment in the Authorized Use level would contribute to

improving herbaceous structure within the allotment by potentially promoting retention of residual cover.

Seral Stages

Initial Actions – Decreasing the level of Authorized Use by 27 percent would establish potential levels of use 0 to 28 percent less than currently reported use, but would not have a large effect on plant composition with regard to the deferred rotations discussed under Alternative 3. Potential benefits of deceased grazing disturbance would be largely negated by increasing trends of invasive bluegrass, particularly in pasture 5 but also in portions of pasture 1. Decreasing or otherwise adjusting Authorized Use to improve plant composition is unlikely to be successful without coordinating the grazing season with the respective production and palatability of the invasive and native grass components, and in relation to desired shifts in plant composition.

Sharp-tailed Grouse

Initial Actions – The initial proposed action of reducing the Authorized Use to the initial estimated carrying capacity could enhance potential grouse nesting and brooding habitat by allowing for increased levels of residual cover.

ALLOTMENT 141

Table 141.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 141 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 6.1 – Rangeland With Broad Resource Emphasis	311	100	
Total allotment acres	435	100	
NFS acres	311	71	
State land acres	0	0	
Private land acres	124	29	
Current permitted livestock grazing (AMs) on NFS lands			177
Initial estimated carrying capacity (AUMs) on NFS lands			113
Number of pastures containing NFS lands			2

Table 141.2 — Allotment 141 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	Green River – 2006 PFC survey rated the Green River as PFC.	Maintain PFC
Woody draws	There are no woody draws in the allotment.	None
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Below Objectives High – Below Objectives 2004 Transects: 1.2 2004 Stations percent: Low-80/Moderate-20/ High-0.	Manage for additional Moderate and High structure on biologically capable habitats.
Seral stages	About 80 percent of the two NFS pastures are composed of broken land with a mixture of invasive and native grasses and increasing trends of bluegrass.	Maintain or increase the development of native grasses and decrease or limit the spread of invasive bluegrass.
Sharp-tailed grouse	There are no known leks within this allotment. There are no known leks within 1 mile of this allotment.	Manage allotment to increase the amount of High structure.
Remarks	No known noxious weeds on NFS lands.	

Table 141.3 — Allotment 141 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 177 federal AMs. • Three-year average permitted use is 155 summer federal AMs.* • Permit type: Inventory (managed as turn-in). • Rotation: Three-pasture deferred rotation. • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 177. • Continue to annually rotate season of use between pastures 1 and 3. **Adaptive Options** • Adjust Authorized Use.	**Initial Actions** • Authorized federal AUMs: 113. • Continue to annually rotate season of use between pastures 1 and 3. • Start deferred rotation May 1st in 1 of 4 years. **Adaptive Options** • Assess species composition to determine effectiveness of periodic early grazing period. • Adjust Authorized Use.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Gather Visual Obstruction Readings once every 3 years. • Complete Properly Functioning Condition survey once every 5 years. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3 .

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 141 — Existing Condition

Range – This allotment is approximately 435 acres in total size and contains private and NFS lands with 311 acres of NFS lands. Currently, this allotment is issued an inventory permit for 22 head for 8 months and 45 head for 1 month by the MGA. It is also the headquarters allotment associated with a common allotment (Ash Coulee Common). It should be noted that although this allotment is permitted with an inventory permit, which typically means that livestock are somewhere on the allotment for a full 12 months, it is actually managed like a turn-in permit. The permittee brings in livestock to graze sometime in the summer months, but brings them home to a separate 'off permit' location to winter the livestock. This allotment is located in the Rolling Prairie geographic area.

This allotment has been subdivided into three pastures and of these three pastures two contain NFS lands. These pastures range from 144 to 166 acres. Current AMs provided by NFS lands can be found in Table 141.1. Water developments within this allotment include a reservoir with a water lot

to water both pastures 1 and 3. The current rotation on this allotment is a three-pasture deferred rotation with increased livestock numbers for a shortened season. The number of grazing days on NFS lands varies by season, but typically the turn out date is around the third week of May to the first week of June. The vegetation in this allotment is a mixture of Kentucky bluegrass, western wheatgrass, blue grama, and prairie Junegrass with scattered patches of crested wheatgrass and smooth brome. The whole allotment lies within the Rolling Prairie geographic area, and livestock distribution is spread throughout.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there were no known state listed noxious weeds or county listed weeds within this allotment.

Riparian –

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
141-01	Green River (1)	0.44					0.44
141-03	Green River (1)	0.82					0.82

A 1.3-mile reach of the upper Green River (reach 1) flows through pastures 1 and 3 of Allotment 141. The interdisciplinary team gave this reach a functionality rating of PFC. The riparian plant community was extremely robust and diverse in this reach.

Figure 141.1 — The headwaters of Green River traverse Allotment 141.

The riparian area consists of interrupted lentic pools (Figure 141.1) that serve as refugia for reptiles, amphibians, macro invertebrates and other native aquatic species. Fairy shrimp (*Eubranchipus*) are found in these pools. According to a recent study (Euliss and Mushet, 2004), on the Little Missouri National Grassland, fairy shrimp were observed only in natural, unexcavated seasonal wetlands.

Livestock do congregate along the lentic pools, and swards of riparian vegetation are disrupted and broken in places. Also, hydric soils in the riparian area have been compacted due to hoof shear along the banks of lentic pools. Some pedestalling of riparian swards is evident (Figure 141.1). The management objective is to maintain PFC and to insure that the native aquatic organisms continue to prosper at this site.

Woody Draws – There are no woody draws in this allotment.

Herbaceous Structure – There was one sample VOR transect from 2004 in this allotment and it was measured as Low structure (1.2 inches). The station averages also indicated a dominance of Low with 80 percent in the Low class and 20 percent in the Moderate class. This transect was not resurveyed in 2005.

Seral Stages – Most of the two pastures constituting this allotment consisted of broken land dominated by crested wheatgrass and Kentucky bluegrass (Figure 142.2a) with native grasses most prominent on intermingled clay slicks (Figure 142.2b) and at the far north and south ends of the allotment. Mid seral stages are dominant but plant composition is at or approaching an Invaded Grass State for broken land in large portions of the allotment. Invasive bluegrass is particularly prominent along the center of the allotment on either side of the pasture fenceline and a water reservoir.

Figure 141.2, a and b — a) Pasture 3 at north end of the allotment. Crested wheatgrass and bluegrass in the foreground with increasing dominance of bluegrass indicated by brown hue of seed heads in the background or south half of the pasture. b) Clay slicks dominated by native species indicated by lighter hue on the left side of photo and crested wheatgrass on the right side with increasing bluegrass in the background.

A sere plot in broken land of pasture 1 was at a mid seral stage with relative dominance of crested wheatgrass, needle-and-thread, and invasive bluegrass. Relative plant frequency of bluegrass increased from seven percent to 34 percent between 1978 and 2009 along a repeated pace transect in the southwest quarter of the pasture, with only traces of needle-and-thread in either measurement year. Relative plant frequency of western wheatgrass decreased from 40 percent to 16 percent, while blue grama and buffalo grass increased from 12 percent to 34 percent. The frequency of clubmoss increased from 7 percent to 25 percent.

A belt transect in the north half of pasture 3 recorded crested wheatgrass as the dominant species, while a Robel transect in the south half of the pasture recorded bluegrass dominance.

Sharp-tailed Grouse – There are no known leks within this allotment. There are no known leks within 1 mile of this allotment. The nearest known lek is approximately 1.5 miles away.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed 2 years later.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would now be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian condition along the Green River as described in the existing condition would continue and evolve toward the potential riparian community.

Woody Draws – There are no woody draws in this allotment.

Herbaceous Structure – With the removal of livestock, there would be an appreciable increased opportunity for the development of High and Moderate herbaceous structure, and a decrease in the amount of Low herbaceous structure.

Seral Stages – The removal of livestock grazing would facilitate the accumulation of plant litter, which would assist increases of invasive bluegrass and transitions to Invaded Grass States where they have not already occurred. Crested wheatgrass would remain persistent but bluegrass would gradually constitute greater portions of total grass production. Existing native plant diversity would sharply decrease. These effects would occur within 10 years because of the existing amount and extent of bluegrass.

Sharp-tailed Grouse – The increase in High structure from removal of livestock disturbance would benefit potential nesting and brooding habitat for sharp-tailed grouse. However, over time the decrease in forb diversity due to increased grass density would decrease foraging opportunities for grouse. To a somewhat lesser extent, nesting and brooding quality would also decrease because of lower quality habitat associated with invasive grasses that may invade/ expand into local habitats.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by an inventory grazing association permit, and Authorized Use is 177 federal AMs.
- Cow/calf pairs are run in a two-pasture deferred rotation.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance

of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian condition along the Green River as described in the existing condition would continue.

Woody Draws – There are no woody draws in this allotment.

Herbaceous Structure – Current management would likely continue to perpetuate the herbaceous structure distribution with a limited potential to improve the herbaceous structure in general. Retaining the current Authorized Use level is projected to continue to promote a lack of residual cover.

Seral Stages – Invasive grasses would continue increasing under current management with further transitions to Invaded Grass States and a loss of native plant diversity. The deferred rotation with a third pasture on private land results in low palatability of invasives grasses on NFS pastures because turn-in onto pastures 1 and 3 occurs after mid-June at least 5 out of every 8 years. Decreasing palatability of crested wheatgrass and bluegrass after mid June contributes to selective use of the native grass component, potentially decreasing plant vigor and assisting the spread of invasive grasses. Levels of Authorized Use and reported use that exceed initial estimated carrying capacity by 81 percent after adjusting for cow size compound the level of selective native grass utilization.

Sharp-tailed Grouse – Existing management actions, primarily the high Authorized Use levels, would not enhance grouse nesting habitat (i.e. High structure grasslands) thus limiting the potential to enhance grouse nesting and brooding habitat in this allotment.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 177 federal AMs.
- Continuing to annually rotate season of use between pastures 1 and 3.

ADAPTIVE OPTIONS:

- Adjusting Authorized Use.

Range

Initial Actions – Because the initial Authorized Use will remain the same as current management, the permittees would be allowed to harvest the same amount of forage. Continuing to annually rotate the season of use between pastures 1 and 3 would not have an effect on livestock distribution because of the size of the pastures.

Adaptive Options – Adjusting Authorized Use downward would result in fewer livestock numbers, fewer grazing days, or a combination of the two because of the management as a turn in permit for

this allotment. Adjusting Authorized Use would not change the distribution of the livestock; however, the amount of forage harvested would be less than the existing forage harvested.

Riparian

Initial Actions – It is expected that desired conditions along the Green River would continue with the initial actions proposed.

Continuing to annually rotate season of use between pastures 1 and 3 would have no effect on existing desired riparian condition along the Green River. Livestock use on the riparian corridor would not change.

Adaptive Options – It is expected that desired conditions along the Green River would continue with the adaptive options proposed.

Reducing Authorized Use should help improve the uplands vegetation which in turn reduces overland flow which would further benefit the riparian conditions along the Green River. A reduction in overland flow delivered to the stream would result in reduced stream velocities allowing for the establishment of riparian vegetation which would build stream banks.

Woody Draws – There are no woody draws in this allotment.

Herbaceous Structure

Initial Actions – The proposed actions maintain the existing management and conditions. The Authorized Use level, which is approximately 44 percent over the initial estimated carrying capacity, would not contribute to improving the herbaceous structure distribution within the allotment. The Authorized Use level limits the retention of residual cover. The rotation would not leave adequate time for regrowth.

Adaptive Options – Adjusting the Authorized Use level would improve the potential to improve the herbaceous structure distribution. Decreasing use has a positive effect on standing crop.

Seral Stages

Initial Actions – The effects of continuing current grazing rotations and levels of Authorized Use were discussed under Alternative 2, but in summary, would result in further increases of invasive grasses and transitions to Invaded Grass States with decreased maintenance of native plant diversity.

Adaptive Options – Neither decreases nor increases in Authorized Use would be effective in helping to control bluegrass and increasing the native component without coordinating a large portion of the grazing season with high palatability of the former and decreasing utilization of the latter to increase its vigor and development. A compressed early season grazing period in both pastures would hold the greatest promise of achieving this result (Sedivec 2006).

Sharp-tailed Grouse

Initial Actions – There are no known leks within 1 mile of this allotment. However, biologically capable habitat types can be found throughout the allotment. Existing management actions, notably the Authorized Use level, would not enhance High structure grasslands thus limiting the potential to

enhance grouse nesting and brooding habitat in this allotment. The rotation would not allow adequate time for regrowth.

Adaptive Options – Adjusting the Authorized Use down would have the best potential to enhance grouse nesting and brooding habitat due to improved potential to increase residual cover.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3; therefore, Alternative 3A would have the same effects as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.
- Starting deferred rotation May 1st in 1 of 4 years.

ADAPTIVE OPTIONS:

- Assessing species composition to determine effectiveness of periodic early grazing period.

Range

Initial Actions – Authorized Use for this allotment would be 113 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 177 federal AMs converted to AUMs by adjusting for cow size is 204 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 44 percent reduction in AUMs from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment.

Initiating a deferred rotation on May 1st in 1 out of 4 years would not have any effects on livestock distribution because of the small size of the pastures.

Adaptive Options – Assessing species composition to determine the effectiveness of a periodic early grazing period would not have any effects on livestock.

Riparian

Initial Actions – The effects would be the same as described previously in Alternative 3.

Adaptive Options – The effects would be the same as described previously in Alternative 3.

Woody Draws – There are no woody draws in this allotment.

Herbaceous Structure

Initial Actions – The downward adjustment in the Authorized Use level should contribute to

improving herbaceous structure distribution within the allotment by potentially promoting retention of residual cover. Early use of pastures should also contribute by increasing the potential for regrowth 1 out of 4 years.

Seral Stages

Initial Actions – Initiating the deferred rotation with two NFS and one private pasture on May 1st 1 of every 4 years would be insufficient to halt or reverse the trend of increasing invasive grasses and transitions to Invaded Grass States. The palatability of invasive grasses would continue to be low during most grazing seasons in each pasture and would result in excessive use of the native component, which decreases plant vigor and assists the spread of invasive grasses. Increasing plant litter in underutilized invasive grass areas would also assist the maintenance and spread of invasive grasses.

Decreasing Authorized Use by 44 percent according to initial estimated carrying capacity and cow size would also be ineffective in halting or reversing the trend of increasing invasive grasses unless the grazing season is coordinated with high palatability of the invasive grasses. Increasing plant litter with decreased levels of grazing has the potential to assist further invasive grass increases, and the reduced stocking level might continue to be excessive for the proportion of native grass production that is probably about half of the total production.

Adaptive Options – The effects of additional adjustments in Authorized Use are discussed above and under Alternative 3.

Sharp-tailed Grouse

Initial Actions – Adjusting the Authorized Use to account for the initial estimated carrying capacity, including adjusting for animal weight, should aid in promoting positive changes in potential nesting and brooding habitat for sharp-tailed grouse (i.e. High structure grasslands).

Adaptive Options – Determining the effectiveness of the periodic early grazing period, or many other grazing strategies, could have a bearing on the quantity and quality of potential habitat available in the allotment, and others, in the long term.

ALLOTMENT 142

Table 142-1 — Summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 142 in the North Billings County AMP Revision project area

Summary	Acres	Percent	Number
Management Area 6.1 – Rangeland With Broad Resource Emphasis	318	100	
Total allotment acres	318	100	
NFS acres	318	100	
State land acres	0	0	
Private Land Acres	0	0	
Current permitted livestock grazing (AMs) on NFS lands			167
Initial estimated carrying capacity (AUMs) on NFS lands			128
Number of pastures containing NFS lands			2

Table 142.2 — Allotment 142 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	There are no perennial or intermittent stream reaches in this allotment.	None.
Woody draws	40 percent of sampled woody draws were Healthy and 60 percent were At Risk. At Risk stands are bottom type woody draws which are easily accessed by cattle. Lack of adequate regeneration and impacted shrub layer are putting the stands At Risk.	Increase successful recruitment of woody species.
Herbaceous structure	Transect Results : Low – Exceeding Objectives Moderate – Meeting Objectives High – Below Objectives 2004 Transects: 2.13 2004 Stations percent: Low-20/Moderate-75/ High-5.	Manage for additional High structure on biologically capable habitats.
Seral stages	Broken land constitutes 21 percent of pasture 1 and 80 percent of pasture 2, and invasive bluegrass is frequent in both pastures with an increasing trend measured between 1980 and 2009. Sere plots in each pasture were at mid seral stages.	Limit the expansion of invasive grasses and maintain or increase the proportion of native grasses.
Sharp-tailed grouse	Suitable habitat is present within the allotment, and there is one known lek in the allotment.	Manage for increased High vegetative structure on biologically capable sites to enhance nesting and brooding habitat.
Remarks	Some burdock and absinth wormwood noted in drainage, size was less than 0.1 acre.	

Table 142.3 — Allotment 142 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action	Alternative 3A	Alternative 4
• Authorized Use is 167 federal AMs. • Three-year average permitted use is 83 federal AMs.* • Permit type: Turn-in. • Rotation: Two-pasture rotation starting in same pasture annually. • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 167. • Annually, change season of use within the grazing rotation. **Adaptive Options** • Fence high-value woody draws. • Adjust Authorized Use. • Remove fence between pastures 1 and 2 and annually change season of use.	**Initial Actions** • Authorized federal AMs: 167. • Annually, change season of use within the grazing rotation. • Construct an electric cross fence running east/west in the west half of Section 9, T142N, R100W. **Adaptive Options** • Fence high-value woody draws. • Adjust Authorized Use. • Remove fences between all pastures and annually change season of use.	**Initial Actions** • Authorized federal AUMs: 128. • Implement two-pasture deferred rotation, but defer start in pasture 1 till June 1st and in pasture 2 (crested wheatgrass) till May 15th. **Adaptive Options** • Fence high-value woody draws. • Adjust Authorized Use. • Remove fence between pastures 1 and 2 and annually change season of use.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every 3 years. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3.	**Monitoring** • Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 142 – Existing Condition

Range – This allotment consists solely of approximately 318 acres of NFS lands. Currently, this allotment is issued a turn-in permit for 39 head for four and a quarter months (4.28 to be exact) by the MGA. This allotment has been subdivided into two pastures ranging from 101 to 217 acres. The rotation for this allotment has been fairly constant in recent years and is as follows: typically, livestock begin in pasture 2 around May 15th and rotate to pasture 1 around June 1st. The livestock then leave the allotment and come back into pasture 1 around August 19th for approximately 30 more days. Current AMs provided by NFS lands can be found in Table 142.1. Water developments within this allotment include two reservoirs, one in each pasture. This allotment is right on the transition zone from Rolling Prairie to Badlands geographic area. Based on visual observations the uplands are intermixed with crested wheatgrass, western wheatgrass and blue grama, but the draws have more of a native grass species component. Although livestock grazing is evenly distributed throughout the allotment, there is trailing through the woody draws in pasture 1 leading to the reservoir in the southeastern end of the pasture.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated some burdock and absinth wormwood within drainages less than a tenth of an acre in size.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – Of five woody draw samples in pasture 1, 40 percent were Healthy and 60 percent were At Risk. At Risk draws occurred along the bottom of drainages flowing to a reservoir in the southern half of the pasture, while Healthy draws occurred on steep sideslopes with decreased livestock use. Only small patches or fragments of woody draws were present in pasture 2 and were not sampled.

Herbaceous Structure – The one randomly selected sample site had a transect VOR average of 2.13 which is Moderate structure. The station frequency of this transect is 20 percent Low, 75 percent Moderate, and 5 percent High VOR.

Seral Stages – Pasture 1 is the largest of two pastures in this allotment and contained about 21 percent broken land with native grasses remaining dominant in unbroken land but containing varying amounts of invasive grasses. A sere plot was at a mid seral stage with invasive grasses comprising about 22 percent of the relative grass canopy cover. A repeated pace transect at the north end of the pasture indicated an increase of invasive grass relative frequency from 15 percent to 47 percent between 1980 and 2009.

Pasture 2 is 101 acres in size and composed of about 80 percent broken land. A sere plot along a low ridgeline was at a mid seral stage with several native grasses intermixed with crested wheatgrass and a high proportion of clubmoss. Other areas of broken land exhibited increased dominance of crested wheatgrass and varying amounts of bluegrass. Native grasses of prairie sandreed and needlegrass occurred along the slopes of first order drainages.

Sharp-tailed Grouse – Suitable habitat is present within the allotment, and there is one known lek in the allotment.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock will be removed after 2years.
- Most range infrastructure will begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association will occur. No grazing fees will be collected from this allotment; therefore, there will be no contribution towards CP funds. Removal or maintenance of existing range infrastructure will be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service will be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – Woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration of desired woody species. However, existing invasive grasses and increases of these species as a result of increasing litter with the removal of livestock grazing would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – There will be increased opportunity for the development of High and Moderate structure, and a decrease in the amount of Low structure resulting in increased nesting opportunities for ground nesting birds requiring or preferring Moderate/High structure habitat. Species that favor Low structure habitat will decrease.

Seral Stages – The removal of livestock grazing and trampling disturbances would facilitate shifts towards late seral stages, but increasing plant litter would also facilitate an increase of invasive grasses that would impede the development or maintenance of native communities. Transitions to Invaded Grass States and a loss of native plant diversity would occur within ten years across large areas of the allotment with appreciable amounts of invasive grasses. Crested wheatgrass would persist in broken land but gradually decrease with increasing bluegrass.

Sharp-tailed Grouse – The increase in High structure will benefit nesting and brooding habitat for sharp-tailed grouse. However, over time the decrease in forb diversity will decrease foraging opportunities.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by a turn-in grazing association permit, and Authorized Use is 167 federal AMs.
- Cow/calf pairs are run in a two-pasture rotation starting in the same pasture annually.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association will occur. Grazing fees will be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure will be the responsibility of the grazing association. Noxious weeds control will continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management will continue to be vectors for the spread of noxious weeds.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – The current grazing system should be compatible high woody draw conditions because grazing periods are relatively short and recently reported use is light at only a little more than half of Authorized Use and 11to 22 percent less than initial estimated carrying capacity. Greater levels of reported use prior to 2004 may have contributed to the current 60 percent proportion of At Risk woody draw conditions. However, late summer rotations in pasture 1 with increased temperatures and insect pests likely contribute to high woody draw use, as does trailing through the At Risk woody draws to reach the primary water source. Continuation of currently reported levels of use might contribute to gradually increasing woody draw conditions, but stocking at the level of Authorized Use that is almost twice as great as reported use would contribute to the persistence or decrease of existing conditions.

Herbaceous Structure – There is minimal potential for increase in High herbaceous structure and improvement of the herbaceous structure in general under current livestock management because Authorized Use exceeds initial estimated carrying capacity.

Seral Stages – Use of pasture 2 in May should result in utilization of crested wheatgrass and bluegrass, but the potential occurs for premature use of native grasses that would impede their increased establishment. This is particularly true with turn-in dates during the second rather than first half of May because there is an increased expression of the native grass component. Pasture observations indicate concentrated use around the main dugout reservoir that is likely assisting the increased prominence of bluegrass. The far south end of the pasture with less use contained varying development of native grasses mixed with crested wheatgrass, but accumulating plant litter in these areas has the potential to assist the spread of invasive grasses.

Twice-over grazing of pasture 1 with a late June to mid-August rest period should allow for the development and maintenance of mid to late seral native grass communities but this is impeded by increasing trends of bluegrass. Although reported levels of use are less than initial estimated carrying capacity, three stands of crested wheatgrass constituting 21 percent of the pasture acreage are of relatively low palatability during the summer grazing season and contribute to increased use of native grasses. Decreasing palatability of bluegrass during the grazing seasons would also contribute to increased use of the native components. Areas of concentrated use around the reservoir have the potential to assist the establishment of invasive grasses by decreasing native plant vigor. There is some evidence of desirable native grasses establishing in stands of crested wheatgrass at the far north and south ends of the pasture that experience low levels of use, but invasive grasses may be assisted by accumulating plant litter in these areas. Although stocking at current levels of Authorized Use would decrease the accumulation of plant litter, there would be an increased

potential for excessive utilization and decreased vigor of the native component that could further assist the spread of invasive grasses.

Sharp-tailed Grouse – Because of minimal potential for increase in High herbaceous structure under current livestock management, existing nesting and brooding habitat will be maintained but enhancement is not expected.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 167 federal AMs.
- Annually, changing the season of use within the grazing rotation.

ADAPTIVE OPTIONS:

- Fencing high-value woody draws.
- Adjusting Authorized Use.
- Removing the fence between pastures 1 and 2 and annually change season of use.

Range

Initial Actions – By annually changing season of use within the grazing rotation, the available forage will be harvested during different times of the year compared to the existing rotation. By annually changing the season of use desirable graminoid species will have time to recover from grazing during the growing season, thus affecting the quality of forage available for livestock grazing and potentially changing the livestock distribution throughout the allotment. Because the initial Authorized Use will remain the same as current management, the permittee will be allowed to harvest the same amount of forage.

Adaptive Options – Fencing high-value woody draws will have little to no change in livestock distribution across the allotment. Forage within the exclosures will no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may occur on remaining forage. There will be a cost to install these fences and as a result there will be additional cost of maintenance of the fence to prevent livestock access to the woody draws.

Adjusting Authorized Use downward will result in fewer livestock numbers, fewer grazing days, or a combination of the two because of the turn in permit for this allotment. Adjusting Authorized Use will not change the distribution of the livestock; however, the amount of forage harvested will be less than the existing forage harvested.

The removal of the interior fence between pastures 1 and 2 will create one larger pasture. A change of livestock distribution will be expected because of the decrease in livestock concentration. By annually changing the season of use, desirable graminoid species will have time to recover from grazing during the growing season. This will affect the quality of forage available for livestock grazing and potentially changing the livestock distribution throughout the allotment.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws

Initial Actions – The deferred rotation would annually change the season of grazing in the two pastures, but woody draws in pasture 1 would experience levels and seasons of use similar to current conditions so the proportion of Healthy communities (40 percent) is unlikely to increase. Livestock would continue to trail along woody draws that lead to the reservoir, and stocking at levels of Authorized Use that is almost twice as great as currently reported use would have a high potential to contribute to decreasing conditions.

Adaptive Options – Fencing selected woody draws would increase the potential for their improvement by decreasing livestock browsing and trampling disturbances. However, increased plant litter resulting from the removal of livestock grazing would facilitate invasive grass increases that would impede the regeneration of woody plants, and adjacent unfenced woody draws would have the potential to experience increased disturbance and decreasing conditions. The potential for increased use of other woody draws would be greatest for those currently at an At Risk condition located along the drainage bottoms and lower sideslopes, rather than Healthy sites located on steeper slopes with more difficult livestock access.

Decreasing the level of Authorized Use would facilitate the regeneration of desired woody species by decreasing browsing and trampling disturbances, but potential reductions would have to exceed current levels of use that are well below Authorized Use.

Removing the interior fence between the two pastures would increase the duration that woody draws in pasture 1 are accessible to livestock with a high potential for decreased conditions. The combined pastures would not qualify as a crested wheatgrass pasture, so the season of use would occur after June 1st when palatability of invasive grasses is decreasing. This would tend to concentrate use in pasture 1 with the least amount of crested wheatgrass, thereby increasing the potential for decreased woody draw conditions. The larger pasture size would facilitate a greater extent of secondary range with an increased potential for development of small woody draw patches in pasture 2, but this would not compensate for decreasing conditions in pasture 1.

Annually changing the season of use is unlikely to result in decreased use of woody draws because grazing would continue to be primarily implemented after June 1st according to native grass dominance within the combined pastures. Summer temperatures and insect pests would contribute to frequent annual use of the woody draws, as would trailing through the draws to access the water reservoir.

Herbaceous Structure

Initial Actions – Given the retention of the current Authorized Use level, annually changing the season of use within the grazing rotation will not appreciably increase High herbaceous structure within the allotment. Due to the length of the grazing season under a two-pasture deferred rotation, appreciable regrowth would not be expected in the early pasture.

Adaptive Options – Depending on the size of the woody draw exclosure relative to the size of the pasture, increased livestock grazing pressure on the remaining biologically capable habitat may decrease the potential for High structure and increase the pressure on any existing High structure. Removing the fence between pastures 1 and 2 and annually changing the season of use would not

generally improve the herbaceous structure, however, less use of the crested wheatgrass, especially in the late rotation, may permit increased proportions of High herbaceous structure because crested wheatgrass will not be the preferred forage later in the summer growing months resulting in less use of the crested wheatgrass patches. Adjusting Authorized Use downward will create the potential for meeting High herbaceous structure by decreasing grazing intensity thereby increasing residual standing crop.

Seral Stages

Initial Actions – Changing from a nondeferred to a deferred rotation would decrease coordination of the grazing season with crested wheatgrass palatability in pasture 2, thereby contributing to high use of the relatively small native grass component. This would impede development of existing communities and potentially assist the spread of invasive grasses. Stocking at levels of Authorized Use that greatly exceed initial estimated carrying capacity would compound selective use of the native component.

The deferred rotation is unlikely to improve the native grass communities in pasture 1 because it would continue to be grazed during similar time periods as present in regards to the palatability of invasive and native grasses. Broken land constituting 21 percent of the pasture, and additional areas containing invasive grasses, would be of low palatability during most grazing seasons and contribute to high use of the native component that has the potential to assist the spread of invasive grasses. Implementing occasional early season grazing in an effort to utilize crested wheatgrass in pasture 1 are unlikely to be successful because these stands constitute less than a quarter of the pasture acreage, and two of the three stands are located at the far north and south ends of the pasture with relatively low livestock use. Stocking at proposed levels of Authorized Use that exceed initial estimated carrying capacity by 50 percent after adjusting for cow size would compound the effect of selective native grass utilization.

Adaptive Options – The adaptive action of removing the fence and combining pastures 1 and 2, along with annually changing the season of use, would perpetuate low palatability of the invasive grass component and selective use of the native component during most years. Implementation of earlier turn-in dates in an effort to utilize the invasive grass component may not be effective because livestock distribution would likely be concentrated along the central area of pasture 1 with the greatest native grass component.

Decreasing the level of Authorized Use would decrease the intensity of selective native grass utilization by establishing stocking levels closer to production of the native component. However, reductions would have to exceed current levels of reported use, and increased litter in portions of the allotment resulting from decreases in use would assist the spread and dominance of bluegrass.

Sharp-tailed Grouse

Initial Actions – Given the retention of the current Authorized Use level, annually changing the season of use within the grazing rotation will not appreciably increase the amount of High herbaceous structure, therefore not enhancing nesting and brooding habitat for sharp-tailed grouse in the allotment. Due to the length of the grazing season under a two-pasture deferred rotation, appreciable regrowth would not be expected in the early pasture.

Adaptive Options – Depending on the size of the woody draw exclosure relative to the size of the pasture, increased livestock grazing pressure on the remaining biologically capable habitat may decrease the potential for High structure and potentially increase the pressure on existing High structure. This will not enhance nesting and brooding habitat for sharp-tailed grouse. Removing the fence between pastures 1 and 2 and annually changing the season of use would not generally improve the grouse habitat. However, less use of the crested wheatgrass, especially in the late rotation(s), may permit increased proportions of High herbaceous structure because crested wheatgrass would not be the preferred forage later in the summer growing months resulting in less use of the crested wheatgrass patches that could provide nesting sites for grouse. Adjusting Authorized Use downward would eventually create the potential for meeting High herbaceous structure by decreasing grazing intensity thereby increasing residual standing crop.

Effects of Alternative 3A

The effects of Alternative 3A are the same as Alternative 3 with the following stated exceptions.

INITIAL ACTIONS:

- Constructing an electric cross fence running east/west.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 3A are the same as Alternative 3.

Range

Initial Actions – Under Alternative 3A an electric cross fence will be constructed running east/west in the west half of Section 9, T142N, R100W, resulting in subdividing the allotment into three or four smaller pastures instead of the current two pastures. Livestock grazing distribution will become even more evenly distributed because of the reduction in size of pastures. Livestock management will be more intense than the existing management, because it will require more time from both the permittee and the Forest Service in assuring that over utilization of native herbaceous species does not occur within the smaller pastures. An analysis of the AMs available as a starting point in each pasture will need to be performed, to develop a rotation that takes into consideration the smaller size of each pasture and the differences in topography and vegetative plant communities in each pasture. The initial cost of the installation of the cross fence will also be an effect of this action. In review of the allotment map and existing range water improvements, the availability of reliable livestock water will be another effect. A small reservoir will potentially be the source of livestock water in two or three of the pastures. Depending on the length of the grazing season and climatic conditions, this livestock water development may only be dependable during certain times of the year, thus potentially creating a rotation where certain pastures are always grazed at certain times of the year. Vegetative plant composition changes will result if this occurs.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws

Initial Actions – Woody draw conditions would have the potential to increase with three or four

rather than two pastures because the period of access to individual draws would decrease by about half. However, the concentration of use would increase with smaller pasture sizes and the degree of browsing and trampling would remain similar to current conditions. Authorized Use that exceeds initial estimated carrying capacity, and the contribution of broken land and invasive grasses with low palatability during most grazing periods in pasture 1, would contribute to the high use of woody draws. Although additional pastures would increase periods for the regrowth of browsed woody plants, recovery periods for woody species are longer than those for herbaceous species and the increased period for regrowth would not compensate for annual levels of browsing. Overall, the potential for increasing woody draw conditions by subdividing pastures would be low.

Herbaceous Structure

Initial Actions – Given the retention of the current Authorized Use level, annually changing the season of use within the grazing rotation would not appreciably affect High herbaceous structure within the allotment. Cross fencing could achieve more efficient early use of some crested wheatgrass pastures allowing for regrowth and fall improvement in High herbaceous structure. Because the Authorized Use level exceeds initial estimated carrying capacity, the proportion of High herbaceous structure would continue to be limited with few nesting opportunities for species requiring High structure grasslands.

Seral Stages

Initial Actions – Creating a three or four-pasture rotation would increase opportunities for grasses to complete critical growth stages. However, the evenness of utilization would increase across all pastures with potential shifts towards early seral stages and a decreased mosaic of grazing pressure. Positive effects of increased livestock distribution within the smaller pastures could include decreasing plant litter in current areas of low utilization that would potentially decrease the spread of invasive bluegrass. However, decreased palatability of invasive grass dominated areas with increasing lateness of the season would continue to impede increased utilization, and native grass components would have a high potential to be excessively used before increased use of invasive grasses occurs. This situation would frequently occur in pasture 1 as a result of June turn-in dates, and would occur in pasture 2 whenever it is used after early June.

Sharp-tailed Grouse

Initial Actions – Given the retention of the current Authorized Use level, creating a four-pasture rotation including annually changing the season of use within the grazing rotation would not appreciably increase the amount of High herbaceous structure, and therefore would not enhance nesting and brooding habitat for sharp-tailed grouse in the allotment. Cross fencing could achieve more efficient early use of some crested wheatgrass pastures and may allow for regrowth and potentially increase the proportion of High herbaceous structure. However, because the Authorized Use level exceeds initial estimated carrying capacity, the proportion of High herbaceous structure will continue to be limited allowing few nesting opportunities for sharp-tailed grouse.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as those for Alternative 3 actions. The analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.
- Implement a two-pasture deferred rotation, but defer start in pasture 1 till June 1st and in pasture 2 (crested wheatgrass) till May 15th.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 4 are the same as in Alternative 3.

Range

Initial Actions – Livestock distribution changes will be minimal because of the relatively small size of the pastures. Authorized Use for this allotment will be 128 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of a 167 federal AMs converted to AUMs by adjusting for cow size is 192 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 33 percent reduction in AUMs from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager will have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws

Initial Actions – Decreasing Authorized Use by 33 percent, 22 percent less to 28 percent greater than currently reported use, would contribute to decreased woody draw disturbances, but the inconsistent level would decrease the potential degree of woody draw improvement.

Adaptive Options – Reducing Authorized Use would increase the potential for improved woody draw conditions because there would be an increased potential for actual reductions in the current level of use.

Herbaceous Structure

Initial Actions – Implementing a two-pasture deferred rotation would not likely improve the herbaceous structure distribution within the allotment due to the length of the grazing season under the rotation would not be projected to allow appreciable regrowth time for herbaceous species. Adjusting AUMs to the initial estimated carrying capacity could create the potential for an improvement in the herbaceous structure distribution in an appreciably less time than Alternative 3.

Seral Stages

Initial Actions – Effects of a two-pasture deferred rotation were discussed under Alternative 3 and would not appreciably change with the proposed reduction in Authorized Use because the potential level of use would remain 22 percent less to 28 percent greater than currently reported use. The invasive grass forage component would continue to be underutilized in pasture 1 and would

contribute to high utilization of the native grass component relative to the total pasture forage. The invasive grass component dominating pasture 2 would be utilized 1 of every 2 years when it is the first pasture of use, but would be underutilized when it is the second pasture of use. In the latter case, the native grass component would be excessively utilized within primary grazing areas. Native grasses intermixed with crested wheatgrass in secondary range of pasture 2 may also experience increased use when it is the second pasture of use. Thus, further development of the native component in pasture 2 would be impeded by the deferred rotation system. Additionally, the May 15th turn-in date proposed for pasture 2 allows for greater emergence of the native component and increases the potential degree of premature grazing relative to early May turn-in dates.

Adaptive Options – Reducing Authorized Use beyond currently reported levels of use would increase the potential development of both the native and invasive grass components without altering the competitive relationship. Although there would be an increased potential for the development of late seral stages, increasing invasive grasses as assisted by increased plant litter would have a high potential to impede the maintenance of native grass communities.

Sharp-tailed Grouse

Initial Actions – Implementing a two-pasture deferred rotation would not likely improve grouse habitat within the allotment because the length of the grazing season under the rotation would not be projected to allow appreciable regrowth time for herbaceous species that could carry over to the following spring. Adjusting AUMs to the initial estimated carrying capacity could create the potential for an improvement in grouse nesting habitat in an appreciably less time than Alternative 3.

ALLOTMENT 158

Table 158.1 — Summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 158 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 3.65 – Rangelands With Diverse Natural-Appearing Landscapes	2,277	44	
Management Area 4.22 – River and Travel Corridors	301	6	
Management Area 6.1 – Rangeland With Broad Resource Emphasis	2,561	50	
Total allotment acres	6,746	100	
NFS acres	5,138	76	
State land acres	104	2	
Private land acres	1,505	22	
Current permitted livestock grazing (AMs) on NFS lands			1,566
Initial estimated carrying capacity (AUMs) on NFS lands			1,527
Number of pastures containing NFS lands			12

Table 158.2 — Allotment 158 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	The Little Missouri River borders this allotment on the east side. Given the size of the river and the small amount of NFS land on the river, Forest Service management has little effect on the river. A field review by the district hydrologist indicated no riparian concerns.	None,
Woody draws	Of the woody draws sampled 69 percent were Healthy, 23 percent were At Risk and 8 percent were Unhealthy. At Risk and Unhealthy woody draws had low regeneration, shrub layers were impacted, and downcutting was occurring.	Increase successful recruitment of woody species.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Below Objectives High – Below Objectives 2004 Transects: 1.03; 1; 1.41; 1.13; 1.04; 2; 1.33; 1.0; 1.7 2004 Stations percent: Low-80/Moderate-18.33/ High-1.67 2005 Transects: 1.4; 1.86; 1.43; 2.64; 2.11 2005 Stations percent: Low-34/Moderate-65/High-1.	Manage for additional Moderate and High structure on biologically capable habitats.
Seral stages	Mid seral stages dominate in primary use areas and habitat types but a high potential occurs for late seral stages in secondary habitat types among rugged and less accessible topography. Invasive grasses occur in high use areas and in association with oil and gas related disturbances in several pastures.	Maintain native grass communities and increase the proportion of late seral stages in primary habitat types.
Sharp-tailed grouse	There is one lek on one of the private pastures and three other leks within 1 mile of the allotment. Suitable nesting and brooding habitat exists in differing amounts in all pastures.	Manage for increased High vegetative structure on biologically capable sites to enhance nesting and brooding habitat.
Remarks	Approximately 263 acres of leafy spurge and Canada thistle. Leafy spurge and Canada thistle are adversely affecting woody draws; continue to treat with biological controls. Burdock was also noted in the woody draws.	

Table 158.3 — Allotment 158 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 1,566 federal AMs. • Three-year average permitted use is 1,469 federal AMs.* • Permit type: Inventory (12 months). • Rotation: Modified deferred rotation (Twice-over in pastures 4 and 8). • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range development	**Initial Actions** • Authorized federal AMs: 1,566. • Annually change season of use within the grazing rotation. • Utilize crested wheatgrass pasture 4 as an early season pasture • Continue use of a once-over deferred grazing rotation. **Adaptive Options** • Fence high-value woody draws. • Adjust Authorized Use. • Utilize prescribed fire to treat encroaching juniper in pastures 1, 2, 6, and 11. • Add Allotment 249 into the grazing rotation. • Implement a rest rotation.	**Initial Actions** • Authorized federal AUMs: 1,527. • Annually change season of use within the grazing rotation. • Utilize crested wheatgrass pasture 4 as an early season pasture. • Continue use of a once-over deferred grazing rotation. • Recommend relocation of winter feeding from NFS to private pastures. **Adaptive Options** • Fence high-value woody draws. • Add Allotment 249 into the grazing rotation. • Adjust Authorized Use.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings annually for 3 years then reevaluate survey frequency. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 158 — Existing Condition

Range – This allotment is approximately 6,746 acres in total size and contains private, state, and NFS lands with 5,138 acres of NFS lands. Currently, this allotment is issued a private allocation inventory permit for 204 head for eight months by the MGA. With this type of permit livestock are on the allotment for the entire year, not just the typical May 1st to December 31st. Livestock are

currently wintered on private and intermingled private and NFS lands during the winter months of January through April. This allotment has been subdivided into 14 pastures, of which 13 contain NFS lands. Prior to issuance of a private allocation inventory permit, pasture 14 was part of the historical Bell Lake Common. The pastures range from 71 to 2,554 acres. Current AMs provided by NFS lands can be found in Table 158.1. Water developments within this allotment include developed springs, reservoirs, dugouts, and a well/stock tank.

There has been a change in ownership of the base property in this allotment in the past 5 years. Prior to this change in management and the first year of new management, between 166 head and 204 head were turned out into pasture 14 for the months of May through December ,and the remaining pastures were utilized as winter grazing/winter feeding. Now pasture 14 is included in a deferred rotation system with the other pastures, some of which may be included in some type of twice-over rotation.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there is approximately 263 acres of leafy spurge and Canada thistle. During the woody draw inventory, burdock was also noted within the woody draws. The size and amount of infestation of burdock is unknown at the present time. The leafy spurge and Canada thistle in areas have had an adverse effect on the woody draws (see Project Record, Specialist Reports and Notes, Botany Report). The primary control for leafy spurge has been biocontrol, while Canada thistle has been controlled with herbicides. During allotment inspections in 2005 through 2007, other infestations of leafy spurge and Canada thistle were identified. The Billings County weed board has been informed of these infestations and has made an attempt to control some of these infestations.

Oil and gas development on NFS lands in this allotment has removed a total of approximately 22.3 acres from livestock access. A total of approximately 7.5 acres of oil and gas pads and access roads have been reclaimed and are or will be available for livestock access. Associated forage from these acres is approximately 5.8 and 2.0 AUMs, respectively

Riparian – There are no intermittent streams in this allotment. There are no riparian issues in the allotment.

Woody Draws – Thirteen woody draw samples from five pastures resulted in ratings of 69 percent Healthy, 23 percent At Risk, and 8 percent Unhealthy. Rocky Mountain juniper constitutes the dominant woodland type and covers a large portion of several pastures. Green ash woody draws often occur as small inclusions along the lower slopes of Rocky Mountain juniper communities. The exception to Rocky Mountain juniper dominance involves pasture 14, which is situated about 3 miles southwest of pastures 1 through 13. Three sampled woody draws in pasture 14 were Healthy despite extensive leafy spurge infestations. Three pastures along the Little Missouri River (LMR) contain woodlands of cottonwood. Except for noxious weed and invasive grass issues, these communities appear to be in moderately good condition, with sapling populations establishing along gravel bars of the river channel.

Herbaceous Structure – In 2004, there were nine sampled herbaceous-dominated VOR transects. Seven of the nine averaged in the Low structure class and two were measured in the Moderate class. No transects were measured as High structure. The consolidated station averages showed 80 percent

Low (<1.5 inches) structure; 18.33 percent Moderate (≥1.5 to <5.5 inches) structure; and 1.67 percent were High (≥5.5 inches) structure.

Five transects were resampled in 2005. Two of the five measured in the Low structure class and three were in the Moderate structure class. No transects were measured in the High structure class. All five transects increased in transect average over 2004. Station averages also shifted to the Moderate class with Low structure stations at 34 percent; Moderate structure stations at 65 percent; and High structure stations at 1 percent.

Seral Stages – Adequate plant composition data for this large allotment is lacking. There appears to be a tendency towards mid seral stages in primary use areas and habitat types occurring along drainage valleys and level plateaus. Steep slopes and rugged terrain within several pastures are likely to contribute to low levels of livestock use and greater potential for late seral stages, particularly among communities or habitat types of little bluestem and prairie sandreed. Extensive stands of Rocky Mountain juniper and various shrub communities involving creeping juniper (*Juniperus horizontalis* Moench), aromatic sumac (*Rhus aromatica* Ait.), sagebrush, and others occur on steep north aspects in secondary range. Barren landform communities of Wyoming big sagebrush (*Artemisia tridentata* Nutt.) and spiny saltbush (*Atriplex confertiflora* (Torr. & Frem.) S. Wats.) occur on south aspect slopes.

Nine active or reclaimed oil well sites and several miles of improved access road have contributed to the occurrence of invasive grasses and forbs such as yellow sweet clover (*Melilotus officinalis* (L.) Pall.) in several pastures.

Broken land is identified in about 10 percent of pasture 1 involving level plateaus on the east side of the pasture, but a belt transect at the north end of this area recorded needle-and-thread and sedge as the dominant species with light amounts of bluegrass. Steep slopes and drainages below the plateaus comprise a large portion of the pasture and are likely to be dominated by native communities.

Pasture 2 is also largely composed of steep slopes leading to terraces along the LMR on the east side of the pasture. High livestock disturbances were noted along sampled woody draw drainages. Livestock use is likely less among open slopes with secondary habitat types between the drainages.

Pasture 3 consists of a broad floodplain and terraces along the LMR with high proportions of smooth brome, sweet clover, and leafy spurge mixed among native grasses and silver sagebrush shrubs between stands of cottonwood and Rocky Mountain juniper.

Pasture 4 is entirely comprised of broken land and a sere plot was at a mid seral stage with dominance of crested wheatgrass and a diverse mixture of native grasses. However, two Robel transects recorded overwhelming dominance of crested wheatgrass.

Pasture 5 is composed of only 111 acres, with 36 acres of NFS land along steep tributaries to the LMR that may receive trailing disturbances.

Pasture 6 consists of rugged terrain with high amounts of Rocky Mountain juniper and various shrub communities above a prominent tributary of the LMR. Secondary habitat types of little bluestem and prairie sandreed likely constitute the majority of herbaceous communities. Steep topography and dense woodlands control areas of livestock use.

Only 30 acres (11 percent) of pasture 7 are composed of NFS land, and most of this involves broken land.

NFS land comprises about 70 acres (42 percent) of pasture 8, and primarily consists of narrow ridgelines and adjacent steep slopes.

NFS land comprises about 38 acres (30 percent) of pasture 9, and primarily consists of floodplain and terraces along the LMR, likely with high amounts of invasive grasses and/or silver sagebrush/western wheatgrass communities.

NFS land comprises 32 acres (5 percent) of pasture 10, most of which occurs along an improved road and likely contains high amounts of invasive grasses.

NFS land comprises 730 acres (83 percent) of pasture 11, much of which involves steep slopes above tributaries to the LMR. Two NDSU sample sites along toeslopes on Thin Loamy ecological sites were at mid seral stages with light to moderate amounts of bluegrass. A Robel transect on the edge of a plateau on the opposite side of the pasture recorded sedge and clubmoss as the dominant species, suggesting early seral stages.

Most of pasture 12 consists of a broad plateau, with 21 percent of NFS land identified as broken land. Two Robel transects on the edge of broken land recorded dominance of bluegrass, smooth brome, needlegrass, and crested wheatgrass.

NFS land constitutes 85 acres (46 percent) of pasture 13, with about half the acreage involving the edge of a plateau and half involving steep south aspect slopes.

All of the 2,560 acres constituting pasture 14 is NFS land and all is unbroken land. Two sere plots were at mid seral stages with light amounts of invasive grasses in one of the plots. Small areas of late seral wheatgrass-needlegrass communities were observed in the pasture but reservoirs constructed along several drainages were moderately well-spaced and decrease the potential for extensive late seral stages among the primary habitat types. Plant species recorded along three Robel transects were suggestive of mid seral stages while two transects were suggestive of late stages.

Sharp-tailed Grouse – There is one lek within the allotment and there are three other known leks that are within 1 mile of the allotment. All pastures contain biologically capable habitat types in various proportions.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed after 2 years.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would now

be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – There are no intermittent streams in this allotment. There are no riparian issues in the allotment.

Woody Draws – Woody draw conditions in pasture 1 would improve with the removal of livestock browsing and trampling disturbances, which would facilitate the regeneration and growth of desired woody species. Existing invasive grasses as well as increases of these species as a result of increasing litter with the removal of livestock grazing would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock, there would be an appreciable increased opportunity for the development of High and Moderate herbaceous structure, and a decrease in the amount of Low herbaceous structure. This should result in an initial improvement in the herbaceous structure distribution. However, over time, this distribution would likely shift to where there is excess High and Moderate structure at the expense of Low structure.

Seral Stages – The removal of livestock grazing disturbances would facilitate shifts towards late seral stage communities. The desired proportion of early, mid, and late seral stages would not be achieved, and decreased plant diversity resulting from decreasing proportions of early and mid seral stage communities would occur. The removal of livestock grazing would also result in an increase of herbaceous plant litter that would in turn facilitate the expansion of invasive grasses with the potential of transitioning to Invaded Grass States with decreased maintenance of native plant diversity. Transitions would occur relatively slowly in large portions of the allotment with rugged terrain and secondary habit types, but would occur in 5 to 10 years along drainage valleys and plateaus where invasive grasses are currently more prominent.

Sharp-tailed Grouse – The increase in High structure from removal of livestock disturbance of habitat would benefit nesting and brooding habitat for sharp-tailed grouse because of the increased potential for spring nesting habitat. However, over time the decrease in forb diversity would decrease foraging opportunities. To a lesser extent, nesting and brooding quality would also decrease because of lower quality habitat associated with invasive grasses that may invade local habitats.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by an inventory grazing association permit, and Authorized Use is 1,566 federal AMs.
- Cow/calf pairs are ran in a modified deferred rotation with a twice-over rotation in Pastures 4 and 8.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – There are no intermittent streams in this allotment. There are no riparian issues in the allotment.

Woody Draws – Woody draw conditions of 69 percent Healthy would persist under current management in which conditions developed. Healthy woody draws would tend to persist among rugged topography and steep slopes, while draws among relatively accessible topography would have the potential to decrease in condition. Extensive stands of Rocky Mountain juniper in several pastures that add to the total amount of woodland acreage would continue to contribute to decreased use of green ash woody draws.

Stocking at levels of Authorized Use that exceeds initial estimated carrying capacity by 18 percent after adjusting for cow size would have a high potential to result in decreasing woody draw conditions compared to recently reported use, which has been only 51 to 70 percent of Authorized Use. Additional winter use would decrease the difference between Authorized Use and reported use, but it is not counted towards Authorized Use. The potential therefore exists for additional summer use that would contribute to decreasing woody draw conditions.

Herbaceous Structure – It is expected that current management would continue to approximate the existing herbaceous structure distribution, maintaining a limited potential to promote an increase in the proportion of High herbaceous structure and the overall herbaceous structure distribution in general. Retaining the current Authorized Use level and management system is projected to continue to promote a lack of residual standing crop/biomass.

However, a noticeable change in management since 2005 has effectively resulted in a reduction in use within Pasture 14 that has been distributed over other pastures. Twice-over grazing could be occurring in other pastures and winter grazing is also likely within some pastures. A change in Authorized Use is not indicated in the change in management.

Pasture 14 should be experiencing improvement in the herbaceous structure distribution because of the reduced use; however, this improvement comes at the expense of other pastures, which may be experiencing twice-over grazing at times. In addition, winter use is likely occurring in selected pasture but is not known at this time.

Over the allotment as a whole, Authorized Use exceeds initial estimated carrying capacity but it is unknown if it is actually being used because of unaccounted winter use. In addition, twice-over grazing is potentially occurring on some pastures, with winter feeding/grazing, and now growing season grazing potentially in all pastures. In conclusion, though there may be some improvement in herbaceous structure distribution in Pasture 14 due to the assumed reduction in use on that pasture, as a whole across the allotment, based on established assumptions, the situation is the same as previously stated: current management would continue to limit the potential to promote an

appreciable increase in the proportion of High structure and the overall herbaceous structure distribution in general because of retention of Authorized Use.

Seral Stages – Continuation of current management and stocking levels would result in the persistence of mid seral stages in primary use areas and habitat types, with the potential for late seral stages occurring in secondary habitats types with less accessible topography and lower degrees of use. Consistent premature spring grazing of native grasses in hay feeding pastures as well as summer pastures is likely impeding plant vigor, impeding development of late seral stages in primary habitat types, and potentially assisting the spread of invasive grasses. Although short grazing periods and long periods of rest are reported for the affected summer pastures, annual repetition of premature grazing with inconsistent pasture deferment, along with not infrequent drought years, decreases the ability for plants to recover from premature grazing (Manske 2001, Manske and Sedivec 1999). Some of the premature grazing and short grazing periods might be appropriate for the utilization of crested wheatgrass and other invasive grasses in portions of native dominated pastures, but the degree that this is coordinated is uncertain.

High stocking levels or concentrated livestock distribution in winter hay feeding pastures contributes to low plant vigor and the spread of invasive grasses. Livestock use is likely to be concentrated on private land in several winter and/or hay feeding pastures that contain small proportions of NFS land primarily involving less accessible topography. Adverse impacts of hay feeding and premature grazing may therefore be concentrated on private land in these pastures, but adverse effects resulting from the spread of invasive grasses could occur on NFS land.

Recent turn-in into Pasture 14 has been delayed until mid to late June, thus providing plants with a significant start to the growth season before grazing disturbances and facilitating the maintenance of native plant communities that appear to occur at or near the desired proportion of seral stages.

Potentially increased levels of stocking at the value of Authorized Use would facilitate shifts towards early seral stages, with potential areas of excessive use contributing to the spread of invasive grasses.

Sharp-tailed Grouse – As noted under Herbaceous Structure previously, existing management actions, notably retention of Authorized Use levels that exceed initial estimated carrying capacity by 34 percent after adjusting for cow size, but also twice-over grazing and winter feeding/grazing would not enhance High structure grasslands, thus limiting the potential to enhance grouse nesting and brooding habitat in this allotment. However, the effective reduction in use on pasture 14 could improve the potential to enhance grouse nesting habitat in that pasture, and given the size of the pasture, within the allotment. This does come at the expense of what could be happening on other pastures as they absorb the redistributed AMs from the changes in management since 2006.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 1,566 federal AMs.
- Annually changing season of use within the grazing rotation.

- Utilizing crested wheatgrass pasture 4 as an early season pasture.
- Continuing use of a once-over deferred grazing rotation.

ADAPTIVE OPTIONS:

- Fencing high-value woody draws.
- Adjusting Authorized Use.
- Utilizing prescribed fire to treat encroaching juniper in pastures 1, 2, 6, and 11.
- Adding Allotment 249 into the grazing rotation.
- Implementing a rest rotation.

Range

Initial Actions – Because the initial Authorized Use will remain the same as current management, the permittee would be allowed to harvest the same amount of forage. Annually changing the season of use within the grazing rotation would not change the distribution of livestock because currently the season of use is changing among pastures.

Utilizing pasture 4 early would help defer livestock grazing on native pastures until range readiness. Distribution of livestock would change in the larger pastures because of their size, topography, forage quality when used, climatic conditions (summer versus fall), and quality of livestock water in the existing range water developments. However, in the smaller pastures within this allotment livestock distribution would have minimal changes because of the size, topography, and existing range water developments.

A deferred rotation is currently being used on all pastures with the exception of pastures 4 and 8. For these two pastures this would be a change from the existing condition because livestock would not be allowed to return to the pastures for a second time.

Adaptive Options – Fencing high-value woody draws would have little to no change in livestock distribution across the allotment. Forage within the exclosures would no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may occur on remaining forage. There will be a cost to install these fences and as a result there will be additional cost of maintenance of the fence to prevent livestock access to the woody draws.

Adjusting Authorized Use downward would result in fewer livestock numbers because of the inventory permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock; however, the amount of forage harvested would be less than the existing forage harvested.

Prescribed burning would increase the amount of forage available as graminoid communities replace the existing Rocky Mountain juniper communities. Livestock distribution would also change from the existing conditions because livestock would be attracted to the regrowth from the burn. Deferment of livestock grazing or rest of the pasture would need to occur if the prescribed burn is on a large scale. However, deferment or rest would be dependent on the size and intensity of the prescribed burn and its effects on soils and the herbaceous community. Rest would require an

adjustment in Authorized Use resulting in less livestock numbers due to the inventory grazing association permit for this allotment.

Adding Allotment 249 into the deferred rotation of Allotment 158 would add an additional native pasture. There would be no changes in Authorized Use because federal AMs in each allotment would be managed as two separate allotments.

Implementation of a rest rotation would require a decrease in federal AMs available. Adjustments would have to be made based on the size of pasture(s), vegetative components within the pasture(s), and the amount of forage available within pasture(s). Because the allotment carries an inventory grazing association permit the adjustment would be in livestock numbers.

Riparian – There are no intermittent streams in this allotment. There are no riparian issues in the allotment.

Woody Draws

Initial Actions – Continuation of current grazing rotations and levels of reported use would contribute to the persistence of existing woody draw conditions where the proportion of sampled sites was 69 percent Healthy. Potentially increased stocking at levels of Authorized Use that are much greater than reported levels of summer use would increase browsing and trampling disturbances and decrease woody draw conditions. Delaying turn-in by 2 to 3 weeks until June 1st in several native dominated pastures would not have a large influence on the level of woody draw disturbances, but would be complicated by the 12-month inventory permit and several winter pastures. Winter use and hay feeding would continue to contribute to trampling disturbances when livestock seek woody draws for shelter, and would assist the spread of invasive grasses that can impede the regeneration of woody species.

Adaptive Options – Fencing woody draws and/or reducing Authorized Use would increase the potential for increased growth and regeneration of woody species by removing or decreasing livestock browsing and trampling disturbances. However, reductions in Authorized Use would have to exceed 30 percent before summer use is decreased, and unreported winter use would remain as an unknown variable. Fencing of woody draws would provide the fastest and greatest degree of woody draw improvement by removing all disturbances, but existing and potential increases of invasive grasses could impede or decrease the degree of woody draw improvement. Fencing of one woody draw would have the potential to increase browsing and trampling disturbances and decrease conditions of other woody draws.

Control of encroaching Rocky Mountain juniper through prescribed burning could contribute to increased levels of woody draw disturbance as a result of decreased woodland acreage for livestock utilization. However, the effects would be localized and would primarily occur where juniper is expanding downslope into grassland habitat. Potential benefits to woody draws occurring within or near the burn sites would include decreasing the competitive influence of juniper on deciduous woody species, temporarily improving seedbed conditions for seedling establishment, promoting a flush of regrowth as a result of increased nutrients and removal of decadent material, and disruption of disease or pest cycles. Most of the deciduous woody species have the ability to resprout after burning, but the potential exists for high mortality of some desired woody plants depending on the

intensity and timing of the burn. Burning would result in livestock attraction to the flush of new herbaceous growth outside of woody draws, potentially decreasing browsing and trampling disturbances.

Adding the single pasture of Allotment 249 into the grazing rotation would result in shorter grazing periods in individual pastures and potentially assist greater deferment of the pasture rotations. However, positive effects to woody draw conditions would be low because of the already high number of pastures. Increased livestock density and distribution resulting from the combined livestock herds would also counter potential benefits.

Herbaceous Structure

Initial Actions – Given the retention of an Authorized Use level that exceeds the initial estimated carrying capacity by 34 percent after adjusting for cow size, implementation of the various proposed tools would not be expected to improve the potential to increase the proportion of High herbaceous structure or the herbaceous structure distribution in general within the allotment. There potentially could be an increase in fall VOR readings in Pasture 4 due to regrowth potential though this could be negated by the presumed high stocking (Angell 1997) and impacts to residual cover the following spring, via trampling primarily, with the earlier turn-out. Continuing with the recent once-over rotation, within a deferred rotation strategy, could benefit the herbaceous structure distribution, but, again, with the proposed Authorized Use level it is projected that there would not be appreciable improvement in the herbaceous structure distribution. Also, winter use is expected to continue and would reduce herbaceous structure in affected pastures in the spring but could be available for fall measurements. Also, with the recent and proposed reduced use of pasture 14, there potentially could be some improvement in the herbaceous structure distribution in that pasture but is unknown to what extent that could be given the recent change in management ,and it comes at the expense of other pastures with the re-distribution of the AMs.

Adaptive Options – Adjusting Authorized Use downward could eventually create the potential for addressing herbaceous structure goals by decreasing grazing intensity thereby increasing residual standing crop, particularly within the context of the number of pastures available for management options. The adaptive actions of fencing woody draws and using fire to reduce juniper encroachment would have little appreciable effect on herbaceous structure across the allotment due to the projected relatively small scale and local scope of these actions. Integrating Allotment 249 into the rotation may not be beneficial, initially, because the initial Authorized Use levels in both allotments would not necessarily be offset by the number of pastures and potential for longer deferment periods. Implementing a rest rotation under the initially proposed Authorized Use level may not be effective in balancing the herbaceous structure because of the projected high use in the grazed pastures. However, if Authorized Use is balanced for the appropriate carrying capacities, opportunities to improve the herbaceous structure condition would occur.

Seral Stages

Initial Actions – Continuation of current grazing rotations and levels of reported use would maintain current seral stages and trends of plant composition. Hay feeding and premature grazing of native grasses in several winter pastures would have a high potential to assist the spread of invasive grasses. Delaying turn-in by 2 to 3 weeks until June 1st in 2 of every 3 years in individual native-

dominated pastures would facilitate increased plant vigor, but could also result in decreased utilization of invasive grasses in portions of some pastures, which would contribute to increased use of the native grass component. Although the current grazing system is identified as a deferred rotation, AOIs/AWs indicate very little change in the season of use among most pastures, and this is likely to continue without specific direction. Some of the pasture rotations or seasons of use are likely influenced by characteristics of pasture size and location in relation to logistics of the 12-month inventory permit and winter use. Pasture 14 would likely continue to be relied upon for the majority of summer grazing. The potential exists for increased use of relatively large sized pastures 6 and 11 in the summer rotation but this is not specifically proposed. Native-dominated communities in pasture 14 that appeared to support a range of seral stages are probably sustainable with levels of use reported during 2004 through 2008. Potentially increased stocking at levels of Authorized Use would facilitate shifts towards early seral stages in all pastures and potentially increase invasive grasses where they are frequent or abundant.

Adaptive Options – Prescribed burning to control Rocky Mountain juniper in four pastures would increase or maintain plant vigor and forage production by removing the competitive effects of juniper for moisture and nutrients. The flush of increased herbaceous growth and nutrient content would have the potential of temporarily increasing livestock use in burn areas and relieving grazing pressure in current primary use, thereby facilitating a shifting mosaic of grazing pressure and seral stages. Burning would have the potential to assist the spread of annual brome or other invasive grasses and noxious weeds, so the effects of burning would be monitored for future burn planning.

Decreasing Authorized Use would facilitate shifts towards late seral stages by decreasing the level of grazing and trampling disturbances, but reductions would have to exceed 30 percent before summer use is reduced.

Adding the single pasture of Allotment 249 into the grazing rotation would result in slightly shorter periods of grazing individual pastures and a potentially increased deferment of the grazing rotation. However, the slightly shorted grazing period in each pasture would be unlikely to have a large effect on plant composition and would be countered by increased livestock density resulting from the combined livestock herds.

Implementing a rest-rotation grazing system would facilitate increased plant vigor in individual pastures on a rotating basis, but a total of 14 pastures would result in long time periods between rests.

Sharp-tailed Grouse

Initial Actions – Given the retention of an Authorized Use level that exceeds the initial estimated carrying capacity by 34 percent after adjusting for cow size, implementation of the various proposed tools would not be expected to improve the potential to increase the proportion of High herbaceous structure and enhance sharp-tailed grouse nesting habitat within the allotment. There potentially could be an increase in fall VOR readings in pasture 4 due to regrowth potential though this could be negated by the presumed high Authorized Use level (see Angell 1997). Continuing with the recent once-over rotation, within the context of a deferred rotation strategy, could potentially benefit grouse nesting habitat, but, again, with the proposed Authorized Use level it is projected that there

would not be an appreciable enhancement in grouse habitat because of the expected high Authorized Use level and its impact on productivity and composition. Also, winter use is expected to continue and would reduce potential grouse habitat in affected pastures in the spring. Also, with the recent and proposed reduced use of pasture 14, there potentially could be some improvement in grouse habitat in that pasture, but the scale of improvement is unknown given the recent change in management, and it comes at the expense of other pastures with the redistribution of the AMs.

Adaptive Options – Adjusting Authorized Use downward could eventually create the potential for addressing grouse habitat objectives by decreasing grazing intensity thereby increasing residual standing crop; particularly within the context of the number of pastures available for management options. The adaptive actions of fencing woody draws and using fire to reduce juniper encroachment could have little appreciable effect on grouse habitat across the allotment due to the projected relatively small scale and local scope of these actions. Integrating Allotment 249 into the rotation may not be beneficial, initially, because of the high initial Authorized Use levels in both allotments would not be offset by the number of pastures and the potential for longer deferment periods. Implementing a rest rotation may provide areas free from grazing providing potential grouse nesting habitat. Longer term benefits could be realized if the Authorized Use is balanced for the appropriate carrying capacities, offering more opportunities to diversify habitat conditions.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as in Alternative 3 with the exceptions of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.
- Recommending relocation of winter feeding from NFS to private pastures.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 4 are the same as Alternative 3.

Range

Initial Actions – Authorized Use for this allotment would be 1,527 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 1,566 federal AMs converted to AUMs by adjusting for cow size is 1,801 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 15 percent reduction in AUMs from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment.

Moving the winter feeding activities from NFS lands to private land will reduce the chances of introducing or continuing the spread of noxious weed species. The distribution of livestock may change because there is no longer an attractant drawing them to specific sites used for feeding; however, taking into consideration the size and topography of the pastures the change in distribution would be minimal.

Riparian – There are no intermittent streams in this allotment. There are no riparian issues in the allotment.

Woody Draws

Initial Actions – Reducing Authorized Use by 15 percent according to initial estimated carrying capacity and adjustments for cow size would have no effect on woody draw conditions because potential levels of use would remain 21 to 65 percent greater than reported summer use.

Recommending that hay feeding be moved to private pastures would shift adverse effects associated with this practice off NFS land. However, the response to the recommendation is unknown and would require a large change in management because several NFS pastures are currently used as winter pastures and are likely managed as such for their accessibility during the winter. Several small winter pastures contain both NFS and private land where confining hay feeding to the private portion would continue to contribute to the introduction of invasive seed and potential browsing and trampling disturbances in woody draws on NFS land.

Herbaceous Structure

Initial Actions – The adjustment in Authorized Use from AMs to AUMs to reflect the initial estimated carrying capacity should result in a positive improvement in herbaceous structure, assuming actual use reflects the preference level. Moving winter feeding locations from NFS surface to private would remove the attractant. Depending on the old location relative to the new location and the size and configuration of the pasture, effects could be positive to neutral for the herbaceous structure distribution. The larger issue is the apparent unaccounted for winter use that may occur.

Seral Stages

Initial Actions – Reducing Authorized Use by 15 percent according to initial estimated carrying capacity and adjustments for cow size would have no effect on seral stages or plant composition compared to currently reported levels of use because potential levels of use would remain 21 to 65 percent greater than reported summer use. Delayed turn-in until June 1st in 2 of every 3 years within individual native dominated pastures would assist the maintenance of native plant communities, but could be complicated by the 12-month inventory permit and numerous winter pastures. The potential would occur for increased use of the native component in some pastures that contain invasive grass dominated areas that would decrease in palatability with later turn-in dates.

Removing hay feeding from NFS land would decrease the annual introduction of invasive grass seed, but as discussed under woody draws, this would require a committed effort and relatively large changes in pasture management. Confining hay feeding to private land within intermingled private/NFS pastures would maintain the potential for premature spring grazing on NFS land, and would not eliminate the introduction of invasive grass seed. There are no specific proposals

regarding a change in the current use of six to eight NFS pastures during the winter and it is therefore unlikely that management changes would occur on these pastures.

Sharp-tailed Grouse

Initial Actions – The adjustment in Authorized Use from AMs to AUMs to reflect the initial estimated carrying capacity should result in a positive improvement in potential grouse habitat, assuming actual use reflects the Preference level. Pasture 14, which falls within the 1-mile proximity radius of three leks, may benefit the most and experience a greater level of grouse habitat enhancement. Moving winter feeding locations from NFS surface to private would remove the attractant. Depending on the old location relative to the new location and the size and configuration of the pasture, effects to grouse habitat could be positive to neutral since winter use reduces vegetation that could be potential spring nesting habitat. The larger issue could be the apparent unaccounted for winter use that may occur.

ALLOTMENT 220

Table 220.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 220 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 6.1 – Rangeland With Broad Resource Emphasis	279	100	
Total allotment acres	279	100	
NFS acres	279	100	
State land acres	0	0	
Private land acres	0	0	
Current permitted livestock grazing (AMs) on NFS lands			160
Initial estimated carrying capacity (AUMs) on NFS lands			112
Number of pastures containing NFS lands			2

Table 220.2 — Allotment 220 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	There are no perennial or intermittent stream reaches in this allotment.	None.
Woody draws	There are no woody draws in the allotment.	None.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Below Objectives High – Below Objectives 2004 Transects: 1.19 2004 Stations percent: Low-85/Moderate-15/ High-0 2005 Transects: 1.16 2005 Stations percent: Low-95/Moderate-5/ High-0.	Manage for additional Moderate and High structure on biologically capable habitats. Assess practicality of managing for High herbaceous structure given the capability of the allotment.
Seral stages	Of five sample sites, four were at mid seral stages and one was at an Invaded Grass State. There is an apparent trend of increasing bluegrass from the north to the south end of the allotment.	Maintain and increase seral development of native grass communities and decrease or limit the spread of invasive grasses.
Sharp-tailed grouse	One lek within one mile encompassing 32 acres of overlap within that radius.	Improve seral conditions and reassess practicality to produce High structure grasslands habitat.
Remarks	No known noxious weeds on NFS lands.	

Table 220.3 — Allotment 220 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 160 federal AMs. • Three-year average permitted use is 146 federal AMs.* • Permit type: Turn-in. • Rotation: Two-pasture deferred rotation. • Class(s) of livestock: Yearlings or cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 160. • Continue to annually change season of use within the grazing rotation. **Adaptive Options** • Adjust Authorized Use.	**Initial Actions** • Authorized federal AUMs: 112. • Continue to annually change season of use within the grazing rotation. **Adaptive Options** • Adjust Authorized Use.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Gather Visual Obstruction Readings annually for 3 years then reevaluate survey frequency. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 220 — Existing Condition

Range – This allotment is approximately 279 acres of NFS lands only. Currently, this allotment is issued a turn-in permit for 20 head for 8 months by the MGA. It is also the headquarters allotment associated with a common allotment (Fairfield Common). This allotment has been subdivided into two pastures which range in size from 137 to 148 acres. Current AMs provided by NFS lands can be found in Table 220.1. This allotment is located in the Rolling Prairie geographic area. Water developments within this allotment include two reservoirs.

The rotation on this allotment since 2002 has been a two-pasture deferred rotation with yearlings, typically. During drought years such as in 2005, the yearlings have been replaced with cow/calf pairs. The grazing season starts around June 1st and runs through November 30th.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there were no known state listed noxious weeds or county listed weeds within this allotment.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – There are no woody draws in this allotment.

Herbaceous Structure – In 2004, there was one VOR transect in this allotment. It was measured in the Low herbaceous structure class. Station averages were also dominated by Low structure: Low structure stations – 85 percent; Moderate stations – 15 percent; High – 0 percent.

This transect was resurveyed in 2005 and was again measured in the Low structure class with essentially the same measurement. Low structure stations dominated the transect at 95 percent with Moderate stations at 5 percent. There were no High structure stations in 2005.

Seral Stages – An NDSU sample on a Claypan ecological site at the north end of pasture 1 was at an Invaded Grass State with bluegrass comprising 54 percent of the grass production and 36 percent of the total production. A sere plot in the northeast quarter of the pasture was at a mid-early seral stage with blue grama dominance and Kentucky bluegrass constituting 22 percent of the relative grass basal cover. A belt transect in the north half of the pasture recorded bluegrass as the dominant species. A second NDSU sample on a Shallow Clay ecological site in the southwest quarter of the pasture was at a mid seral stage with Junegrass and blue grama dominance and no invasive grasses. A Robel transect in this area indicated similar plant composition. A Shallow Loamy ecological site in the southeast quarter of the pasture was at a mid-early seral stage. Invasive bluegrass and Junegrass were the most frequent species but bluegrass comprised less than four percent of the grass production from clipped plots.

A sere plot on a Shallow Loamy ecological site near the center of pasture 2 at the south end of the allotment was at a mid seral stage with invasive bluegrass constituting about 7 percent of the relative grass canopy cover.

Sharp-tailed Grouse – There is one known sharp-tailed grouse lek within 1 mile. Approximately 32 acres occur within the 1-mile radius of the allotment.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed 2 years later.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would now be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – There are no woody draws in this allotment.

Herbaceous Structure – With the removal of livestock, there would be an increased opportunity for the development of improving the herbaceous structure distribution within this allotment with a decrease in the amount of Low structure due to increased residual cover with the lack of grazing.

Seral Stages – The removal of livestock grazing would facilitate the accumulation of plant litter that would assist increases of invasive bluegrass and transitions to Invaded Grass States where they have not already occurred. Native plant diversity would gradually decrease. These effects would occur within 10 years across most of the allotment due to the current extent and amount of bluegrass.

Sharp-tailed Grouse – In this allotment, it is uncertain whether an appreciable proportion of High structure habitat would be achievable within 10 to 15 years due to productivity of the soils. Even though High structure may increase, the quality and quantity of habitat for nesting and brooding may not be appreciably enhanced due to the probable increase in Kentucky bluegrass.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by a turn in grazing association permit, and Authorized Use is 160 federal AMs.
- Yearlings or cow/calf pairs are run in a two pasture deferred rotation.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – There are no woody draws in this allotment.

Herbaceous Structure – Current management would continue to perpetuate the herbaceous structure distribution with a limited potential to improve the herbaceous structure distribution in general. However, there is debate as to the ability of the allotment to contribute practically to addressing High structure objectives due to the presumed soil productivity levels. However, the role of current and historical management cannot be ruled out at this time.

Seral Stages – Invasive grasses would have a high potential to continue increasing under current management with Authorized and reported use that exceed initial estimated carrying capacity by as much as 64 percent after adjusting for cow size. Forage production measured on the NDSU sample plots appeared low relative to Authorized Use and stocking levels that are often in the range of 1.5 acres/AUM. Usual turn-in during June results in low palatability and utilization of invasive grasses

during most of the grazing season, and selective use of the native component at current levels of use has a high potential to decrease plant vigor and assist the spread of invasive grasses. Conversely, current levels of use that impede the accumulation of plant litter may be slowing the spread of invasive grasses compared to Alternative 1. Although the potential exists for fall regrowth and increased palatability of bluegrass near the end of the grazing season, the lack of early season utilization of the species may decrease this potential. Pasture 1 at the north end of the allotment with the greatest amount of bluegrass would be the most affected by poor coordination of the grazing seasons with invasive grass palatability.

Sharp-tailed Grouse – There is one lek within 1 mile of the allotment with approximately 32 acres of the allotment that fall within the 1-mile radius. Existing management, notably an Authorized Use level that is 64 percent over the initial estimated carrying capacity, would continue to limit the potential to enhance grouse nesting and brooding habitat in this allotment.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 160 federal AMs.
- Continue to annually change season of use within the grazing rotation.

ADAPTIVE OPTIONS:

- Adjusting Authorized Use.

Range

Initial Actions – Because the initial Authorized Use will remain the same as current management, the permittee would be allowed to harvest the same amount of forage. Annually changing the season of use within the grazing rotation would not have an effect on livestock distribution because of the small size of the pastures.

Adaptive Options – Adjusting Authorized Use downward would result in fewer livestock numbers, fewer grazing days, or a combination of the two because of the turn in permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock; however, the amount of forage harvested would be less than the existing forage harvested.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – There are no woody draws in this allotment.

Herbaceous Structure

Initial Actions – Proposed actions under this alternative are essentially the same as current management. Therefore, it is projected that the existing herbaceous structure distribution would generally be retained. The Authorized Use that is 64 percent over the initial estimated carrying capacity, and the grazing system, would limit the retention of residual cover and regrowth while maintaining the early to mid seral condition at the same time.

Adaptive Options – Adjusting Authorized Use downward could eventually create the potential for addressing the potential herbaceous structure distribution within the context of the ability of the productivity of the allotment by decreasing grazing intensity thereby increasing residual cover.

Seral Stages

Initial Actions – Current management is proposed to continue and the effects were discussed under Alternative 2.

Adaptive Options – Decreasing the level of Authorized Use would facilitate shifts towards late seral stages in areas of the allotment that are not heavily invaded by bluegrass. Existing bluegrass cover would impede the development or maintenance of late seral stages in portions of the allotment, and sufficiently decreased levels of use could assist increases of bluegrass by increasing litter accumulation. In general, neither decreases nor increases in Authorized Use would be effective in helping to control bluegrass and increasing the native component without coordinating a large portion of the grazing season with high palatability of the invasive component and decreasing utilization of the native component to increase its vigor and development. A compressed early season grazing period in the most heavily invaded portions of the allotment holds the greatest promise of achieving this result.

Sharp-tailed Grouse

Initial Actions – Approximately 32 acres of overlap occur within a 1-mile radius around a known lek. Though desirable to improve grouse nesting habitat within this allotment, it is not necessary per Grasslands Plan guidance because it is appreciably less than the recommended 160 acres.

Adaptive Options – Continuing to adjust the Authorized Use downward would eventually create the potential for increasing grouse nesting habitat relative to the allotment's capability by decreasing grazing intensity thereby increasing residual standing crop.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3; therefore, Alternative 3A would have the same effects as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carry capacity.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 4 are the same as Alternative 3.

Range

Initial Actions – Authorized Use for this allotment would be 112 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 160 federal AMs converted to AUMs by adjusting for cow size is 184 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 39 percent reduction in AUMs from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – There are no woody draws in this allotment.

Herbaceous Structure

Initial Actions – Adjusting the Authorized Use to reflect initial estimated carrying capacity could begin to move the allotment towards an improved representation of herbaceous structure relative to the capability of the allotment because more cover would be left after grazing.

Seral Stages

Initial Actions – Effects of continuing the deferred rotation were discussed under Alternative 2. Decreasing Authorized Use by 39 percent according to initial estimated carrying capacity and adjustments for cow size would increase plant vigor and facilitate trends towards late seral stages in areas of the allotment that are not heavily invaded by bluegrass. However, invasive bluegrass could have an increased potential to increase and spread from the north to the south end of the allotment as assisted by increasing litter with the decrease in utilization.

Sharp-tailed Grouse

Initial Actions – Adjusting the Authorized Use to reflect the initial estimated carrying capacity could begin to increase the quantity and quality of grouse nesting habitat relative to the capability of the allotment because more cover would be left after grazing that could be available the following spring.

ALLOTMENT 221

Table 221.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 221 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 6.1 – Rangeland With Broad Resource Emphasis	403	100	
Total allotment acres	1123	100	
NFS acres	403	36	
State land acres	0	0	
Private land acres	719	64	
Current permitted livestock grazing (AMs) on NFS lands			246
Initial estimated carrying capacity (AUMs) on NFS lands			174
Number of pastures containing NFS lands			3

Table 221.2 — Allotment 221 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	There are no perennial or intermittent stream reaches in this allotment.	None.
Woody draws	All surveyed woody draws were At Risk. This is because of lack of regeneration and impacted shrub layer.	Increase successful recruitment of woody species.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Below Objectives High – Below Objectives 2004 Transects: 1.19 2004 Stations percent: Low-80/ Moderate-20/High-0 2005 Transects: 1.18 2005 Stations percent: Low-75/ Moderate-25/High-0.	Manage for additional Moderate and High structure on biologically capable habitats.
Seral stages	Broken land and/or invasive grasses comprise large portions of the three pastures. Of four sample sites, three were at mid seral stages and one was at an Invaded Grass State.	Increase the development of native plant species and decrease or limit the spread of invasive bluegrass.
Sharp-tailed grouse	There are two leks within 1 mile of the NFS lands of this allotment. Approximately 316 acres of overlap occur within the pastures with NFS lands within the 1-mile radius	Manage for increased High vegetative structure on biologically capable sites to enhance habitat.
Remarks	No known noxious weeds on NFS lands.	

Table 221.3 — Allotment 221 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 246 federal AMs. • Three-year average permitted use is 221 federal AMs.* • Permit type: Turn-in. • Rotation: Modified three-pasture deferred rotation. • Class(s) of Livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 246. • Utilize crested wheatgrass pastures 2 and 3 as early season pastures. • Annually change season of use in pasture 6. • Locate stock tank on fenceline between Allotment 221 pasture 3 and Allotment 272 pasture 2. Tank would be supplied from proposed rangeland pipeline located in Allotment 272 pasture 2. **Adaptive Options** • Adjust Authorized Use.	**Initial Actions** • Authorized federal AUMs: 174. • Initiate 3-pasture deferred rotation with grazing commencing May 1st. • Locate stock tank on fenceline between Allotment 221 pasture 3 and Allotment 272 pasture 2. Tank would be supplied from proposed rangeland pipeline located in Allotment 272 pasture 2. **Adaptive Options** • Remove fence between Allotment 221 pasture 3 and Allotment 272 pasture 2; adjust Authorized Use in both allotments to reflect removal of Allotment 221 pasture 3. • Burn, mow, hay, interseed, or reseed crested wheatgrass to improve stand vigor and/or species composition. • Adjust Authorized Use.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings annually for 3 years then reevaluate survey frequency. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** Same As Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 221 — Existing Condition

Range – This allotment is approximately 1,123 acres in size and contains both private and NFS lands with 403 acres of NFS lands. Currently, this allotment is issued a turn-in permit for 40 head for 7 months by the MGA. It is also the headquarters allotment associated with a common allotment (Fairfield Common). This allotment has been subdivided into seven pastures, and of these seven pastures, three contain NFS lands. These pastures range in size from 88 to 177 acres. Current AMs provided by NFS lands can be found in Table 221.1. This allotment is located in the Rolling Prairie geographic area. Water developments include two reservoirs and a dugout.

The rotation on this allotment has been a two-pasture deferred rotation beginning around May 1st with cow/calf pairs between pastures 2 and 3 in recent years and ending each year in pasture 6. Prior to 2005 the rotation on this allotment was as follows: start in pasture 2, rotate to pasture 3, and then to pasture 6. One of the challenges faced within this allotment is reliable livestock water in pastures 2 and 3. Although grazed earlier, there are times when the dugout in pasture 2 is dry, and the livestock have to utilize the creek running through a small portion of private land that is included in this pasture. The reservoir in pasture 3 typically dries out as well, and if so the gates are opened between pastures 2 and 3. Another challenge faced in these pastures is the plant composition that includes intermingled crested wheatgrass, native grasses, and introduced species such as Kentucky bluegrass. This challenge is a balance of not over utilizing the native species component (both native grasses and native forb species), and not promoting the increase of Kentucky bluegrass, while still utilizing the crested wheatgrass.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there were no known state-listed noxious weeds or county listed weeds within this allotment.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – Pasture 2 contained three woody draws, and surveys of two of the sites indicated At Risk conditions with a lack of tree regeneration and desired shrub layers (Figure 221.1). A small woody draw patch occurs adjacent to the reservoir in pasture 3 and field observations indicated At Risk conditions. No woody draws occurred in pasture 6.

Figure 221.1 — Two At Risk woody draws in pasture 2 with a lack of recent tree regeneration and desired shrub layers.

Herbaceous Structure – There is one randomly sampled VOR transect within this allotment located in pasture 2. In 2004, this transect was measured in the Low structure class. Station readings were also dominated by Low structure readings at 80 percent; 20 percent of the stations were Moderate structure. There were no High readings.

This transect was resurveyed in 2005 and was also sampled in the Low class. And, again, the station averages were dominated by Low as well with 75 percent and the balance in Moderate at 25 percent. There were no High readings.

Seral Stages – All of pasture 2 consists of broken land and a sere plot near the middle of the pasture was at a mid seral stage with crested wheatgrass dominance and lesser amounts of western wheatgrass and other native grasses. A nearby Robel transect and belt transect recorded similar plant composition. Bluegrass consistently occurred in light amounts and small patches throughout the pasture. Crested wheatgrass and blue grama remained dominant along a repeated pace transect near the sere plot, but measurements were suggestive of decreasing plant cover and increasing litter, clubmoss, and low growing forbs such as pussy-toes (*Antennaria* spp).

Broken land is not identified in pasture 3 but invasive grasses of crested wheatgrass, bluegrass, and smooth brome, along with sweet clover, dominate large areas of the pasture with native grass communities persisting on low ridge shoulders.

About 73 percent of pasture 6 is identified as broken land and under-utilized crested wheatgrass is observed throughout the northern two-thirds of the pasture (Figure 221.2a). Unbroken land constituted a corridor along a tributary of Whitetail Creek in the southern third of the pasture, but frequent patches of annual brome and smooth brome were mixed among native grasses in this area. A stock pond along the drainage contributes to heavy livestock use relative to the north half of the pasture (Figure 221.2b).

Figure 221.2 — a) Under-utilized crested wheatgrass observed at the north end of pasture 6 during late September. b) High use around stock pond and unbroken land in southeast quarter of pasture.

An NDSU sample plot on a Clayey ecological site in the northeast quarter of pasture 6 was at an Invaded Grass State with Canada bluegrass and trace amounts of Kentucky bluegrass constituting almost 59 percent of the grass production. Non-native intermediate wheatgrass constituted 28 percent of the grass production. Small amounts of cheatgrass (*Bromus tectorum* L.) and crested wheatgrass were also present. A sere plot in this general area of the pasture was at a mid-early seral stage but with equal dominance of crested wheatgrass and bluegrass and a similar proportion of intermediate wheatgrass (*Agropyron intermedium* (Host) Beauv.). A nearby belt transect was dominated by bluegrass and crested wheatgrass. Relative plant frequency of invasive bluegrass increased from 0 percent to 27 percent along a repeated pace transect between 1980 and 2009 on the east side of the pasture. Relative plant frequency of crested wheatgrass decreased from 50 percent to 25 percent, while western wheatgrass decreased from 18 percent to 0 percent during the sample interval. A second NDSU sample site on a Claypan ecological site within broken land in the southwest quarter of the pasture was also at a mid-early seral stage. Crested wheatgrass and invasive bluegrass respectively comprised about 74 percent and 13 percent of the grass production, while smooth brome and cheatgrass collectively comprised about 6 percent of the grass production.

Sharp-tailed Grouse – There are two leks within 1 mile of this allotment, overlapping all three pastures containing NFS lands. Approximately 316 acres occur within the 1-mile radius of the leks.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed 2 years later.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would now be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – Woody draw conditions in pasture 2 would improve with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. Existing invasive grasses and potential increases of these species as a result of increasing litter with the removal of livestock grazing would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock, there would be an appreciable increased opportunity for the development of High and Moderate herbaceous structure, and a decrease in the amount of Low herbaceous structure.

Seral Stages – The removal of livestock grazing would facilitate the accumulation of plant litter that would assist increases of invasive bluegrass and transitions to Invaded Grass States where they have not already occurred. Existing native plant diversity would gradually decrease. These effects would occur within 10 years in pastures 3 and 6 because of the current predominance of bluegrass and other invasive grasses in these pastures, but would require longer periods in pasture 2 due to more localized occurrences of aggressive bluegrass species.

Sharp-tailed Grouse – The increase in High structure from removal of livestock disturbance of habitat would benefit nesting and brooding habitat for sharp-tailed grouse. However, over time the decrease in forb diversity would decrease foraging opportunities. To a lesser extent, nesting and brooding quality would also decrease because of lower quality habitat associated with invasive grasses that may invade local habitats.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by a turn in grazing association permit, and Authorized Use is 246 federal AMs.
- Cow/calf pairs are run in a three-pasture modified deferred rotation.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – At Risk woody draw conditions would persist or decrease towards Unhealthy conditions under current management. The scarcity of woody draws in pastures 2 and 3 contributes to concentrated livestock disturbances during grazing periods that frequently extend into the warm temperatures of mid to late July. Despite relatively short grazing periods, the shrub layer and recent tree regeneration are lacking and there is no reason to expect improvement under current management. Decreasing palatability of invasive grasses after mid June is likely to contribute to woody draw disturbances when livestock seek extended green periods of the understory. Authorized Use that exceeds initial estimated carrying capacity by 63 percent after adjusting for cow size also contributes to high levels of browsing and trampling disturbances that would continue to impede the regeneration of desired trees and shrubs.

Herbaceous Structure – Current management would continue to perpetuate the herbaceous structure distribution with a limited potential to improve the proportion of High herbaceous structure and the herbaceous structure distribution in general.

Seral Stages – May turn-in dates and the deferred rotation between pastures 2 and 3 facilitate use of the invasive grass component during alternate years in each pasture. Low palatability of the invasive component in the second pasture of the rotation, along with Authorized Use that greatly exceeds initial estimated carrying capacity, contribute to selective and excessive use of the native component that impedes its development with the potential to assist the spread and dominance of invasive grasses.

Mid to late summer turn-in dates onto pasture 6 also results in low palatability of the invasive grass component that contributes to selective use of the native component in the southern third of the pasture. Low use in the northern two-thirds of the pasture is assisting the spread of invasive bluegrass even at the expense of crested wheatgrass. Continued increases of invasive grasses and transitions to Invaded Grass States would be expected throughout the pasture with a loss of native species diversity at the south end of the pasture.

Sharp-tailed Grouse – Existing management actions, notably an Authorized Use level 63 percent above the initial estimated carrying capacity, would continue to limit the potential to enhance grouse nesting and brooding habitat in this allotment.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 246 federal AMs.
- Utilizing crested wheatgrass pastures 2 and 3 as early season pastures.
- Annually changing season of use in pasture 6.
- Locating a stock tank on fenceline between Allotment 221 pasture 3 and Allotment 272 pasture 2. Tank would be supplied from proposed rangeland pipeline located in Allotment 272 pasture 2.

ADAPTIVE OPTIONS:

- Adjusting Authorized Use.

Range

Initial Actions – Because the initial Authorized Use will remain the same as current management, the permittee would be allowed to harvest the same amount of forage. Utilizing pastures 2 and 3 as crested wheatgrass pastures would defer grazing on the native portions of pasture 6 until range readiness. Because of the size and topography of pasture, changes in livestock distribution would be minimal.

Changing the season of use in pasture 6 would change the timing of when federal AMs are harvested and would allow for graminoid species to be grazed at different periods of the growing season. Because of the size and topography of pasture there would be minimal changes in livestock distribution.

Adding a stock tank in pasture 3 from the proposed pipeline in Allotment 272 would allow for more flexibility in the rotation. The pasture is normally grazed early because of the existing livestock

water source. Adding the tank would allow the pasture to be used later in the grazing season and allow for graminoid species to be utilized during different periods of the growing season providing for opportunities for initial growth or regrowth.

Adaptive Options – Adjusting Authorized Use downward would result in fewer livestock numbers, fewer grazing days, or a combination of the two because of the turn in permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock; however, the amount of forage harvested would be less than the existing forage harvested.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws

Initial Actions – Using pastures 2 and 3 as early season crested wheatgrass pastures would not be appreciably different from current grazing seasons. Current use that extends into mid-July with a deferred rotation between these pastures might be slightly shortened, but would not appreciably decrease current woody draw disturbances. The relative scarcity of woody draws and Authorized Use that exceeds initial estimated carrying capacity by 63 percent would maintain the current level of woody draw disturbances.

Adding a water tank in pasture 3 would increase the reliability of water in the pasture, with potentially increased use contributing to decreased conditions of small woody draw patches in the pasture. Decreased reliance on pasture 2 might contribute to improved woody draw conditions in this pasture, but levels of Authorized Use and the scarcity of woody draws in the pasture would impede improvement of At Risk conditions.

Adaptive Options – Decreasing Authorized Use would decrease the level of livestock browsing and trampling disturbances that would facilitate increased regeneration of desired trees and shrubs. However, existing and potentially increasing invasive grasses would have the potential to impede or decrease the rate of regeneration and degree of woody draw improvement.

Herbaceous Structure

Initial Actions – The proposed retention of an Authorized Use level that is 63 percent higher than the initial estimated carrying capacity after accounting for cow size, would continue to limit High herbaceous structure and the herbaceous structure distribution in general. Utilizing crested wheatgrass pastures early in the year has the potential to improve the structure distribution. However, the proposed Authorized Use level would limit the retention of residual cover after grazing and the ability to recover from grazing (Angell 1997). Annually changing season of use in pasture 6 would not improve the herbaceous structure distribution due to the proposed Authorized Use level. Lastly, a new water source would promote more even use especially in combination with the proposed Authorized Use level.

Adaptive Options – Adjusting the Authorized Use downward would tend to improve the potential for increasing the proportion of High herbaceous structure within the allotment and improve the overall herbaceous structure distribution. However, under this alternative and given the potential discrepancy between Authorized Use and initial estimated carrying capacity estimates, that achieving that balance between the Authorized use level in AUMs and the initial estimated carrying capacity could potentially take longer than 10 to 15 years.

Seral Stages

Initial Actions – Implementing slightly shorter grazing seasons in pastures 2 and 3 with continuation of a deferred rotation would only slightly assist the development of native species and later seral stages compared to current management. Although greater deferment or changes in the season of use are proposed for pasture 6, grazing seasons would continue to be conducted after invasive grass palatability has decreased and there would be no appreciable change in effects compared to current management. Invasive bluegrass would continue to increase and further transitions to Invaded Grass States would occur throughout most of the pasture in 5 to 10 years.

Adding a water tank along the boundary of pasture 3 would decrease reliance of pasture 2 and could facilitate greater utilization of invasive bluegrass and smooth brome that occur in pasture 3 and that may have been facilitated by decreased levels of use associated with poor water reliability. Potentially decreased reliance on pasture 2 could facilitate increased expression of the native grass component that is mixed within the stand of crested wheatgrass.

Adaptive Options – Decreasing Authorized Use would increase plant vigor and development by decreasing the level of grazing disturbances. However, sufficiently decreased levels of use could assist increases of bluegrass by facilitating the accumulation of plant litter. Neither decreases nor increases in Authorized Use would be effective in long-term control of bluegrass and maintenance of native plant diversity without coordinating the grazing season with high palatability of the invasive grass component and decreasing utilization of the native component to increase its vigor and development. A compressed early season grazing period in all three pastures of the allotment holds the greatest promise of achieving this result.

Sharp-tailed Grouse

Initial Actions – The proposed retention of an Authorized Use level that is 63 percent higher than the initial estimated carrying capacity after accounting for cow size, would continue to limit grouse nesting habitat. Utilizing crested wheatgrass pastures early in the year has the potential to improve grouse habitat. However, the proposed Authorized Use level would limit the retention of residual cover after grazing and the ability to recover from grazing for the growing season (Angell 1997). Annually changing season of use in pasture 6 would not improve grouse habitat conditions because of the proposed Authorized Use level. Lastly, a new water source would promote more even use especially in combination with the proposed Authorized Use level.

Adaptive Options – Adjusting the Authorized Use downward would tend to improve the potential for increasing the proportion of grouse nesting habitat within the allotment. However, under this alternative and given the potential discrepancy between Authorized Use and initial estimated carrying capacity, achieving that balance between the Authorized Use level in AUMs and the carrying capacity could potentially take longer than 10 to 15 years.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3; therefore, Alternative 3A would have the same effects as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carry capacity.
- Initiating a three-pasture deferred rotation with grazing commencing May 1st.

ADAPTIVE OPTIONS:

- Removing the fence between Allotment 221 pasture 3 and Allotment 272 pasture 2; adjust Authorized Use in both allotments to reflect removal of Allotment 221 pasture 3.
- Burning, mowing, haying, interseeding, or reseeding crested wheatgrass to improve stand vigor and/or species composition.

Range

Initial Actions – Authorized Use for this allotment would be 174 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 246 federal AMs converted to AUMs by adjusting for cow size is 283 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 38 percent reduction in AUMs from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment.

Initiating a three-pasture deferred rotation on May 1st would change the existing rotation because livestock would graze all three pastures at different times from year to year utilizing pastures at different stages of the growing season. Livestock distribution changes would be minimal due to the relatively small size of the pastures.

Adaptive Options – Removing pasture 3 from this allotment by removing the fence between this pasture and Allotment 272 pasture 2 would change the distribution of livestock because the size of the pasture would increase. An adjustment in AUMs would be required since pasture 3 would no longer be part of this allotment resulting in a reduction in AUMs for Allotment 221 and an increase in AUMs for Allotment 272.

Burning, mowing, haying, interseeding, or reseeding crested wheatgrass to improve stand vigor and/or species composition would affect livestock distribution minimally. However, there may be some focused livestock grazing with some of these treatments initially because of the increased palatability. Also, some treatments would require deferment or rest from livestock grazing. Deferment would not affect Authorized Use because livestock grazing would occur later in the growing season. Rest would result in reducing Authorized Use because the forage would no longer be available to livestock until desired conditions are reached.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws

Initial Actions – Implementing a three-pasture deferred rotation with grazing initiated in early May would not appreciably improve woody draw conditions in pastures 2 and 3. A three-pasture deferred rotation would decrease the frequency of early season grazing to once every 3 years in each pasture, with an increased frequency of mid and late summer grazing in pastures 2 and 3 when warmer temperatures and insect pests create the potential for increased woody draw disturbances. Low palatability of the invasive forage component during these years would also contribute to woody draw disturbances as a result of livestock seeking extended green periods in the understory.

Decreasing Authorized Use by 38 percent according to initial estimated carrying capacity and cow size would decrease the level of livestock browsing and trampling disturbances, which would facilitate increased regeneration of desired trees and shrubs. However, relatively high levels of woody draw disturbances would continue due to the low number of draws, and increased frequency of warm-season grazing, and low palatability of upland grasses as discussed above. The proposed reduction in use might facilitate the maintenance or slight improvement of At Risk conditions and avoid trends towards Unhealthy conditions. Existing and potentially increased invasive grasses with the reduction in stocking levels would have the potential to impede or decrease the rate of woody regeneration and degree of woody draw improvement.

Adaptive Options – Transferring pasture 3 to Allotment 272 and adjusting Authorized Use accordingly would not have an appreciable effect on woody draw conditions in pasture 2 because the grazing system would be presumed to return to a relatively early season two-pasture deferred rotation similar to current management. Current conditions of small woody draw patches in pasture 3 would persist due to seasons of use similar to current management.

Various treatments to improve crested wheatgrass stands would have minimal effect on woody draw conditions without consistent coordination of the grazing season with high palatability of invasive grasses.

Herbaceous Structure

Initial Actions – Adjusting the Authorized Use to reflect initial estimated carrying capacity could begin to move the allotment towards a balanced representation of herbaceous structure, particularly High herbaceous structure, assuming the permittee is currently operating at or near the preference level. Initiating a three-pasture deferred rotation could provide a longer regrowth period in the early pasture, which may promote some recovery of herbaceous structure depending on time of year and weather patterns. Locating a livestock watering tank on the fenceline of pasture 3 would be necessary to ensure rotational integrity but would also promote homogenization, though expected in a small pasture.

Adaptive Options – Continuing to adjust the Authorized Use downward would improve the potential for addressing the potential herbaceous structure distribution of the allotment by further decreasing grazing intensity thereby increasing residual standing crop. Integrating pasture 3 into Allotment 272 pasture 2 could potentially aid the herbaceous structure distribution due to the early use and the longer regrowth period associated with Allotment 272. However, impacts to Allotment

221 would include altering the rotation to potentially a two-pasture deferred rotation. Because of the length of the grazing season within a two-pasture rotation, the regrowth time would be limited.

Seral Stages

Initial Actions – Implementing a three-pasture deferred rotation with grazing initiated in early May would maintain or increase the degree of poorly coordinated grazing seasons and palatability of invasive grasses that dominate most portions of the three pastures in the allotment. Grazing seasons currently coincide with low palatability of invasive grasses every other year in pastures 2 and 3, and every year in pasture 6. A three-pasture rotation would result in low palatability of the invasive grass component two of every 3 years in each pasture, and the degree of poorly coordinated grazing seasons with invasive grass palatability would increase in pasture 2 and 3 compared to current management and Alternative 3. Increased coordination of the grazing season with invasive grass palatability would occur one of every 3 years in pasture 6, but this would not be sufficient to offset trends of increasing invasive grasses in the pasture.

Decreasing Authorized Use by 38 percent according to initial estimated carrying capacity and adjustments for cow size would decrease the level of grazing disturbances and increase plant vigor in primary use areas. However, decreased use would not alter trends of increasing invasive grasses in large portions of all three pastures due to poor coordination of the grazing season with invasive grass palatability. Further spread of invasive grasses and transitions to Invaded Grass States would continue and possibly accelerate with increasing plant litter associated with the decreased level of use. Neither decreases nor increases in Authorized Use would be effective in long-term control of bluegrass and the maintenance of native plant diversity without coordinating the grazing season with high palatability of the invasive grass component.

Adaptive Options – The adaptive action of removing the fence and adding pasture 3 to Allotment 272 pasture 2 could contribute to more consistent use of invasive grass components in pasture 3. Allotment 272 pasture 2 is grazed during the early season when palatability of invasive grasses is greatest, but field observations indicate relatively low utilization at the north end of the pasture and sharp increases of invasive bluegrass compared to ecoplot measurements conducted during 1998. A new water tank proposed on the pasture boundary of Allotment 221 pasture 3 and Allotment 272 pasture 2 (see effects analysis for Allotment 272) would contribute to increased use of invasive components in this area, but could be countered by decreased use of invasive grasses in the south half of Allotment 272 pasture 2. Therefore, utilization of invasive grasses might increase in Allotment 221 pasture 3, but would remain relatively unchanged across a larger landscape scale.

Various treatments to improve crested wheatgrass stands would have the potential to increase plant vigor and production. However, little benefit is likely to be obtained in regards to increasing or maintaining native plant components compared to consistent coordination of the grazing season with high palatability of invasive grasses and deferring use of the native component until it has achieved sufficient vigor and development to withstand appropriate stocking levels.

Neither decreases nor increases in Authorized Use would be effective in long-term control of bluegrass and maintenance of native plant diversity without coordinating the grazing season with high palatability of the invasive grass component.

Sharp-tailed Grouse

Initial Actions – Adjusting the Authorized Use to reflect initial estimated carrying capacity could begin to potentially enhance grouse nesting cover by improving the amount of higher herbaceous structure on the allotment, assuming the permittee is currently operating at or near the preference level. Initiating a three-pasture deferred rotation could provide a longer regrowth period in the early pasture which may permit limited recovery of potential grouse cover depending on time of year and weather patterns. Locating a livestock watering tank on the fenceline of pasture 3 would be necessary to ensure rotational integrity but would also promote homogenization, though expected in a small pasture.

Adaptive Options – Continuing to adjust the Authorized Use downward would improve the potential for enhancing grouse nesting habitat within the allotment by further decreasing grazing intensity thereby increasing residual cover. Integrating pasture 3 into Allotment 272 pasture 2 could potentially aid grouse habitat in Allotment 272 due to the early use and the longer regrowth period in Allotment 272 pasture 2. However, impacts to Allotment 221 would include altering the rotation to potentially a two-pasture deferred rotation. Because of the length of the grazing season within a two pasture rotation, the regrowth time would be limited thus limiting the recovery of residual cover.

ALLOTMENT 230

Table 230-1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 230 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 3.65 – Rangelands With Diverse Natural-Appearing Landscapes	323	37	
Management Area 6.1 – Rangeland With Broad Resource Emphasis	557	63	
Total allotment acres	1671	100	
NFS acres	881	53	
State land acres	0	0	
Private land acres	790	47	
Current permitted livestock grazing (AMs) on NFS lands			364
Initial estimated carrying capacity (AUMs) on NFS lands			358
Number of pastures containing NFS lands			3

Table 230.2 — Allotment 230 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	Survey(s) conducted in 2004 rated the portion of Blacktail Creek in the allotment as PFC.	Maintain PFC.
Woody draws	Of the woody draws sampled, 67 percent were Healthy and 33 percent were At Risk due to low sapling numbers, cattle use, and headcuts.	Increase successful recruitment of woody species.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Meeting Objectives High – Below Objectives 2004 Transects: 1.31; 1.85 2004 Stations percent: Low-50/ Moderate-50/High-0.	Manage for additional High structure on biologically capable habitats.
Seral stages	One sample was at a mid seral stage and one sample in broken land was at an early stage. Varying amounts of invasive grasses occur in all three pastures.	Maintain native dominated communities while achieving desired seral objectives. Limit or decrease the occurrence of invasive grasses.
Sharp-tailed grouse	One lek within one mile encompassing approximately 222 acres of overlap within the radius.	Manage for increased High vegetative structure on biologically capable sites to enhance nesting and brooding habitat
Remarks	3 acres of Canada thistle, absinth wormwood, and burdock being treated.	

Table 230-3. Allotment 230 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 364 federal AMs. • Three-year average permitted use is 366 summer federal AMs.* • Permit type: prior to 2010 - Inventory (12 months), 2010+ - Turn-in. • Rotation: Seasonlong (yearling herd) and modified deferred rotation with Blacktail Common (cow/calf herd). • Class(s) of livestock: Cow/calf pairs and yearlings. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 364. • Create a four-pasture deferred rotation utilizing Allotment 230 pasture 1, Allotment 288 pasture 2, Allotment 256 pasture 2, and the proposed riparian pasture in Allotment 256. • Annually change season of use between Allotment 140 pasture 4 and Allotment 230 pasture 2. **Adaptive Options** • Fence high-value woody draw in pasture 1. • Adjust Authorized Use.	**Initial Actions** • Authorized federal AUMs: 358. • Create a four-pasture deferred rotation utilizing Allotment 230 pasture 1, Allotment 288 pasture 2, Allotment 256 pasture 2, and the proposed riparian pasture in Allotment 256. • Annually change season of use between Allotment 140 pasture 4 and Allotment 230 pasture 2. **Adaptive Options** • Fence high-value woody draw in pasture 1. • Adjust Authorized Use.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every three years. • Complete Properly Functioning Condition survey once every 5 years. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 230 — Existing Condition

Range – This allotment is approximately 1,671 acres in size and contains both private and NFS lands with 881 acres of NFS lands. This allotment was issued an inventory permit for 50 head for 8 months by the MGA through 2009. With this type of permit there is a potential of livestock being on NFS lands for the entire year, not just the typical May 1st to December 31st. Livestock were wintered on private and NFS lands during the winter months of January through April. It is also the headquarters allotment associated with a common allotment (Blacktail Common). In 2010, this permit was changed and approved by the MGA for a turn-in permit for 59 head for 8 months. There

is no longer any wintering on NFS lands within this allotment. This allotment has been subdivided into four pastures, and of these four pastures three contain NFS lands. These pastures range in size from 161 to 639 acres. Current AMs provided by NFS lands can be found in Table 230.1. This allotment is located in both the Badlands and the Rolling Prairie geographic areas. Water developments within this allotment include a reservoir, dugout, and a pipeline system with stock tanks. In review of the allotment map with the permittee it has been indicated that the spring development in pasture 1 is no longer functional.

Historically, pastures 1 and 2 have been used as summer pastures with two separate herds essentially in seasonlong grazing systems. Pasture 3 has historically been used at the end of the season and in the winter months along with other private lands; however, because of the change in the permit in 2010, this pasture is now in the summer rotation. Pastures 1 and 3 consist primarily of native species with some areas of crested wheatgrass. Pasture 2 is more dominated by crested wheatgrass, but has a silver sagebrush component within it.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there are approximately 3 acres of a combination of Canada thistle, absinth wormwood, and burdock that have been treated by the Billings County Weed Board.

Oil and gas development on NFS lands in this allotment has removed a total of approximately 3.7 acres from livestock access. Approximately 5.0 acres of oil and gas pads and access roads have been reclaimed and are or will be available for livestock access. Associated forage from these acres is approximately 1.4 and 1.9 AUMs, respectively.

Riparian –

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
230-03	Blacktail Creek (1)	0.91					0.91

The headwaters of Blacktail Creek (reach 1) flow through Allotment 230. This reach was evaluated in 2004 (Brooks 2005) and had a functionality rating of PFC. However, active headcuts are eroding ephemeral drainage ways in the allotment.

Woody Draws – Of two woody draw samples in pasture 1, one was At Risk and the second along the toe of a steep slope dominated by Rocky Mountain juniper was Healthy. One woody draw sample in pasture 3 was Healthy. No woody draws occurred in pasture 2.

Herbaceous Structure – In 2004, there were two random sampled VOR transects in this allotment. One was measured in Low structure class and the other in the Moderate structure class. Station averages were split evenly between the Low and Moderate structure classes at 50 percent in each. There were no High structure stations recorded. The transects were not resurveyed in 2005.

Seral Stages – Pasture 1 appears to be dominated by native grasses with light but persistent invasive grasses. A sere plot was at a mid-early seral stage with native grasses and subordinate

invasive grasses. Dominant species along two belt transects varied between blue grama and western wheatgrass.

Pasture 2 consists of 160 acres of broken land and an ecoplot was at a mid-early seral stage with crested wheatgrass, blue grama, and light amounts of bluegrass. An NDSU sample on a Loamy ecological site on the opposite side of the pasture was at an early seral stage for broken land with crested wheatgrass comprising 94 percent of the grass production. Bluegrass was the second most frequent species, but along with smooth brome, constituted less than 2 percent of the grass production.

Field observations in pasture 3 indicate intermingled and intermixed native and invasive grasses including bluegrass, smooth brome, annual brome, crested wheatgrass, and intermediate wheatgrass. Patches of these species appear to follow areas of hay feeding with increased manure concentrations. Sweet clover can be very prominent across the pasture during some years and has the potential of assisting the vigor and spread of invasive grasses (Figure 230.1). Native dominated communities with subordinate amounts of bluegrass remain prominent in the pasture and invasive grasses can be absent among alkaline affected clay-slicks. Two Robel transects in opposite corners of pasture 3 reported dominance of western wheatgrass and sedge with light amounts of bluegrass and other native grasses. A remeasured pace transect in the northeast corner of pasture 3 indicated that relative plant frequency of blue grama increased from 22 percent to 41 percent between 1980 and 2009, while western wheatgrass decreased from 22 percent to 10 percent. Relative frequency of crested wheatgrass increased from 0 percent to 8 percent during the sample period, and bluegrass appeared in trace amounts during the second measurement.

Figure 230.1 — Pasture 3 on right side of fence with a high amount of sweet clover and no sweet clover on private land of adjacent allotment left of fence.

Sharp-tailed Grouse – One grouse lek occurs within 1 mile of the allotment. Pastures 2 and 3 split the total of 222 acres that occurs within the 1-mile radius of the lek.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed 2 years later.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would now be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds

because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian condition along Blacktail Creek as described in the existing condition would continue and evolve toward the potential riparian community.

Woody Draws – Woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. Existing invasive grasses within the woody draws, as well as potential increases of these species as a result of increasing litter with the removal of livestock grazing, would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock, there would be an appreciable increased opportunity for the development of High and Moderate herbaceous structure, and a decrease in the amount of Low herbaceous structure.

Seral Stages – The removal of livestock grazing disturbances would increase plant vigor and facilitate shifts towards late seral stages, but the accumulation of plant litter with the removal of grazing would assist increases of invasive grasses and transitions to Invaded Grass States. This would occur relatively rapidly in pasture 3 but might require 10 to 20 years in pastures 1 and 2 with lower amounts of invasive grasses.

Sharp-tailed Grouse – The increase in High structure from removal of livestock disturbance would enhance nesting and brooding habitat for sharp-tailed grouse. However, over time the decrease in forb diversity would decrease foraging opportunities. To a lesser extent, nesting and brooding quality would also decrease because of lower quality habitat associated with invasive grasses that could invade local habitats.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by an inventory grazing association permit, and Authorized Use is 364 federal AMs.
- Yearlings are run in a seasonlong grazing system, and cow/calf pairs are run in a modified deferred rotation with Blacktail Common.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian condition along Blacktail Creek as described in the existing condition would continue.

Woody Draws – The proportion of Healthy woody draws is unlikely to increase under existing seasons of use and stocking levels. Healthy woody draws within accessible rangeland were at the low range of this condition. Seasonlong grazing that typically occurs in pasture 1 contributes to high woody draw disturbances. Almost 6 months of late fall through spring use in pasture 3 can contribute to high levels of woody draw disturbance when livestock seek thermal shelter adjacent to hay feeding areas. Stands of crested wheatgrass and annual brome along terraces of some woody draw drainages suggest that hay feeding and/or high use occurs in these areas. Potential shifts towards early May and late fall/early winter use of pasture 3 may maintain low woody draw use across larger areas of the pasture due to favorable temperatures and high invasive grass palatability in the uplands, but future management of the pasture is not specified and is therefore uncertain. Increased summer use of pasture 3 would increase the potential for woody draw disturbances and decreasing conditions across the pasture.

Potentially increased stocking at the level of Authorized Use would contribute to decreasing woody draw conditions.

Herbaceous Structure – Current management is projected to continue to promote the existing herbaceous structure distribution with limited potential to improve the proportion of High herbaceous structure and the herbaceous structure distribution in general. The high Authorized Use level, relative to the initial estimated carrying capacity, and the unaccounted winter grazing and hay feeding contribute to the existing herbaceous structure distribution.

Seral Stages – Continued premature grazing of native grasses in pasture 1 along with seasonlong use can decrease plant vigor and production and facilitate the spread of invasive grasses that were observed in light amounts throughout most of the pasture.

Early May turn-in dates are appropriate for the dominance of crested wheatgrass in pasture 2, but reported grazing through the end of September results in heavy use of blue grama and other native species that are present in the understory, thereby impeding development of the plant community. Invasive bluegrass could therefore have an increased potential to fill niches between crested wheatgrass plants.

Adverse effects of hay feeding and premature spring grazing in pasture 3 have contributed to the occurrence of invasive grasses and sweet clover. These impacts would be alleviated with the recent cessation of winter use, and preliminary management involving early spring and late fall rotations would improve the utilization of invasive species with potential increases in the maintenance of native communities. However, continued or future management of the pasture is not specified and remains uncertain. Increased summer use of pasture 3 would increase the potential for selective utilization of the native grass component, thereby decreasing seral stage and assisting the spread of invasive grasses.

Potentially increased stocking at the level of Authorized Use would facilitate shifts towards early seral stages and increase the potential for invasive grass spreading.

Sharp-tailed Grouse – Existing management actions, notably an Authorized Use levels that is 14 percent higher than the initial estimated carrying capacity after accounting for cow size, plus unaccounted winter use are projected not to enhance grouse nesting and brooding habitat in this allotment. Winter use in pasture 3 would reduce cover after fall grazing.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 364 federal AMs.
- Creating a four-pasture deferred rotation utilizing Allotment 230 pasture 1, Allotment 288 pasture 2, Allotment 256 pasture 2, and the proposed riparian pasture in Allotment 256.
- Annually changing season of use between Allotment 140 pasture 4 and Allotment 230 pasture 2.

ADAPTIVE OPTIONS:

- Fencing high-value woody draw in pasture 1.
- Adjusting Authorized Use.

Range

Initial Actions – Because the initial Authorized Use would remain the same as current management, the permittee would be allowed to harvest the same amount of forage. However, the use of these federal AMs would be different than the existing condition because forage would be harvested at different times of the grazing season compared to the current rotations.

Creating a four-pasture deferred rotation would not change the distribution of livestock in the smaller pastures because of the size and topography of the pastures. Livestock distribution in the larger pastures would change because of the change in timing of grazing, forage quality of graminoid species, and climatic conditions during the grazing period. A four-pasture deferred rotation would change the season of use within the pastures from year to year providing opportunities for initial growth or regrowth of individual native graminoid species. The permittee would have to combine several herds into one herd to accommodate the four pasture deferred rotation.

Annually changing the season of use between Allotment 230 pasture 2 and Allotment 140 pasture 4 would allow the permittee to change the season of use between the two pastures on different grazing association permits using one herd instead of utilizing the pastures at the same time of year every year with two different herds of livestock. Distribution of livestock would not change because of the small size of each pasture.

Adaptive Options – Fencing high-value woody draws would have little to no change in livestock distribution across the allotment. Forage within the exclosures would no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may occur on remaining forage. There will be a cost to install these fences and as a result there will be additional cost of maintenance of the fence to prevent livestock access to the woody draws.

Adjusting Authorized Use downward would result in fewer livestock numbers because of the inventory permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock; however, the amount of forage harvested would be less than the existing forage harvested.

Riparian

Initial Actions – It is expected that desired conditions along Blacktail Creek would continue with the initial actions proposed.

Creating a four-pasture deferred rotation would have no effect on riparian desired condition along Blacktail Creek in pasture 3 because of rotation being located in different pastures.

Annually changing the season of use between Allotment 230 pasture 2 and Allotment 140 pasture 4 would have no effect on riparian condition along Blacktail Creek in pasture 3 due to rotation being located in different pastures.

Adaptive Options – It is expected that desired conditions along Blacktail Creek would continue with the adaptive options proposed.

Fencing high-value woody draws should have no effect on riparian condition along Blacktail Creek because there would be no expected change in livestock distribution and the distance of separation.

Reducing Authorized Use should help improve the uplands vegetation which in turn reduces overland flow which would further benefit the riparian conditions along Blacktail Creek. A reduction in overland flow delivered to the creek would result in reduced stream velocities allowing for the establishment of riparian vegetation which would build stream banks.

Woody Draws

Initial Actions – Using pasture 1 in a four-pasture deferred rotation with several other allotments/pastures would be unlikely to improve woody draw conditions. Although periods of rest or non-use in of the pasture would occur with the deferred rotation, increased livestock density resulting from the shortened grazing season and combining of livestock herds would increase the evenness of grazing disturbances across the pasture. Current levels of browsing and trampling disturbances would therefore be maintained or increased and impede the successful regeneration of woody species, in part due to the slow growth response of woody species to the loss of plant tissue that limits their ability to escape beyond the reach of browsing livestock. Concentrated early or late season use that would occur on a periodic interval with the deferred rotation could contribute to decreased woody draw disturbances, but the limited frequency of these grazing seasons would decrease the potential for increasing conditions.

Using pasture 2 in a deferred rotation would have no effect on woody draw conditions in Allotment 230 due to the absence of draws in this pasture.

The reported shift from winter to spring and late fall use of pasture 3 should maintain current woody draw conditions, but potentially increased summer use of the pasture would contribute to increasing disturbances and decreasing conditions.

Potentially increased stocking towards the level of Authorized Use that has exceeded typically reported use by about 30 percent would contribute to decreasing woody draw conditions.

Adaptive Options – Temporarily fencing woody draws and/or decreasing Authorized Use would increase the potential for improved conditions by removing or decreasing livestock browsing and trampling disturbances that would facilitate the regeneration of desired woody species. Exclusion of livestock impacts through fencing would provide the fastest and greatest degree of woody draw improvement, but increasing plant litter and invasive grass layers could impair the regeneration of woody species. Fencing of one woody draw would have a high potential to result in increased disturbance within adjacent unfenced woody draws. Potential reductions in Authorized Use would have to exceed 30 percent to affect a reduction in actual use compared to typically reported use.

Herbaceous Structure

Initial Actions – Implementation of the four-pasture rotation may not overcome the Authorized Use level (14 percent higher than the initial estimated carrying capacity) and the time needed for regrowth could limit residual cover, thus limiting the potential to improve the overall herbaceous structure distribution. It is assumed that the first rotation between Allotment 230 pasture 2 and Allotment 140 pasture 4 would be grazed early (e.g. start May 1st) since both pastures are crested wheatgrass dominated. There is potential that the early grazed pasture could experience regrowth and contribute an indeterminate amount of higher structure. However, the high Authorized Use level may limit regrowth potential.

Adaptive Options – Adjusting the Authorized Use downward would improve the potential for increasing the proportion of High herbaceous structure within the allotment and improve the overall herbaceous structure distribution. Fencing woody draws in pasture 1 would have a relatively small effect on the overall herbaceous structure distribution and would be relative to the size of the exclosure but is expected not have an appreciable effect due to the small amount of woody habitat projected to be fenced.

Seral Stages

Initial Actions – Using pasture 1 in a four-pasture deferred rotation with other allotments/pastures would increase plant vigor and facilitate the development of late seral stages by increasing opportunities for the completion of critical plant growth stages. Delaying the date of turn-in appropriate for the growth stage of the native dominated pasture would also increase plant vigor and seral development compared to current turn-in dates during mid-May. The evenness of livestock grazing across the pasture would increase as a result of greater livestock density, potentially decreasing the amount of secondary range and impeding the development or maintenance of late seral stages. However, longer periods would be available for plant recovery and regrowth as a result of shorter grazing seasons and contribute to overall increasing conditions. Increased livestock density that would increase the evenness of grazing may assist the utilization of invasive grasses, or at least impede the accumulation of plant litter that can assist the spread of these species. Potentially increased stocking towards the level of Authorized Use that has exceeded typically reported use by about 30 percent would impede the development or maintenance of late seral stages and facilitate shifts towards early stages.

A deferred rotation of pasture 2 with Allotment 140 pasture 2 would be unlikely to improve plant composition or seral development. Both pastures are entirely composed of broken land, and the deferred rotation would result in low palatability of crested wheatgrass that dominates each pasture every other year. Early turn-in dates would allow efficient use of crested wheatgrass and lesser amounts of bluegrass and smooth brome during alternate years, but extending the grazing season into mid and late summer would impede the establishment of desired native species and community development. Native grasses would be selectively grazed in the second pasture of use each year, but with some potential for the use of invasive grass regrowth during the fall. However, the result is unlikely to be appreciably different from current management with seasonlong grazing in each pasture. Crested wheatgrass would persist as the dominant species, the establishment of native grasses would be impeded, and invasive grasses would have the potential to gradually spread and increase in dominance.

Recent management changes in pasture 3 involving a shift from winter to spring and late fall rotations would improve the utilization of invasive species with potential increases in the maintenance or development of native grasses. However, continued or future management of the pasture is not specified and remains uncertain. Increased summer use of the pasture would increase the potential for selective utilization of the native grass component, thereby decreasing seral stage and assisting the spread of invasive grasses.

Adaptive Options – Decreasing Authorized Use would facilitate shifts towards late seral stages in pasture 1, and to a lesser extent in pastures 2 and 3, by decreasing the level of livestock grazing disturbances. Potential reductions in Authorized Use would have to exceed 30 percent to affect a reduction in actual use compared to typically reported use, and potential reductions would not offset selective and potentially excessive use of the native component in pasture 2. Invasive grasses would have the potential to increase in localized areas in all pastures where decreased stocking levels could facilitate increasing amounts of litter.

Sharp-tailed Grouse

Initial Actions – Implementation of the four-pasture rotation may not overcome the Authorized Use level (14 percent higher than the initial estimated carrying capacity) and the time needed for regrowth, could limit residual cover thus limiting the potential to enhance grouse nesting habitat. It is assumed that the first rotation between Allotment 230 pasture 2 and Allotment 140 pasture 4 would be grazed early (e.g. start May 1st) since both pastures are crested wheatgrass dominated. There is potential that the early grazed pasture could experience regrowth and contribute an indeterminate quantity of higher structure in the fall to enhance grouse nesting habitat. The high Authorized Use level could limit the potential enhancement.

Adaptive Options – Adjusting the Authorized Use downward would improve the potential for enhancing grouse nesting habitat within the allotment. Fencing woody draws in pasture 1 would have a relatively small effect on overall grouse habitat and would be relative to the size of the exclosure.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3; therefore, Alternative 3A would have the same effects as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 4 are the same as Alternative 3.

Range
Initial Actions – Authorized Use for this allotment would be 358 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 364 federal AMs converted to AUMs by adjusting for cow size is 419 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 14 percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment.

Riparian
Initial Actions – The effects would be the same as described previously in Alternative 3.

Woody Draws
Initial Actions – Decreasing Authorized Use by 14 percent according to initial estimated carrying capacity and adjustments for cow size would have minimal effect on woody draw conditions because the potential level of use would remain about 11 percent greater than typically reported use not including winter use.

Herbaceous Structure
Initial Actions – Adjusting the Authorized Use to reflect initial estimated carrying capacity should begin to move the allotment towards an improved herbaceous structure distribution, assuming the permittee is currently operating at or near the preference level.

Pasture 3 is not mentioned in the proposed actions and it is assumed that late fall use is occurring primarily in this pasture as recorded on AOIs/AWs. Fall and winter use would permit a longer growing season for vegetation to regrow. However, both VOR points from 2004 were in this pasture and were both measured less than two inches.

Seral Stages
Initial Actions – The proposed 14 percent reduction in Authorized Use would have minimal effect

on plant composition because the potential level of use would remain about 11 percent greater than typically reported use.

Sharp-tailed Grouse

Initial Actions – Adjusting the Authorized Use to reflect initial estimated carrying capacity should begin to move the allotment towards enhancing grouse nesting habitat, assuming the permittee is currently operating at or near the preference level.

Pasture 3 is not mentioned in the alternatives so it is assumed that no changes are planned for this pasture. It is assumed that late fall use is occurring primarily in this pasture as recorded on the AOIs/AWs. Fall and winter use would permit a longer growing season for vegetation to regrow. However, both VOR points from 2004 were in this pasture and were both measured in the fall at less than 2 inches.

ALLOTMENT 237

Table 237.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 237 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 3.65 – Rangelands With Diverse Natural-Appearing Landscapes	514	71	
Management Area 6.1 – Rangeland With Broad Resource Emphasis	207	29	
Total allotment acres	758	100	
NFS acres	721	95	
State land acres	0	0	
Private land acres	37	5	
Current permitted livestock grazing (AMs) on NFS lands			288
Initial estimated carrying capacity (AUMs) on NFS lands			250
Number of pastures containing NFS lands			3

Table 237.2 — Allotment 237 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	2004 survey rated portion of Blacktail Creek in allotment at PFC.	Maintain PFC.
Woody draws	60 percent of sampled woody draws were Healthy and 40 percent were At Risk. At Risk stands have low regeneration, grass-dominated understory and/ or impaired shrub layer.	Increase seedling/sapling understory, and enhance shrubs.
Herbaceous structure	Transect Results: Low – Below Objectives Moderate – Exceeding Objectives High – Below Objectives 2004 Transects: 1.58; 1.69 2004 Stations percent: Low-52.5/ Moderate-47.5/ High-0.	Manage for additional Low and High structure on biologically capable habitats.
Seral stages	Plant composition generally consisted of intermixed and intermingled native and invasive grasses with a predominance of mid seral stages. Invaded Grass States occurred in portions of the allotment.	Maintain or increase the proportion of native grass communities and late seral stages while limiting or decreasing the extent of invasive grasses.
Sharp-tailed grouse	There is one lek within a 1-mile radius of the allotment. Within this radius, approximately 340 acres overlap with the allotment.	Manage for increased High vegetative structure on biologically capable sites to enhance nesting and brooding habitat
Remarks	Approximately 1 acre of Canada thistle and burdock.	

Table 237-3. Allotment 237 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 288 federal AMs. • Three-year average permitted use is 205 federal AMs.* • Permit type: Turn-in. • Rotation: Three-pasture deferred rotation. • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 288. • Utilize pasture 3 early and change season of use in the remaining two pastures. • Extend existing rangeland pipeline into pasture 1 and add a tank. **Adaptive Options** • Fence high-value woody draws. • Adjust Authorized Use.	**Initial Actions** • Authorized federal AUMs: 250. • Utilize pasture 3 early and change season of use in the remaining two pastures. **Adaptive Options** • Fence high-value woody draws. • Extend existing rangeland pipeline into pasture 1 and add a tank. • Adjust Authorized Use.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings (VOR) once every 3 years. • Complete Properly Functioning Condition (PFC) survey once every fi5ve years. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 237 — Existing Condition

Range – This allotment is approximately 758 acres and contains 721 acres of NFS lands with the rest privately owned. Currently, this allotment is issued a turn-in permit for 37 head for 8 months by the MGA. This allotment has been subdivided into three pastures, all containing NFS lands, and range from 133 to 379 acres. Current AMs provided by NFS lands can be found in Table 237,1. This allotment is located primarily in the Badlands geographic area, with the southeastern portion in the Rolling Prairie geographic area. Water developments include a pipeline with stock tanks and a spring.

The current rotation is a three-pasture deferred grazing system. Livestock are turned out around June 1st and graze through November 1st. Although the plant composition is primarily made up of native species, there are introduced species such as crested wheatgrass and Kentucky bluegrass.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there is approximately one acre of a combination of Canada thistle and burdock.

Oil and gas development on NFS lands in this allotment has removed a total of approximately 13.2 acres from livestock access. A total of approximately 10.0 acres of oil and gas pads and access roads have been reclaimed and are, or will be, available for livestock access. Associated forage from these acres is approximately 4.3 and 3.3 AUMs, respectively.

Riparian – A headwater reach of Blacktail Creek (Reach 2) flows through Allotment 237. This reach was evaluated in 2004 (Brooks 2005) and had a functionality rating of PFC.

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
237-01	Blacktail Creek (2)	1.40					1.40

Woody Draws – Three woody draws in pasture 2 that is used during early fall were Healthy, while a sampled woody draw in each of pastures 1 and 3 that are used during the summer were At Risk (Figure 237.1a and 1b).

a) b)

Figure 237.1 a and b — Examples of (a) Healthy, and (b) At Risk, woody draws in Allotment 237.

Herbaceous Structure – There were two random sampled VOR transects in this allotment. Both were sampled in the Moderate structure class. Station averages were split fairly evenly between the Low (52.5 percent) and Moderate (47.5 percent) structure classes. No High structure stations were recorded. No transects were reread in 2005.

Seral Stages – Pasture 1 consisted of intermixed and intermingled native and invasive grasses. A sere plot in the northeast corner of pasture 1 was at a mid seral stage with equal canopy cover of western wheatgrass, blue grama, and Kentucky bluegrass. Bluegrass was the dominant species recorded in a nearby Robel transect, but a belt transect 500 feet to the southeast recorded native species dominance. Another sere plot in the southwest portion of the pasture was at or approaching

an Invaded Grass State with high amounts of bluegrass and crested wheatgrass. Annual brome was also common in this area.

Oil and gas disturbances have resulted in large invasive grass areas along a central ridge or plateau in the east and central portions of pasture 2. Pasture observations indicated native and invasive grass mixtures similar to pasture 1 away from the ridgeline. Bluegrass was the dominant species recorded in a Robel transect in the southwest quarter of the pasture.

Pasture 3 involved only 77 acres or 66 percent NFS land. About 44 percent of the NFS land consisted of broken land along the ridgeline that extended into pasture 2. The eastern and western sides of the pasture descended to woody draw drainages.

Sharp-tailed Grouse – There is one lek within a 1-mile radius of the allotment. Within this radius there are approximately 340 acres of overlap.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed after 2 years.
- Most range infrastructure would begin to be removed concurrently.

Range – There would be a 100 percent reduction in the existing federal AMs permitted to the grazing association. No grazing fees would be collected from this allotment so there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of the reclamation of removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian condition along Blacktail Creek as described in the existing condition would continue and evolve toward the potential riparian community.

Woody Draws – Woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. Existing and potential increases of invasive grasses facilitated by increasing plant litter with the removal of livestock grazing could slow or decrease the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock, there would be an increased opportunity for the development of High and Moderate herbaceous structure, and a decrease in the amount of Low herbaceous structure. Prior to the end of the 10- to 15-year planning horizon, the balance of herbaceous structure distribution would be skewed towards the High and Moderate ends of the herbaceous structure distribution.

Seral Stages – The removal of livestock grazing disturbances would facilitate shifts towards late seral stages, but increasing plant litter would facilitate the increase of invasive grasses and further transitions to Invaded Grass States. The maintenance of native plant communities would decrease in

large portions of the allotment within 10 years due to the current extent and increased rate of invasive grass spreading with accumulating plant litter.

Sharp-tailed Grouse – The increase in High structure from removal of livestock disturbance would enhance nesting and brooding habitat for sharp-tailed grouse. Over time, the decrease in forb diversity could reduce foraging opportunities. To a lesser extent, nesting and brooding quality would also decrease because of lower quality habitat associated with invasive.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by a turn in grazing association permit, and Authorized Use is 288 federal AMs.
- Cow/calf pairs are run in a three-pasture deferred rotation.
- See allotment map in Appendix B for current range developments.

Range – The existing federal AMs permitted to the grazing association would continue. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian condition along Blacktail Creek as described in the existing condition would continue.

Woody Draws – The proportion of Healthy woody draw conditions would not increase under current management because the two At Risk sites occurred in summer pastures when high temperatures and insect pests contribute to increased woody draw use. Other unsampled woody draws occurring along Blacktail Creek in pasture 1 are likely to be in an At Risk condition similar to the sampled site, and an unsampled draw in pasture 3 occurs in association with a spring with the potential for high browsing and trampling disturbances. Low or decreasing palatability of crested wheatgrass and bluegrass that occurs with June turn-in dates or occasional deferred rotations with later grazing seasons would contribute to increased woody draw disturbances when livestock seek extended green periods within the draws. Stocking at current levels of Authorized Use that exceed initial estimated carrying capacity by 32 percent, and recently reported use by 40 to 55 percent, would result in decreased woody draw conditions.

Herbaceous Structure – Current management would continue to facilitate the existing herbaceous structure distribution with a limited potential to improve the proportion of High structure and the structure distribution in general.

Seral Stages – The current extent of invasive grasses in pastures 1 and 2 suggests a high potential for their continued increase. Decreased palatability of invasive grasses during the summer grazing seasons would facilitate their increase as a result of selective use and competitive disadvantages to the native component. Relatively late turn-in on crested wheatgrass in pasture 3 is also likely to

contribute to high use of native grasses along the ridge slopes. Potentially increased stocking at the level of Authorized Use would compound the adverse effects of selective native grass utilization and spreading invasive grasses.

Sharp-tailed Grouse – Existing management actions, notably the high Authorized Use levels, would not improve High structure grasslands, thus limiting the potential to enhance grouse nesting and brooding habitat.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 288 federal AMs.
- Utilizing pasture 3 early, and changing season of use in the remaining two pastures.
- Extending existing rangeland pipeline into pasture 1 and adding a tank.

ADAPTIVE OPTIONS:

- Fencing high-value woody draws.
- Adjusting Authorized Use.

Range

Initial Actions – Because the initial Authorized Use would remain the same as the current management, the permittee would be allowed to harvest the same amount of forage. The use of these federal AMs would be different than the existing condition because the forage would be harvested at different times of the grazing season.

Utilizing pasture 3 early, and changing the season of use on the remaining two pastures, would defer livestock grazing on the native pastures until range readiness. This would also benefit the crested wheatgrass stand in pasture 3 by using it when it is range ready and providing the opportunity for regrowth.

Extending the existing rangeland pipeline and adding another stock tank to pasture 1 would distribute livestock throughout the allotment. The existing livestock water is in the northern/northeastern portion of the pasture.

Adaptive Options – Fencing high-value woody draws would have little to no change in livestock distribution across the allotment. Forage within the exclosures would no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may occur on remaining forage. There will be an expense to install fencing and for fence maintenance.

Adjusting Authorized Use downward would result in fewer livestock numbers, fewer grazing days, or a combination of the two because of the turn in permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock; however, the amount of forage harvested would be less than the existing forage harvested.

Riparian

Initial Actions – It is expected that desired conditions along Blacktail Creek would continue with the initial actions proposed.

Utilizing pasture 3 early, and changing the season of use in the remaining two pastures, would have no effect on desired riparian condition along Blacktail Creek because livestock use on the creek would not increase.

Extending existing rangeland pipeline into pasture 1 and adding a tank would benefit the riparian condition along Blacktail Creek. The new water source developed to pull livestock away from the riparian corridor would minimize bank sloughing, trailing, trampling, and loafing in the riparian area and allow for herbaceous and woody riparian vegetation recovery.

Adaptive Options – It is expected that desired conditions along Blacktail Creek would continue with the adaptive options proposed.

Fencing high-value woody draws should have no effect on riparian condition along Blacktail Creek. There would be no expected change in livestock distribution and the distance of separation.

Reducing Authorized Use should help improve the uplands vegetation which would reduce the overland flow, further benefitting the riparian conditions along Blacktail Creek. A reduction in overland flow delivered to the creek would result in reduced stream velocities and allow for the establishment of riparian vegetation to build stream banks.

Woody Draws

Initial Actions – Extending a water pipeline and installing an additional stock tank in pasture 1 would not increase the proportion of Healthy woody draws within the 380-acre pasture. Although potentially decreased use of ponded water along Blacktail Creek resulting from an additional tank could assist increased riparian and adjacent woody draw conditions, the draws tend to be clustered along the creek and would continue to be sought for shade and escape from insects during the summer grazing rotations. The most likely locations for an additional tank would be closer to the woody draws than the current tank and would contribute to continued or increasing woody draw disturbances. Potentially increased stocking at levels of Authorized Use that exceeds initial estimated carrying capacity by 32 percent after adjusting for cow size would result in decreasing woody draw conditions compared to currently reported levels of use that are close to initial estimated carrying capacity.

At Risk woody draws in pasture 3 would persist due to similar grazing seasons during June. Greater annual deferment between pastures 1 and 2 would be unlikely to shift woody draw conditions from At Risk to Healthy in pasture 1, and has the potential to contribute to decreasing conditions in pasture 2 as a result of changing from fall rotations to mid-summer use during alternate years.

Adaptive Options – Fencing woody draws and/or decreasing Authorized Use would increase the potential for improving woody draw conditions by removing or decreasing livestock browsing and trampling disturbances that would facilitate the regeneration of desired woody species. However, the reduction in Authorized Use would have to be large to affect a decrease in actual use compared to current levels of reported use. Exclusion of livestock impacts through fencing would provide the

fastest and greatest degree of woody draw improvement, but increasing litter and invasive grass layers could impede the regeneration of woody species. Fencing of one woody draw would have a high potential to result in increased disturbance within adjacent unfenced woody draws.

Herbaceous Structure

Initial Actions – The Authorized Use level exceeds the initial estimated carrying capacity by approximately 15 percent. This level could limit the potential to increase the proportion of High herbaceous structure or improve the structure distribution by placing increased pressure on plants and plant communities influencing their ability to recover. Changing the rotation to graze pasture 3 early may not overcome the Authorized Use level due to increased pressure placed on the plant communities. On the other hand, a longer deferment period could allow for some regrowth. Though management flexibility could be recognized, adding a water source (tank) to pasture 1 would further increase the homogeneity of use, especially considering the size of the pasture.

Adaptive Options – Adjusting the Authorized Use downward would improve the potential for increasing the proportion of High herbaceous structure within the allotment and improve the overall herbaceous structure distribution. Fencing woody draws would have a relatively small effect on the overall herbaceous structure distribution and would be relative to the size and location of the exclosure.

Seral Stages

Initial Actions – Increased consistency of a deferred rotation between pastures 1 and 2 would assist native plant vigor by increasing opportunities for the completion of critical growth stages, thereby facilitating shifts towards late seral stages. However, varying amounts of invasive grasses would have a similar potential to increase in vigor, and low palatability of crested wheatgrass and bluegrass that would occur during large portions of the grazing season in each pasture would contribute to selective use of the native component and assist the spread of invasive grasses. June turn-in onto crested wheatgrass in pasture 3 would continue to miss a large portion of peak palatability for the species and contribute to selective use of the native component in unbroken land. Potentially increased stocking to the level of Authorized Use would compound adverse effects of selective native grass utilization.

Extending a water pipeline and installing an additional stock tank in pasture 1 would result in increased grazing and trampling disturbances around the new tank with shifts towards early seral stages and potential establishment of invasive grasses. Placing the tank in an area dominated by invasive grasses would decrease adverse impacts to native plant communities but could have an increased potential for livestock to disperse invasive grass seed. A second water tank in the 380-acre pasture, along with ephemeral water along Blacktail Creek would increase the evenness of livestock grazing and decrease the mosaic of grazing pressure and seral stages with a resulting predominance of mid stages.

Adaptive Options – Fencing woody draws would not have an appreciable effect on seral stages within individual pastures due to the small size of potential exclosures. Invasive grasses that tend to dominate the herbaceous layer of woody draws would increase in density and extent within the exclosures as a result of increased litter with the removal of grazing.

Neither decreases nor increases in Authorized Use would be effective in long term control of invasive grasses and increased maintenance of native plant communities without consistently coordinating the grazing season and stocking levels with the respective palatability and production of the native and invasive components.

Sharp-tailed Grouse

Initial Actions – The Authorized Use level exceeds the initial estimated carrying capacity by approximately 15 percent. This level could limit the potential to enhance grouse nesting habitat by placing increased pressure on plants and plant communities influencing their ability to recover. Changing the rotation to graze pasture 3 early may not overcome the Authorized Use level due to increased pressure placed on the plant communities. On the other hand, a longer deferment period could allow for some regrowth with potential to carry over for grouse nesting habitat needs. Though management flexibility could be recognized, adding a water source (tank) to pasture 1 would further increase the homogeneity of use, especially considering the size of the pasture, reducing the potential for grouse nesting habitat.

Adaptive Options – Adjusting the Authorized Use downward would improve the potential for enhancing grouse nesting habitat within the allotment. Fencing woody draws would have a relatively small effect on the overall herbaceous structure distribution and would be relative to the size and location of the exclosure(s).

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes. The analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 4 are the same as Alternative 3.

Range

Initial Actions – Authorized Use would be 250 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 288 federal AMs converted to AUMs by adjusting for cow size is 331 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 24 percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in cow size when

calculating the number of head and the grazing season duration when planning the rotation for the allotment.

Riparian

Initial Actions – The effects would be the same as described previously in Alternative 3.

Woody Draws

Initial Actions – Decreasing Authorized Use by 24 percent according to initial estimated carrying capacity and adjustments for cow size would establish potential stocking levels 6 to 17 percent greater than currently reported use and would therefore not facilitate increased woody draw conditions.

Herbaceous Structure

Initial Actions – Adjusting the Authorized Use to reflect initial estimated carrying capacity should begin to move the allotment towards an improved representation of herbaceous structure, that is, assuming actual use reflects the preference level of Authorized Use.

Seral Stages

Initial Actions – Decreasing Authorized Use by 24 percent according to initial estimated carrying capacity and adjustments for cow size would maintain levels of use similar to currently reported use and would therefore have minimal effect on seral stages and apparent trends of increasing invasive grasses.

Sharp-tailed Grouse

Initial Actions – Adjusting the Authorized Use to reflect initial estimated carrying capacity should begin to move the allotment towards an improvement in sharp-tailed grouse habitat, that is, assuming actual use reflects the preference level of Authorized Use.

ALLOTMENT 239

Table 239.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 239 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 6.1 – Rangeland With Broad Resource Emphasis	484	100	
Total allotment acres	641	100	
NFS acres	484	76	
State land acres	0	0	
Private land acres	157	24	
Current permitted livestock grazing (AMs) on NFS lands			250
Initial estimated carrying capacity (AUMs) on NFS lands			176
Number of pastures containing NFS lands			1

Table 239.2 — Allotment 239 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	There are no perennial or intermittent stream reaches in this allotment.	None.
Woody draws	All of the sampled woody draws were At Risk. The At Risk stands have grass-dominated understories, low tree regeneration, and an impacted shrub layer.	Increase seedling/sapling understory, and enhance shrubs.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Below Objectives High – Below Objectives 2004 Transects: 1.43 2004 Stations percent: Low-70/ Moderate-30/High-0 2005 Transects: 2.28 2005 Stations percent: Low-35/ Moderate-65/High-0.	**Manage allotment to maintain meeting structure objectives.
Seral stages	Most of the allotment has transitioned to an Invaded Grass State with a high frequency but low contribution of native grass species.	Decrease or limit the predominance of invasive grasses and increase establishment of native grasses.
Sharp-tailed grouse	The nearest known lek is 3 miles from the allotment. Potential habitat does exist.	Manage to enhance sharp-tailed grouse nesting and brooding habitat by increasing the quality and quantity of High vegetative structure on biologically capable sites.
Remarks	Some scattered burdock noted.	

**** Based on a follow-up field review, the IDT determined that this allotment was meeting structure objectives.**

Table 239.3 — Allotment 239 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 250 federal AMs. • Three-year average permitted use is 224 federal AMs.* • Permit type: Turn-in. • Rotation: Seasonlong. • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 250. • Annually change season of use. • Construct temporary north/south electric fence and implement a deferred rotation. • Recommend early turnout in pasture. **Adaptive Options** • Fence high-value woody draws. • Construct a rangeland fence(s) dividing the allotment into quarters and implement a deferred rotation grazing system. Additional livestock water would also need to be developed once fencing was completed. • Adjust Authorized Use.	**Initial Actions** • Authorized federal AUMs: 176. • Construct temporary north/south electric fence and implement a deferred rotation starting May 1st. **Adaptive Options** • Compress season and alter season of use. • Construct a rangeland fence(s) dividing the allotment into quarters and implement a deferred rotation grazing system. Additional livestock water would also need to be developed once fencing was completed. • Adjust Authorized Use.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every 3 years. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 239 — Existing Condition

Range – This allotment is approximately 641 acres and contains both private and NFS lands with 484 acres of NFS land. Currently, this allotment is issued a turn-in permit for 50 head for 5 months by the MGA. This allotment has only one pasture that contains both private and NFS lands. Current AMs provided by NFS lands can be found in Table 239.1. This allotment is located in the Rolling Prairie geographic area. Water developments within this allotment include two reservoirs.

The historical rotation is a seasonlong system that typically begins around May 15th and lasts for approximately 5 months. The plant composition within this allotment consists primarily of introduced species such as Kentucky bluegrass with scattered areas of crested wheatgrass intermingled with some native species. The eastern portion of the allotment very close to the woody draws does have a mixed native plant component.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicates that there are some scattered populations of burdock found during the woody draw survey (see Project Record, Specialist Reports and Notes, Botany Report).

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – Three woody draws occur in the allotment and all are At Risk. Desired shrub and sapling layers occur on short and less accessible side slopes in portions of the draws but do compensate for the lack of shrub layers and mixed tree age classes throughout the larger community.

Herbaceous Structure – One randomly placed VOR transect was measured in the fall of 2004 in the Low structure class. However, an ID team field visit in September 2006 determined through a visual assessment that the allotment was addressing herbaceous structure objectives. The High structure was being provided primarily through the presence of Kentucky bluegrass which is common throughout the allotment.

Seral Stages – Kentucky bluegrass dominated most of the single pasture of this allotment and most of the plant community has transitioned to an Invaded Grass State (Figure 239.1). Native species occur intermixed with Kentucky bluegrass at a high frequency but contribute a small proportion to the total forage production. Native grass dominance persists on small clay-slicks with poor soil characteristics, but plant cover and production on these sites is low.

Figure 239.1 — Existing vegetation dominated by Kentucky bluegrass emerging through accumulated litter.

A sere plot on a Claypan ecological site at the north end of the pasture was at an Invaded Grass State, with Kentucky bluegrass constituting 82 percent of the relative grass basal cover. Kentucky

bluegrass constituted 64 percent of the total plant production on a nearby NDSU sample plot.

Two NDSU sample plots on Thin Claypan ecological sites in the south half of the pasture exhibited similar conditions with Kentucky bluegrass and crested wheatgrass averaging 52 percent and 30 percent of the grass production. A Robel transect and belt transect near the plots indicated similar plant composition. No broken land was identified in the pasture, in part because of the lack of historic aerial photograph coverage east of Highway 85, but allotment records discuss the occurrence of crested wheatgrass plantings at the south end of the pasture (2210 files). A repeated pace transect in the southwest quarter of the pasture indicated relative plant frequency of Kentucky bluegrass increased from 0 percent to 14 percent to 60 percent during 1980, 2001, and 2009, respectively. Relative plant frequency of crested wheatgrass and western wheatgrass sharply decreased over the measurement period.

Sharp-tailed Grouse – The nearest known sharp-tailed grouse lek is 3 miles away. Assuming no other nearby lek in the area, this allotment is outside the typical distance a hen will travel to nest. Also, the habitat value of Kentucky bluegrass (prevalent in this allotment) to nesting and brooding grouse in the spring is questionable since it flattens out appreciably with snowfall. With these two factors in play, management should not emphasize sharp-tailed grouse nesting habitat in this allotment at this time.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed 2 years later.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would now be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – Woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. Existing invasive grasses within the woody draws, as well as potential increases of these species as a result of increasing litter with the removal of livestock grazing, would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock grazing, there would be an increase in High structure within the allotment. Kentucky bluegrass would continue to provide excessive amounts of litter contributing to fall readings of High structure.

Seral Stages – Kentucky bluegrass would rapidly increase towards a monoculture and the remaining native species would decrease with the removal of livestock grazing. Litter would continue to accumulate with the lack of forage harvest and trampling disturbances that assist litter decomposition. Decreasing soil health resulting from the shallow root system of Kentucky bluegrass and increasing thatch or litter layers would contribute to decreased rangeland productivity. Native grass vigor and production would temporarily increase on clay-slicks that currently experience high livestock use, but increasing plant development on these sites would improve conditions for the establishment of Kentucky bluegrass that would gradually gain dominance.

Sharp-tailed Grouse – Given the distance to the nearest known lek and the questionable value of Kentucky bluegrass to nesting and brooding hens, this allotment is unlikely to provide appreciable habitat for sharp-tailed grouse at this time.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by a turn in grazing association permit, and Authorized Use is 250 federal AMs.
- Cow/calf pairs are ran in a seasonlong grazing system.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – Seasonlong grazing and Authorized Use that exceeds initial estimated carrying capacity by 64 percent after adjusting for cow size would result in the persistence of At Risk woody draw conditions with the potential for gradually decreasing to Unhealthy conditions. Low palatability of Kentucky bluegrass during most of the grazing season would contribute to woody draw disturbances as a result of livestock seeking extended green periods within the draws.

Herbaceous Structure – Current management could continue to facilitate the existing herbaceous structure distribution. Low to Moderate structure could be expected to continue in portions of the southwestern corner of the allotment. Kentucky bluegrass is expected to continue to provide High herbaceous structure in other portions of the allotment in the fall in most years.

Seral Stages – Continuation of current management would facilitate increasing Kentucky bluegrass towards a monoculture almost as rapidly as would occur with the removal of livestock grazing. Seasonlong grazing and high stocking levels are cited as the worst-case situation for facilitating the increase of Kentucky bluegrass (Sedivec 2006), as its low palatability during most of the grazing season results in selective grazing of the native component. Light amounts of native grasses would

persist on small clay-slicks because high use of these areas prohibits development of the plant community and conditions more favorable for the establishment of Kentucky bluegrass. Years of banner sweet clover appear to result in it being a key species of use and this promotes further accumulation of grass litter.

The pasture was temporarily split into two pastures during 2008 to concentrate use away from woody draws and potentially increase the use of bluegrass, but low palatability of invasive grasses during most of the grazing season under this management would continue to impede the utilization of Kentucky bluegrass and maintain high use of the remaining native grasses.

Sharp-tailed Grouse – It is projected that under the assumption of no known sharp-tailed grouse lek in the area, that there would be no effect to sharp-tailed grouse from the implementation this alternative at this time.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 250 federal AMs.
- Annually changing season of use.
- Constructing a temporary north/south electric fence and implementing a deferred rotation.
- Recommending early turnout in pasture.

ADAPTIVE OPTIONS:

- Fencing high-value woody draws.
- Constructing a rangeland fence(s) dividing the allotment into quarters, and implementing a deferred rotation grazing system. Additional livestock water would also need to be developed once fencing was completed.
- Adjusting Authorized Use.

Range

Initial Actions – Because the initial Authorized Use would remain the same as current management, the permittee would be allowed to harvest the same amount of forage. However, the use of these federal AMs would be different than the existing condition because forage would be harvested at different times of the grazing season compared to the current rotations.

Annually changing the season of use would change the timing of when federal AMs are harvested and would allow for graminoid species to be grazed at different periods of the growing season providing the opportunity for initial growth or regrowth. The distribution of livestock would change because of forage quality at the timing of grazing; however, if supplemental protein and minerals are utilized to aid in improving distribution of livestock in the later part of the grazing season a change may not occur.

Constructing a temporary electric fence from north to south and implementing a deferred rotation would concentrate livestock more on the crested wheatgrass early in the season and defer the use of native herbaceous species until range readiness.

Recommending early turnout into the pasture depends on the flexibility of the permittee; however, the permittee has agreed to turn out as many livestock as are ready for a May 1st turnout date. This would allow livestock to concentrate on the crested wheatgrass and Kentucky bluegrass, which are range-ready early in the grazing season. However, native herbaceous species that aren't typically range ready until June 1st would be negatively affected by this early turnout. Grazing native rangeland prior to range readiness would be the most costly alternative, with both economical losses (in most cases) and reductions in production associated with physical damage to the plants (Manske and Sedivec 1999). Vermeire et al. (2008) also concluded that there was an increased prominence of annual C3 grasses and cacti, which indicates that considerable potential exists for shifting species composition with annual grazing before June.

Adaptive Options – Fencing out high-value woody draws would have little to no change in livestock distribution across the allotment. Forage within the exclosures would no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may occur on remaining forage. There will be a cost to install these fences and as a result there will be additional cost of maintenance of the fence to prevent livestock access to the woody draws.

Fencing the allotment into four pastures and implementing a four-pasture deferred rotation would increase the intensity of management for the permittee and Forest Service personnel to assure over use doesn't occur within a pasture. Since the pasture would be split into four separate pastures, available forage in each pasture would have to be determined to identify the number of grazing days in each pasture with the number of livestock to be grazed. Distribution of livestock would be more even throughout the allotment because livestock would be confined to smaller individual pastures and would no longer have free access to the entire pasture. Additional livestock water would be required because of the locations of existing livestock water developments.

Adjusting Authorized Use downward would result in fewer livestock numbers, fewer grazing days, or a combination of the two because of the turn in permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock; however, the amount of forage harvested would be less than the existing forage harvested.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws

Initial Actions – Continued splitting of the allotment into two pastures and implementing a deferred rotation with the current grazing season of May through September or October would be unlikely to achieve Healthy woody draw conditions. Although the period of livestock access to the woody draws would decrease by half, the entire grazing season in the woody draw pasture would occur during the warmest summer months every other year when it is the second pasture of use. When the woody draw pasture is the first pasture of use, the latter half of the grazing season would occur with similar warm temperatures. Current levels of woody draw disturbance are therefore

likely to be maintained, and could have some potential to increase as a result of the decrease in pasture size that would increase livestock density. Authorized Use that exceeds initial estimated carrying by 64 percent after adjusting for cow size and low palatability of Kentucky bluegrass during most of the grazing season would contribute to high browsing and trampling disturbances when livestock seek extended green periods within woody draws.

The recommendation of early turn-in dates would decrease woody draw disturbances because livestock would be less apt to seek the amenities of woody draws during cooler temperatures and high Kentucky bluegrass palatability at the beginning of the grazing season. However, this is not appreciably different than current turn-in dates during mid-May and would not offset woody draw disturbances during the remainder of the season.

Adaptive Options – Temporarily fencing woody draws and/or decreasing Authorized Use would increase the potential for improved woody draw conditions by removing or decreasing livestock browsing and trampling disturbances that would facilitate the regeneration of desired woody species. Exclusion of livestock impacts through fencing would provide the fastest and greatest degree of woody draw improvement, but regeneration of woody species could be impaired by increasing plant litter and invasive grass layers. Fencing of one woody draw would have a high potential to result in increased disturbances within adjacent unfenced woody draws.

Implementing a four-pasture deferred rotation would assist slight woody draw improvement. The amount of time livestock have access to woody draws would decrease by 75 percent, thus decreasing browsing and trampling disturbances and increasing the potential regeneration of desired trees and shrubs that would contribute to increasing woody draw conditions. However, the increased concentration of livestock within the smaller pasture sizes would have the potential to increase the intensity of woody draw disturbances when they are accessible, particularly when the woody draw pastures are used late in the season. Heavy woody draw use for 4- to 6-week periods every 2 or 3 years could limit the degree of successful woody regeneration. The development of an additional water source necessary for the creation of a four-pasture rotation would contribute to decreased woody draw disturbances because the water would be located in the uplands rather than some reservoirs that are situated along woody draw drainages and that contribute to browsing and trampling disturbances.

Herbaceous Structure

Initial Actions – The Authorized Use level appears to be appropriate at this time to maintain the herbaceous structure distribution. Implementing a deferred rotation by utilizing temporary fencing is projected to retain the herbaceous structure distribution based on existing conditions. Early turnout, with earlier rotation into second pasture could enhance regrowth opportunities.

Adaptive Options – Adjusting Authorized Use would have minimal additional improvement on High herbaceous structure due to the presence of Kentucky bluegrass. Implementing a four-pasture deferred rotation, with a necessary complement of additional water sources could enhance Kentucky bluegrass in the early pasture due to regrowth opportunity. It is uncertain what could happen to herbaceous structure in the remaining pastures. Fencing woody draws would have a minor effect on

herbaceous structure within the allotment and would be relative to the size and location of the exclosure.

Seral Stages

Initial Actions – Splitting the allotment into two pastures and implementing a deferred rotation would perpetuate current trends of increasing Kentucky bluegrass because palatability would be low during most of the grazing season in each pasture. The recommendation of early turn-in would assist increased utilization of Kentucky bluegrass during the first half of the first pasture rotation, but palatability would decrease during the second half of this rotation and would be low throughout the rotation in the second pasture. Annually alternating this pattern between the two pastures would not have an appreciably different result than current management, but might slow development of a Kentucky bluegrass monoculture where it has not already occurred. Authorized Use that exceeds initial estimated carrying capacity by 64 percent after adjusting for cow size would compound selective grazing of the native component. Lower production of Kentucky bluegrass compared to the native climax community (NRCS 2009) used to estimate carrying capacity would also compound this effect.

Adaptive Options – Implementing a four-pasture deferred rotation with the current season of use of the allotment would not provide greater benefit than the two-pasture rotation. With the proposed season of use continuing through September or October, palatability of invasive grasses would remain relatively high through the first half of the second pasture rotation if the recommended early turn-in date is implemented. Palatability would decrease during the latter portion of the second pasture rotation, and would be low throughout the third and fourth pasture rotations. Alternating this pattern among pastures would perpetuate selective grazing of the native component in each pasture on a frequent basis. Increased livestock density in each pasture would have the benefit of increasing litter decomposition with the potential for increased establishment of native grasses, but would be countered by selective grazing.

An additional water source would be required for the four-pasture rotation. Increased disturbances around the water site would likely result in decreased dominance of bluegrass, but would contribute little to the maintenance of native plant diversity due to the level of disturbance and resulting establishment of weedy forbs and/or invasive annual brome.

Neither decreases nor increases in Authorized Use would be effective in long-term control of Kentucky bluegrass and increased maintenance of native plant diversity without coordinating the grazing season with high palatability of the invasive grass component throughout all pastures of the allotment. Decreasing Authorized Use without a coordinated grazing season would continue to result in selective utilization of the native component and would facilitate increased litter accumulation, both of which would assist Kentucky bluegrass. Increases in Authorized Use would increase the imbalance with initial estimated carrying capacity and increase the degree of selective native species grazing.

Sharp-tailed Grouse

Initial Actions – It is projected that under the assumption of no known sharp-tailed grouse lek in

the area, that there would be no negative or positive effect to sharp-tailed grouse habitat from the implementation this alternative at this time.

Adaptive Options – The nearest known lek is 3 miles away. This is beyond the typical distance a grouse hen will travel to nest. So assuming no other nearby lek, it is expected that little, if any nesting use is occurring in this pasture at this time and implementation of the adaptive options would have little impact on grouse habitat.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.
- Constructing temporary north/south electric fence and implementing a deferred rotation starting May 1st.

ADAPTIVE OPTIONS:

- Compressing the season and altering the season of use.

Range

Initial Actions – Authorized Use for this allotment would be 176 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 250 federal AMs converted to AUMs by adjusting for cow size is 288 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 39 percent reduction from existing Authorized Use. Because AMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment.

Implementing a deferred rotation starting May 1st would allow livestock to concentrate on the crested wheatgrass and Kentucky bluegrass, which are range ready early in the grazing season. However, native herbaceous species that are not typically range-ready until June 1st would be negatively affected by this early turnout. Grazing native rangeland prior to range readiness would be the most costly alternative, with both economical losses (in most cases) and reductions in production associated with physical damage to the plants (Manske and Sedivec 1999). Vermeire et al. (2008) also concluded that there was an increased prominence of annual C3 grasses and cacti, which indicates that considerable potential exists for shifting species composition with annual grazing before June.

Adaptive Options – Compressing and altering the season of use would require additional livestock numbers compared to the existing number of livestock grazing the allotment. Depending on how short the grazing season would be compressed, the permittee would have to find additional pasture since livestock would not be allowed in the allotment as long as is currently permitted by the MGA. Depending on the timing of use livestock distribution may change because of the type of herbaceous species that are range ready at the given time livestock grazing.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws

Initial Actions – The general effects of implementing a two-pasture deferred rotation were discussed under Alternative 3. However, the potential reduction in browsing and trampling disturbances occurring with the creation of two pastures would increase with the 39 percent reduction in Authorized Use according to estimated carrying capacity and adjustments for cow size. However, the effects would be reduced by the potential level of use that would range from 19 percent less to 13 percent greater than currently reported use. The proposed May 1st turn-in date would facilitate slightly decreased woody draw disturbances during alternate years in each pasture, and offset adverse effects of the decreased pasture size/increased livestock density to a limited degree. These combined factors would improve the potential for increased tree and shrub regeneration and increased woody draw conditions.

Adaptive Options – Compressing the season of use would further decrease the period that livestock have access to woody draws, and along with the deferred rotation and reduction in Authorized Use, would increase the potential for tree and shrub regeneration and improved woody draw conditions. Potentially increased woody draw disturbances resulting from increased livestock numbers associated with the compressed season would be decreased during alternate years when the woody draw pasture is the first pasture of use due to cooler temperatures and high invasive grass palatability.

The effect of decreased livestock access to woody draws resulting from a four-pasture deferred rotation was discussed under Alternative 3. However, the relatively slight potential for increased woody draw conditions identified under Alternative 3 would be increased by the reduction in Authorized Use under Alternative 4 with a greater potential for improved conditions.

Decreases in Authorized Use would facilitate improved woody draw conditions by decreasing livestock browsing and trampling disturbances that would increase the potential for tree and shrub regeneration, while increases in Authorized Use would have the opposite effect.

Herbaceous Structure

Initial Actions – The decrease in Authorized Use in combination with the deferred rotation would allow for the persistence and potential increase in litter from Kentucky bluegrass, and hence, High structure. Other areas of the allotment may experience in increase in herbaceous structure and there potentially could be an overall reduction in the amount of Low structure. Implementing a May 1st starting date within the context of a deferred rotation grazing system could improve the herbaceous structure distribution as measured in the fall.

Adaptive Options – Compressing the grazing season and altering the season of use could enhance herbaceous structure when a pasture is grazed early in the year because of regrowth opportunity from deferment.

Seral Stages

Initial Actions – The general effects of implementing a two-pasture deferred rotation were discussed under Alternative 3, and current trends of increasing Kentucky bluegrass would not appreciably change with the 39 percent reduction in Authorized Use , which would result in potential levels of use ranging from 19 percent less to 13 percent greater than currently reported use. Selective grazing of native grasses that constitute a small portion of the total forage component would continue, and decreased levels of use would facilitate increased litter accumulation that is already high and facilitates the persistence of invasive grasses.

Adaptive Options – A compressed season of use with increased livestock numbers, along with a turn-in date of May 1st and a two-pasture deferred rotation would increase the utilization of Kentucky bluegrass in the first pasture of the rotation. The degree of benefit in the second pasture would depend on the precise season of use. If occurring after mid-June the benefit would be reduced because of decreasing Kentucky bluegrass palatability. However, increased rates of litter decomposition could occur in both pastures with increased livestock numbers and smaller pasture sizes, and this would initiate decreasing conditions for the persistence of Kentucky bluegrass. However, the potential increase in litter decomposition would be reduced with the 39 percent reduction in Authorized Use, and potential reductions in Kentucky bluegrass dominance would not be achieved without coordinating the grazing season in both pastures with high palatability of invasive grasses that would assist decreased utilization of the native component.

The effects of implementing a four-pasture deferred rotation with the current season of use would be minimally different than the two-pasture rotation with selective grazing of the native component at frequent intervals in each pasture. Although benefits of increased litter decomposition could occur with smaller pasture sizes and more even livestock distribution, the decrease in Authorized Use would decrease this benefit. Combining the four-pasture rotation with a compressed season would increase the utilization of invasive grasses and rate of litter decomposition, but potential benefits to increasing native plant components would depend on the length of the entire grazing period.

As discussed under Alternative 3, neither decreases nor increases in Authorized Use would be effective in long-term control of Kentucky bluegrass and increased maintenance of native plant diversity without coordinating the grazing season with high palatability of the invasive grass component throughout all pastures of the allotment.

Sharp-tailed Grouse

Initial Actions – It is projected that under the assumption of no known sharp-tailed grouse lek in the area, that there would be no negative or positive direct or indirect effect to sharp-tailed grouse habitat from the implementation this alternative at this time.

Adaptive Options – The nearest known lek is 3 miles away. This is beyond the typical distance a grouse hen will travel to nest. So assuming no other nearby lek, it is expected that little, if any

nesting use is occurring in this pasture at this time and implementation of the adaptive options would have little impact on grouse habitat.

ALLOTMENT 240

Table 240.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 240 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 6.1 – Rangeland With Broad Resource Emphasis	2013	100	
Total allotment acres	3284	100	
NFS acres	2013	61	
State land acres	0	0	
Private land acres	1271	39	
Current permitted livestock grazing (AMs) on NFS lands			809
Initial estimated carrying capacity (AUMs) on NFS lands			876
Number of pastures containing NFS lands			5

Table 240.2 — Allotment 240 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	Survey conducted in 2006 rated North Creek and Spring Creek as PFC.	Maintain PFC.
Woody draws	About 30 percent of the sampled woody draws were Healthy and 70 percent were At Risk. At Risk stands have grass dominated understories, low regeneration, cattle trailing and some head cutting.	Increase seedling/sapling understory and enhance shrubs.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Meeting Objectives High – Below Objectives 2004 Transects: 2.15; 1.71; 1.38; 1.54; 1.21; 2.3 2004 Stations percent: Low-49.17/Moderate-50.83/High-0 2005 Transects: 1.66 2005 Stations percent: Low-50/Moderate-45/ High-5	Manage for additional High structure on biologically capable habitats.
Seral stages	Mid seral stages with varying amounts of invasive grasses predominated. Invaded Grass States occurring in portions of most pastures.	Decrease or limit the spread of invasive grasses and maintain native grass communities while increasing the proportion of early and late seral stages.
Sharp-tailed grouse	There are two leks that occur within the allotment. Within the allotment, there are approximately 1,433 acres within the 1 mile proximity radius encompassing all or portions of pastures 1, 2, and 3.	Manage for increased High vegetative structure on biologically capable sites to enhance nesting and brooding habitat.
Remarks	0.5 acres of Canada thistle. Burdock and absinth wormwood noted in woody draws.	

Table 240.3 — Allotment 240 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action	Alternative 3A	Alternative 4
• Authorized Use is 809 federal AMs. • Three-year average permitted use is 747 federal AMs.* • Permit type: Inventory (12 months). • Rotation: Modified four-pasture deferred rotation. • Class(s) of Livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 809. • Complete grazing in pasture 4 by March 15th. • Create dependable water in pasture 1, which will allow for a 3-pasture deferred rotation. • Reclaim reservoir(s) in pasture 1. **Adaptive Options** • Fence high-value woody draws. • Utilize pasture 4 for early summer grazing 1 out of every 4 years. • Adjust Authorized Use.	**Initial Actions** • Authorized federal AMs: 809. • Complete grazing in pasture 4 by March 15th. • Create dependable water in pasture 1, which will allow for a 3-pasture deferred rotation. **Adaptive Options** • Fence high-value woody draws. • Utilize pasture 4 for early summer grazing 1 out of every 4 years. • Adjust Authorized Use.	**Initial Actions** • Authorized federal AUMs: 876. • Create dependable water in pasture 1, which would allow for a three-pasture deferred rotation. • Reclaim reservoir(s) in pasture 1. **Adaptive Options** • Fence high-value woody draws. • Utilize pasture 4 for early summer grazing 1 out of every 4 years. • Adjust Authorized Use.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every 3 years. • Complete Properly Functioning Condition survey once every 5 years. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** Same as Alternative 3	**Monitoring** • Same as Alternative 3

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 240 — Existing Condition

Range – This allotment is approximately 3,284 acres in size and contains both private and NFS lands with 2,013 acres of NFS lands. Currently, this allotment is issued an inventory permit for 145 head for 8 months by the MGA. With this type of permit there is a potential of livestock being on NFS lands for the entire year, not just the typical May 1st to December 31st period. Livestock are wintered on private and NFS lands during the months of January through April. This allotment has been subdivided into 10 pastures, 5 of which contain NFS lands. These pastures range in size from 48 to 740 acres. Current AMs provided by NFS lands can be found in Table 240-1. This allotment is located primarily in the Rolling Prairie geographic area with the southern end of it transitioning into the Badlands. Water developments include reservoirs, a dugout, a pipeline system with stock tanks, and a spring.

The rotation in this allotment has been a modified deferred rotation with some pastures having multiple grazing periods in most years, and pasture 1 is always the starting pasture for the season. Pastures 4 and 4a have always been used at the end of the season and have been included with private pastures as a wintering pasture component. The plant composition in this allotment is mixed crested wheatgrass and Kentucky bluegrass with intermingled native species in the uplands and transitions to Kentucky bluegrass intermingled with native species in the bottoms/woody draws.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there is approximately a half acre of Canada thistle. However, during the woody draw survey populations of burdock and absinth wormwood were found within the woody draws that were surveyed (see Project Record, Specialist Reports and Notes, Botany Report). The size and amount of these two species is unknown at this time.

Riparian – Two streams flow through Allotment 240. A 1.3-mile segment of North Creek (Reach 1) flows through pasture 3 (Figure 240.1); and a 0.8-mile reach of Spring Creek (Reach 1) flows through pasture 4 (Figure 240.2). No riparian survey had ever been conducted in either stream prior to 2006. The interdisciplinary team evaluated both streams in June 2006 and gave both reaches a functionality rating of PFC. Spring Creek contained a variety of fish.

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
240-03	North Creek (1)	1.28					1.28
240-04	Spring Creek (1)	0.76					0.76

Figure 240.1 — North Creek has a riparian functionality rating of PFC. The headwater reach is characterized by a robust riparian plant community of sedges, spikerush, and prairie cordgrass (*Spartina pectinata Link*). Livestock trailing along the channel is minimal.

Figure 240.2 — Spring Creek has a functional rating of PFC. Beaver have colonized this reach and improved riparian functionality. Species composition is a minor concern as invasive grasses (especially Kentucky bluegrass) were noted in the riparian area. Some relict bank erosion from hoof shear is healing.

Figure 240.3 — Animal watering facilities and supplemental feeding structures are located on or near the banks of Spring Creek. Supplemental feeding structures should be moved away from the channel to safeguard riparian quality. Spring boxes should be converted to off-stream water tanks.

Woody Draws – Of 10 woody draw samples in pastures 1, 2, and 4, 30 percent were Healthy and 70 percent were At Risk. Several At Risk sites occurred near water reservoirs that contribute to high levels of woody draw disturbance. Two fenced woody draws used for a previous study regarding woody draw improvement were included among the samples (Uresk and Boldt 1986). One of the sites was Healthy while the second was At Risk, and dense stands of smooth brome and Kentucky bluegrass adversely affected both sites. Relatively small woody draw patches occurred among larger shrub communities along a perennial drainage in pasture 3. These communities were not sampled, but high livestock use along the drainage resulted in browsing and trampling disturbances similar to sampled At Risk sites.

Herbaceous Structure – In 2004, there were six random sampled VOR transects. Two were measured in the Low structure class and four were measured in the Moderate class. The consolidated station average indicated nearly a split between Low and Moderate structure. There were no High structure stations.

One transect was remeasured in 2005. This transect improved from the 2004 reading of 1.38 (Low) to 1.66 (Moderate). The station average distribution was 50 percent Low, 45 percent Moderate, and 5 percent High ($\geq$5.5 inches) structure.

Seral Stages – Bluegrass and other invasive grasses are intermixed with native grasses at varying proportions throughout the five pastures of this allotment. Kentucky bluegrass averaged 45 percent of the total grass production on two Claypan ecological sites sampled by NDSU in pasture 1. Kentucky and Canada bluegrass comprised 42 percent of the grass production on a Very Shallow ecological site located between the Claypan sites. Two of these three sites had transitioned to Invaded Grass States while the third site was at a mid seral stage. Three Robel transects and one belt transect reported similar dominance or codominance of invasive grasses in the pasture. A remeasured pace transect at the south end of the pasture indicated relative plant frequency of bluegrass increased from 2 to 26 percent between 1980 and 2009. Relative plant frequency of western wheatgrass decreased from 74 to 20 percent, while blue grama increased from 14 to 31 percent.

Bluegrass comprised about 5 and 8 percent of the grass production on Thin Claypan and Sandy ecological sites sampled by NDSU in pasture 2. Kentucky bluegrass frequency was 40 percent and several other invasive grasses were present on the Sandy ecological site. Bluegrass and annual brome each comprised about 14 percent of the relative grass canopy cover on a sere plot from a Sandy ecological site. Kentucky bluegrass and annual brome comprised 24 and 11 percent of the relative grass canopy cover on a sere plot from a Loamy ecological site at the south end of the pasture. All four of these sites were at mid seral stages. A Robel transect reported bluegrass as the dominant species with lesser amounts of native grasses, while a belt transect reported dominance of western wheatgrass and lesser amounts of Kentucky bluegrass and crested wheatgrass.

Kentucky bluegrass and smooth brome were prominent in a sere plot near the north end of pasture 3, and field observations indicated bluegrass dominance and Invaded Grass States across large areas of a broad ridgeline in the south half of the pasture.

Broken land was not identified in the allotment but the prominence of crested wheatgrass in pasture 4a and the location of this pasture adjacent to private hay land suggests that crested wheatgrass was planted. A sere plot was at a mid seral stage for broken land, with crested wheatgrass dominance, moderate amounts of needle-and-thread, and lesser amounts of bluegrass and smooth brome. Invasive grasses in adjacent pasture 4 appeared to decrease with increasing distance from pasture 4a.

Sharp-tailed Grouse – There are two leks that occur within the allotment. Within the allotment, approximately 1,433 acres occur within the 1 mile proximity radius, encompassing all or portions of pastures 1, 2, and 3.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed 2 years later.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would now be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian condition along North and Spring Creeks described in the existing condition would continue and evolve toward their potential riparian community.

Woody Draws – Woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. Existing and potentially increasing invasive grasses as assisted by increasing plant litter with the removal of livestock grazing would have the potential to slow or decrease the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock, there would be an increased opportunity for the development of High and Moderate herbaceous structure, and a decrease in the amount of Low herbaceous structure. This should result in an initial improvement in the herbaceous structure distribution towards objectives. However, over time, this distribution would likely shift to where there is excess High and Moderate structure at the expense of Low structure.

Seral Stages – The removal of livestock grazing would facilitate increased litter accumulation that would assist continued increases of bluegrass and other invasive grasses. Transitions to Invaded Grass States have occurred in portions of the allotment and further transitions would occur in 5 to 10 years in other areas containing prominent amounts of invasive grasses. Transitions could require 10 or more years in areas with lighter amounts of invasive grasses such as areas of pasture 4 and steep north aspect slopes above drainages in pastures 2 and 3.

Sharp-tailed Grouse – The increase in High structure from removal of livestock disturbance would enhance nesting and brooding habitat for sharp-tailed grouse. However, over time the decrease in forb diversity could decrease foraging opportunities. Also, over time, nesting and brooding quality could also decrease because of lower quality habitat associated with invasive grasses that would invade the pastures.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by an inventory grazing association permit, and Authorized Use is 809 federal AMs.
- Cow/calf pairs are run in a four-pasture modified deferred rotation.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian conditions along North and Spring Creeks as described in the existing condition would continue.

Woody Draws – Objectives for woody draw conditions are not currently met and there would be no reason to expect improved conditions with continuation of current management. Levels of reported use that are appreciably greater than Authorized Use and initial estimated carrying capacity, as well as additional winter use, would continue to contribute to high levels of woody draw disturbances. Both woody draw samples in pasture 4 were At Risk and suggested high winter use of woody draws for shelter. Only a few woody draws occur in pasture 1 and therefore experience concentrated browsing and trampling disturbances. Woody draws in pasture 2 primarily occur along a drainage extending through the pasture that likely experiences concentrated trailing disturbances. Reservoirs along drainages in pastures 1 and 2 contribute to browsing and trampling disturbances in adjacent woody draws. The twice-over grazing rotation ensures frequent summer use during warm temperatures when woody draws attract livestock seeking shade of and escape insect pests. Decreased palatability of invasive grasses during the summer has the potential to contribute to the increased use of woody draws in heavily infested pastures when livestock seek extended green periods of the herbaceous understory.

Herbaceous Structure – Current management (e.g., multiple grazing periods and Authorized Use levels) would continue to facilitate the existing herbaceous structure distribution with a limited potential to improve the proportion of High herbaceous structure and the herbaceous structure distribution in general.

Seral Stages – Invasive grasses would continue increasing under current management and transitions to Invaded Grass States that have occurred in portions of the allotment would increase in extent as invasive communities coalesce. This would occur at slightly slower rates compared to Alternative 1 as a result of decreased litter accumulation and varying levels of invasive grass utilization.

Hay feeding in pasture 4a and other pastures would continue to introduce seed of invasive species. Heavy trampling disturbances in hay feeding areas and premature grazing of native grasses in several pastures facilitates the establishment and spread of invasive species by decreasing native plant vigor and increasing susceptibility of the plant community to invasion. The adverse effect of premature grazing can be compounded by the twice-over pasture rotations because the second grazing period can occur before plants have fully recovered from the first grazing period, and/or can overlap the second critical growth stage during the fall. Although twice-over grazing and the mixture of native and invasive grasses creates the potential for early season use of the invasive component and later season use of the native component, the deferred grazing rotation is not coordinated with this potential. Low palatability of bluegrass during large portions of the grazing season therefore contributes to additional grazing pressure on the native grass component that has the potential to assist the spread of invasive grasses.

Currently reported levels of use, as well as additional winter use frequently exceed Authorized Use and initial estimated carrying capacity and are likely to impede the maintenance of native plant communities and assist the spread of invasive grasses.

Sharp-tailed Grouse – Existing management actions (e.g., multiple grazing periods and Authorized Use levels) would not enhance High structure grasslands due to a lack of retention of residual standing crop, thus limiting the potential to enhance grouse nesting and brooding habitat in this allotment.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 809 federal AMs.
- Completing grazing in pasture 4 by March 15th.
- Creating dependable water in pasture 1, which will allow for a three-pasture deferred rotation.
- Reclaiming reservoir(s) in pasture 1.

ADAPTIVE OPTIONS:

- Fencing high-value woody draws.
- Utilizing pasture 4 for early summer grazing one out of every 4 years.
- Adjusting Authorized Use.

Range

Initial Actions – Because the initial Authorized Use would remain the same as current management, the permittee would be allowed to harvest the same amount of forage. However, the

use of these federal AMs would be different than the existing condition because forage would be harvested during different periods of the grazing season compared to the current rotations. Completing dormant season grazing by March 15th in pasture 4 would ensure that native and introduced species are not grazed during initial active growing conditions. There would be no effects on Authorized Use because this would occur during the winter feeding period of the grazing association permit.

Creating dependable water in pasture 1 and implementing a deferred rotation would change the season of use for pastures 1, 2, and 3 from year to year and provide the opportunity for initial growth or regrowth. Livestock distribution would change, especially in pasture 1, because currently the more dependable water is located in the southern one third of the pasture.

Reclaiming a reservoir(s) in pasture 1 would decrease the amount of livestock watering areas, and over time change the distribution of livestock because there would only be one main source of water in this pasture with the proposed dependable water. Reclamation sites would not affect available AMs because of the reclaimed area size.

Adaptive Options – Fencing high-value woody draws would result in little to no change in livestock distribution across the allotment. Forage within the exclosures would no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may occur on remaining forage. There will be an initial cost to install these fences and additional recurring maintenance costs to consider.

Utilizing pasture 4 for early summer livestock grazing 1 out of every 4 years would remove the pasture from winter use in that 1 year and add a complementary pasture that would defer use of the other three summer use pastures. Livestock distribution would change due to the livestock grazing occurring during the active growing season rather than the dormant season. Early season use of this pasture would result in a decrease of desirable native cool season herbaceous species, however, using the pasture early 1 out of 4 years would provide native herbaceous species an opportunity for initial growth and regrowth the other 3 years.

Adjusting Authorized Use would require reducing the number of livestock since this allotment carries an inventory permit. Adjusting Authorized Use would not change the distribution of the livestock; however, the amount of forage harvested would be less than the existing forage harvested.

Riparian

Initial Actions – It is expected that desired conditions along North and Spring Creeks would continue with the initial actions proposed.

Completing grazing in pasture 4 by March 15th would have no effect on desired riparian condition along Spring Creek because livestock use on the creek would not increase.

Creating dependable water in pasture 1 and implementing a deferred rotation could benefit riparian condition along North Creek due to reduced livestock use. Riparian conditions would benefit from reduced livestock trampling and trailing on stream banks.

Reclaiming a reservoir(s) in pasture 1 would have no effect on riparian condition along North and Spring Creeks due to separation being located in a different pasture.

Adaptive Options – It is expected that desired conditions along North and Spring Creeks would continue with the adaptive options proposed.

Fencing high-value woody draws should have no effect on riparian condition along North and Spring Creeks because there would be no expected change in livestock distribution and the distance of separation.

Utilizing pasture 4 for early summer livestock grazing 1 out of every 4 years would have no effect on desired riparian condition along Spring Creek because livestock use on the creek would not increase.

Woody Draws

Initial Actions – Initial actions would slightly improve woody draw conditions but there would be a limited potential for shifts from At Risk to Healthy conditions.

Continued winter use of pasture 4 would result in the persistence of trampling disturbances when livestock seek thermal shelter, but moving livestock to private land by March 15th would decrease disturbances during the spring with frequently moist soil conditions that can increase adverse effects of trampling.

Creation of a more dependable water source in pasture 1 could increase the consistency of the deferred rotation in the three main summer pastures. Although AOIs/AWs indicate minimal limitations of using pasture 1 that contains four reservoirs, a new water source would create the potential for increased use of the pasture with increased woody draw disturbances that are already high as a result of the scarcity of woody draws. Increased flexibility of the pasture would include greater late season use when livestock are apt to spend more time in woody draws. Implementation of one rather than multiple pasture rotations would contribute to increased seasonal periods of resting woody draws in all pastures, but this change in the grazing system is not specifically listed as a proposed action.

Reclamation of up to two reservoirs at the north end of pasture 1 would contribute to decreased livestock disturbances within adjacent woody draws, but the degree of decreased disturbance would be limited by the scarcity of draws in the pasture that would continue to be sought for shade, escape from insect pests, and extended green periods.

Adaptive Options – Fencing woody draws or decreasing Authorized Use would facilitate the regeneration of desired woody species and increasing conditions by removing or decreasing livestock browsing and trampling disturbances. Current levels of reported use and additional winter use that often exceed Authorized Use would have to be accounted in potential reductions of use. Exclusion of livestock disturbances through fencing would provide the fastest and greatest degree of woody draw improvement, but increasing plant litter and invasive grasses could slow or decrease the level of woody draw improvement. Fencing of one woody draw would have a high potential to result in increased disturbance within adjacent unfenced woody draws.

Utilizing pasture 4 for early summer grazing 1 of every 4 years would not have an appreciable effect on woody draw conditions in any pasture due to the low frequency of this action. Decreased early summer use in pastures 1, 2, and 3 would occur only once every 12 years and summer use of pasture 4 would likely result in a level of woody draw disturbances equal or greater than occurring during the winter.

Herbaceous Structure

Initial Actions – The Authorized Use level is approximately 6 percent higher than the initial estimated carrying capacity, after accounting for cow size. This could be contributing to limiting High herbaceous structure by hindering retention of residual cover. By completing dormant season use by mid-March in pasture 4, a longer deferment period for potential regrowth would be provided. Though management flexibility could be recognized by adding a water tank to pasture 1, it would likely further increase the homogeneity of use in the pasture by increasing the water density, the length of season, and increasing the number of years when grazing could occur throughout the pasture. The effect of removing an existing water reservoir is uncertain given the unknowns about the location of the proposed tank and location of the reclaimed reservoir. It is assumed that the tank would be located in the northern portion somewhere due to the fairly dependable reservoir in the south eastern corner. The proposed deferred rotation could improve herbaceous structure distribution over the current twice-over grazing system but the Authorized Use level and the amount of water sources in the three pastures would limit the ability to appreciably increase the proportion of High structure.

Adaptive Options – Adjusting the Authorized Use downward would improve the potential for increasing the proportion of High herbaceous structure within the allotment and improve the overall herbaceous structure distribution. Fencing woody draws would have a relatively small effect on the overall herbaceous structure distribution and would be relative to the size of the exclosure. And utilizing pasture 4 for early summer use could result in a positive impact to High herbaceous structure due to approximately 19 months of rest in conjunction with this rotation.

Seral Stages

Initial Actions – Trends of increasing Kentucky bluegrass and decreasing native grasses would continue under Alternative 3 because proposed management would not be appreciably different than current management. Most of the allotment is at a Native Invaded Grass State and portions of all pastures are approaching or beyond a threshold of transitioning to an Invaded Grass State.

Developing a pipeline-supplied water tank in pasture 1 might facilitate a deferred rotation, but there is minimal indication from AOIs/AWs that the existing four reservoirs limit summer use of the pasture. Increased late summer use of the pasture would occur during low palatability of Kentucky bluegrass and contribute to high use of native grasses, thereby facilitating the further spread of invasive grasses. Creation of the new water source and reclamation of one or more reservoirs would change the distribution of livestock grazing, but decreased grazing disturbance around reclaimed reservoirs would be countered by increased disturbances around the new water source. The predominance of invasive grasses observed around some reservoirs increases the likelihood of their establishment after reclamation.

Moving livestock from pasture 4 to private land by March 15th would remove adverse effects of premature grazing and assist increased vigor and development of native grasses in this pasture. However, premature grazing would continue in alternating pastures with the 12-month inventory permit, or livestock numbers would be increased during other portions of the year to account for lost use during March and April. Switching from a twice-over to a once-over deferred rotation among summer pastures would assist native plant development by increasing opportunities for the completion of critical growth stages, but grazing seasons would remain poorly coordinated with invasive grass palatability to varying degrees in each pasture.

Adverse effects associated with hay feeding would continue to introduce and assist the establishment of invasive grasses in the allotment. Levels of Authorized Use and currently reported use, as well as additional winter use that appreciably exceed initial estimated carrying capacity would continue to impede the development of native grass communities and maintain conditions for the spread of invasive grasses and transitions to Invaded Grass States.

Adaptive Options – Adding pasture 4 to the early summer grazing rotation 1 of every 4 years would disperse grazing levels among a greater number of pastures but would not appreciably change current conditions or trends in plant composition in any pasture. Grazing seasons and stocking levels would remain poorly coordinated with the relative palatability and production of invasive and native grass components.

Fencing woody draws would have no effect on upland plant composition or trends due to the small acreage of the fenced exclosures.

Neither decreases nor increases in Authorized Use would be effective in long-term control of invasive grasses and the maintenance of native plant communities without consistently coordinating the grazing season with the production and palatability of the invasive and native grass components throughout all pastures of the allotment.

Sharp-tailed Grouse

Initial Actions – The Authorized Use level is approximately 6 percent higher than the initial estimated carrying capacity, after accounting for cow size. This could be contributing to limiting potential grouse nesting habitat by hindering retention of residual cover. By completing dormant season use by mid-March in pasture 4, a longer deferment period for regrowth of residual cover would be provided in the fall but may not be carried over to the spring due to winter use reducing cover levels. Though management flexibility could be recognized by adding a water tank to pasture 1, it would likely further contribute to the homogeneity of use in the pasture and consequent loss of potential grouse nesting habitat by increasing the water density, the length of season, and increasing the number of years when grazing could occur throughout the pasture. The effect of removing an existing water reservoir is uncertain given the unknowns about the location of the proposed tank and location of the reclaimed reservoir. It is assumed that the tank would be located in the northern portion somewhere due to the dependable reservoir in the south eastern corner. The proposed deferred rotation could improve grouse habitat over the current twice-over grazing system, but the initial Authorized Use level and the amount of water sources in the three pastures would limit the ability to appreciably increase the proportion of High structure grassland habitat.

Adaptive Options – Adjusting the Authorized Use downward could improve the potential for increasing the proportion of grouse nesting habitat within the allotment. Fencing woody draws would have a relatively small effect on the overall on grouse nesting habitat and would be relative to the size of the exclosure. Utilizing pasture 4 for early summer use would not appreciably improve grouse nesting habitat.The lack of sufficient regrowth time the first summer and the resumption of winter use the following winter would reduce the amount of potential cover that could be used in the following spring.

Effects of Alternative 3A

The effects of Alternative 3A are the same as Alternative 3 with the following stated exceptions.

INITIAL ACTIONS:

- Drop the initial action of reclaiming a reservoir(s) in pasture 1.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 3A are the same as Alternative 3.

Range

Initial Actions – This action would provide pasture 1 with multiple livestock watering sources, albeit some of them would be seasonal at best. Livestock distribution would be even throughout the pasture because of the multiple sources of water, if they are dependable.

Riparian

Initial Actions – This alternative is the same as Alternative 3 except that reservoir(s) would not be reclaimed in pasture 1. The effects are the same as Alternative 3.

Woody Draws

Initial Actions – None of the four reservoirs in pasture 1 would be reclaimed despite developing a pipeline-supplied water source to establish more reliable water to facilitate greater flexibility in use of the pasture. Creation of the new water source would decrease the use of existing reservoirs, two of which occur near woody draws at the north end of the pasture. Decreased use of the north reservoirs would increase the potential for improved woody draw conditions, but the degree of improvement would be reduced by the relative scarcity of woody draws within the 640-acre pasture, and they would continue to be sought for shade and escape from insect pests. Warm summer temperatures during frequent grazing periods in pasture 1, low palatability of invasive grasses, and the continued presence of the reservoirs would maintain the potential for relatively high disturbances within the woody draws and decrease the degree of improved conditions compared to Alternative 3. No woody draws occurred adjacent to two reservoirs in the southeast quarter of the pasture, and continued maintenance of these sites would have some potential to contribute to decreased use of the north reservoirs and adjacent woody draws.

Herbaceous Structure

Initial Actions – See Alternative 3.

Seral Stages

Initial Actions – Trends of increasing Kentucky bluegrass and decreasing native grasses would continue in pasture 1 regardless of reclaiming or not reclaiming any of the four reservoirs because grazing seasons would remain poorly coordinated with invasive grass palatability regardless of switching from a twice-over to once-over deferred rotation.

Maintaining all four reservoirs along with constructing a more reliable water source in pasture 1 would have the potential to maintain the evenness of livestock grazing across the 640 acres of the pasture. This could facilitate the management of plant litter to help control the spread of invasive grasses, but would remain limited by poor coordination of the grazing season with early season palatability of Kentucky bluegrass. In general, slightly to moderately decreased use around the existing reservoirs is likely to facilitate increased litter and increased dominance of Kentucky bluegrass, which occurs in high amounts around these areas.Increased grazing disturbances around the new tank location would facilitate a shift towards early seral stages and/or increased invasive species such as annual brome.

Sharp-tailed Grouse

Initial Actions – See Alternative 3.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carry capacity.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 4 are the same as Alternative 3.

Range

Initial Actions – Authorized Use for this allotment would be 876 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 809 federal AMs converted to AUMs by adjusting for cow size is 930 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 6 percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment.

Riparian

Initial Actions – The effects would be the same as described previously in Alternative 3.

Woody Draws

Initial Actions – A 6 percent reduction in Authorized Use after adjusting for cow size would minimally decrease woody draw disturbances. Factors that would continue to impede woody draw

improvement include relatively few woody draws among individual pastures, the presence of water reservoirs along woody draw drainages, and low palatability of invasive grasses in each pasture that would frequently occur with the deferred rotation. As evidenced by At Risk conditions in pasture 4, winter use can also contribute to a lack of desired shrub and tree regeneration when livestock seek the shelter of woody draws. Additional winter use not credited towards Authorized Use would continue to contribute to the level of woody draw disturbances.

Herbaceous Structure

Initial Actions – The adjustment in Authorized Use from AMs to AUMs to reflect the initial estimated carrying capacity could result in a positive improvement in herbaceous structure, assuming actual use is reflective of the preference level of 809 AMs. By not completing winter use by March 15th, that could permit grazing to further reduce potential regrowth time by 2 to 6 weeks. However, there should be sufficient regrowth time still available for regrowth to potentially regrow High structure herbaceous vegetation.

Seral Stages

Initial Actions – Trends of increasing Kentucky bluegrass and decreasing native grasses would continue because proposed management would not be appreciably different than current management. The minimal effect on plant composition resulting from development of a more dependable water source in pasture land reclamation of one or more reservoirs were discussed under Alternative 3 and would not appreciably change with the 6 percent reduction in Authorized Use under Alternative 4. Grazing seasons and stocking levels would remain poorly coordinated with the production and palatability of the invasive and native grass components in each pasture during most years, and switching from a twice-over to a once-over rotation would not change this effect.

Sharp-tailed Grouse

Initial Actions – The adjustment in Authorized Use from AMs to AUMs to reflect the initial estimated carrying capacity could result in a positive improvement in the potential to manage for grouse nesting habitat, assuming actual use is reflective of the preference level of 809 AMs. By not completing winter use by March 15th, that could permit grazing to further reduce potential grouse nesting habitat by 2 to 6 weeks.

ALLOTMENT 241

Table 241.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 241 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 6.1 – Rangeland With Broad Resource Emphasis	892	100	
Total allotment acres	4169	100	
NFS acres	892	21	
State land acres	0	0	
Private land acres	3277	79	
Current permitted livestock grazing (AMs) on NFS lands			359
Initial estimated carrying capacity (AUMs) on NFS lands			357
Number of pastures containing NFS lands			5

Table 241.2 — Allotment 241 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	There are no perennial or intermittent stream reaches in this allotment.	None
Woody draws	Of the sampled woody draws, approximately 17 percent were Healthy and 83 percent were At Risk due to lack of regeneration and the shrub layer being in poor condition. The presence of smooth brome is also a factor inhibiting woody regeneration.	Increase seedling/sapling understory, and enhance shrubs.
Herbaceous structure	Transect Results: Low – Below Objective Moderate – Below Objectives High – Exceeding Objectives 2004 Transects: 3.89; 1.85; 3.28 2004 Stations percent: Low-30/Moderate-56.67/ High-13.33	**Manage allotment to maintain meeting structure objectives.
Seral stages	Three of four sample sites were at Invaded Grass States while the fourth site (from an unknown NDSU location) was at a mid seral stage approaching an Invaded Grass State.	Decrease or limit the spread of invasive grasses and maintain native grass communities while increasing late and early seral stages.
Sharp-tailed grouse	There is one known lek within 1 mile of the allotment. There are approximately 116 acres within the 1 mile proximity radius encompassing a portion of pasture 1.	Manage to maintain or enhance the quality and quantity of High vegetative structure on biologically capable sites to enhance sharp-tailed grouse nesting and brooding habitat.
Remarks	Some burdock noted in the woody draw.	

****Based on a review of field notes and observations, the IDT determined that this allotment was meeting structure objectives.**

Table 241.3 — Allotment 241 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 359 federal AMs. • Three-year average permitted use is 334 federal AMs.* • Permit type: Inventory (12 months). • Rotation: Seasonlong (multiple herds). • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 359. • Continue to monitor the woody draw bottom in pasture 7 to establish what is causing the adverse effects. **Adaptive Options** • Use prescribed fire to treat a portion of the woody draw located in pasture 7 and then fence out the treated area. • Adjust Authorized Use. • Use drift or experimental fence to minimize impacts to woody draw bottoms.	**Initial Actions** • Authorized federal AUMs: 357. • Continue to monitor the woody draw bottom in pasture 7 to establish what is causing the adverse effects. • Fence out a woody draw in pasture 1 and monitor response. **Adaptive Options** • Use prescribed fire in woody draws of pastures 1 and 7 to treat a portion of the stand and then fence the treated area. • Use pasture 1 in summer rotation. • Adjust Authorized Use.
Monitoring • Review annual planned management identified in Allotment Worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every 3 years. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** Same as Alternative 3

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 241 — Existing Condition

Range – This allotment is approximately 4,169 acres and contains both private and NFS lands with 892 acres of NFS lands. Currently, this allotment is issued an inventory permit for 175 head for 8 months by the MGA. With this type of permit there is a potential of livestock being on NFS lands for the entire year, not just the typical May 1st to December 31st. Livestock are wintered on private and NFS lands during the winter months of January through April. This allotment has been

subdivided into 10 pastures, and 5 of them contain NFS lands. These pastures range from 86 to 1,755 acres. Current AMs provided by NFS lands can be found in Table 241-1. This allotment is located primarily in the Rolling Prairie geographic area with the north-central area of it transitioning into the Badlands. Water developments include reservoirs in each pasture.

The rotation in this allotment is made up of several small herds grazing essentially seasonlong in a designated pasture with livestock turn out starting around June 1st. However, pasture 7 typically is grazed for 1 month starting around June 15th, and pasture 1 is used as a winter pasture. Field observances in this allotment showed a mixture of cool and warm season native species with Kentucky bluegrass intermingled in the uplands along with patches of smooth brome in pasture 1. Pasture 7 is similar to the rest of the uplands except in the woody draws Kentucky bluegrass is the dominant grass species.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there were no known state listed noxious weeds or county listed weeds within this allotment. However, during the woody draw surveys within this allotment a population of burdock was identified. Currently, the amount and number of infestations are unknown.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – Of five woody draw samples in pasture 1, one was Healthy, three were At Risk, and one near a developed spring was Unhealthy (Figure 241.1). Past beaver activity was observed along several drainages and livestock appeared to be browsing sapling resprouts. A large woody draw comprised 17 percent of pasture 7. North aspect slopes of the woodland were Healthy but the wide and flat semi-riparian bottom was Unhealthy (Figure 241.2). No woody draws occurred in pastures 3 and 6. In summary, 29 percent of woody draws in the allotment were Healthy, 57 percent were At Risk, and 14 percent were Unhealthy.

a)

Figure 241.1 — Unhealthy woody draw adjacent to a developed spring in pasture 1.

b)

Figures 241.2a and 241.2b — Woody draw in pasture 7. a) Relatively Healthy north aspect slopes, and b) Unhealthy conditions along the drainage bottom with no tree regeneration and no shrub layer.

Herbaceous Structure – There were three random VOR transects sampled in 2004. Two were measured in the Moderate structure class and one was in the High structure class. The consolidated station averages were 30 percent in the Low structure class; approximately 57 percent in the Moderate structure class; and approximately 13 percent were in the High structure class. No transects were reread in 2005. Based on the results, field notes, and observations, the IDT determined that this allotment is meeting structure objectives.

Seral Stages – Broken land was not identified in any pasture, but smooth brome and other invasive grasses dominated large areas of pasture 1. Hay storage and feeding occurs on private land within the pasture, and feeding may occur on NFS land. An NDSU plot on a Claypan ecological site sampled at the end of May resulted in 87 percent of the grass production comprised of smooth brome and lesser amounts of crested wheatgrass. This value would decrease with progression of the growth season but it is apparent that the site has transitioned to an Invaded Grass State. Two Robel transects south of the above sample recorded similar dominance of smooth brome and crested wheatgrass.

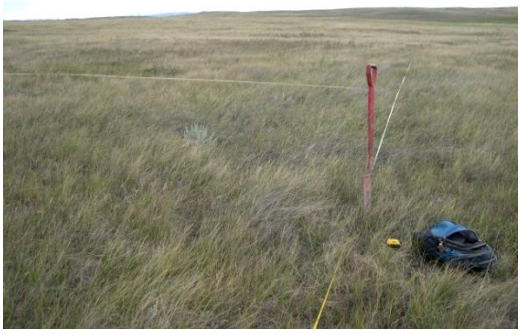


Figure 241.3 — Sere plot in pasture 6 dominated by Canada bluegrass with high amounts of litter and low levels of grazing.

Pasture 3 involved a small portion of NFS land combined with private. Remeasurement of an ecoplot in the pasture resulted in relative grass canopy cover of bluegrass increasing from less than 2 percent in 1998 to 63 percent in 2007, with a corresponding decrease of all native grasses. Pasture observations indicate that three other ecoplots within 1,500 feet of the remeasured plot have experienced similar increases of invasive grasses.

Pasture 6 comprised 86 acres adjacent to pasture 3. Bluegrass and lesser amounts of

smooth brome constituted 47 percent of the relative grass canopy cover in a sere plot (Figure 241.3). Western wheatgrass and green needlegrass remained persistent but the site was at an Invaded Grass State.

Kentucky bluegrass comprised 47 percent of the grass production on a Sandy ecological site sampled by NDSU at the end of May. This site was at or approaching an Invaded Grass State, but the site or pasture location is uncertain until additional information is provided by NDSU.

Native grasses appeared to remain dominant in the uplands of pasture 7, but relative plant frequency of bluegrass increased from 2 percent in 1979 to 15 percent in 2009 along a repeated pace transect at the north end of the pasture. Western wheatgrass and blue grama remained as the most frequent species, but the former decreased while the latter increased over the measurement period. Native grasses were recorded as the two dominant species in a nearby belt transect.

Most of pasture 12 appears to consist of unbroken land but there is a high potential for invasive grass dominance due to the pasture location adjacent to broken land and active agricultural fields.

Sharp-tailed Grouse – There is one known lek within 1 mile of the allotment. There are approximately 116 acres within the 1 mile radius of this lek, which encompasses a portion of pasture 1. Based on the herbaceous structure determination, it may appear that the allotment is addressing grouse habitat needs. However, much of the herbaceous structure is provided by invasive grasses, which may not provide preferred conditions for sharp-tailed grouse.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed 2 years later.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would now be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – Woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. Existing and potential increases invasive grasses as a result of increasing litter with the removal of livestock grazing could slow or decrease the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock, there would be increased opportunity for the development of High and Moderate herbaceous structure. This structure would be likely to be continued to be dominated by Kentucky bluegrass, smooth brome, and other invasive grass species.

Seral Stages – The removal of livestock grazing would facilitate increased litter accumulation that would assist continued increases of bluegrass and other invasive grasses. Transitions to Invaded Grass States have already occurred in large portions of at least three NFS pastures and these would continue at a rapid rate with the removal of livestock grazing. Transitions might require up to 10 years in pasture 7 with lighter amounts and less contiguous invasive grasses.

Sharp-tailed Grouse – Though there would be an increase in High herbaceous structure, this structure would be dominated by Kentucky bluegrass and smooth brome. There is some uncertainty about the value of Kentucky bluegrass and smooth brome (Rodgers and Hoffman 2005) for grouse nesting, which could be dependent on the presence of other stiffer stemmed grass species such as the wheat grasses or shrubs to help it to hold up under snow or capture the litter. However, snow accumulations occur in most winters in western North Dakota. Invasive grass species would thrive under this alternative further increasing their frequency in the allotment while decreasing other species, including native grass species. Therefore, the effects of this alternative on grouse nesting cover are mixed in the short term, but generally negative impacts to grouse nesting habitat might be expected in the longer term.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by an inventory grazing association permit, and Authorized Use is 359 federal AMs.
- Cow/calf pairs are run in a seasonlong grazing system with multiple herds.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weed control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – A high proportion of less than Healthy woody draw conditions would persist or increase in pasture 1 under current management. High livestock numbers and winter use likely result in heavy trampling disturbances within woody draws when livestock seek thermal shelter. One-month grazing periods that have occurred in pasture 7 3 of 4 recent years, often at relatively low stocking levels, should allow for the persistence of Healthy woody draw conditions along drainage slopes of the sampled community. There was minimal evidence of heavy livestock disturbance causing Unhealthy conditions in the bottom of the woody draw but further monitoring and evaluation will be conducted.

Herbaceous Structure – Current management would continue to facilitate the existing herbaceous structure distribution. Kentucky bluegrass and smooth brome are expected to continue to provide

High herbaceous structure in large portions of the allotment, particularly since the permittee has not been operating at the Authorized Use for several years. It is unknown what the effects may be if the Authorized Use was fully utilized but it would likely result in reduced High structure.

Seral Stages – Hay feeding and premature grazing of native grasses has likely facilitated the spread of invasive grasses in pasture 1 and would continue under current management with transitions to Invaded Grass States where they have not already occurred.

Invasive bluegrass will continue increasing in pastures 3 and 6 with further transitions to Invaded Grass States. Palatability of bluegrass is starting to decrease at the time of turn-in and is low during the majority of the grazing season that extends through September or October. Although there is some potential for increased use of bluegrass at the end of the grazing season, high use of the decreasing native component would assist the spread and increased dominance of invasive grasses. The potential exists for appreciably increased levels of use compared to recently reported use, and this would compound adverse effects of selective native grass utilization unless grazing seasons are coordinated with the respective palatability and production of the invasive and native grass components. Although increased use would facilitate improved management of accumulating plant litter that was observed in pastures 3 and 6 and that can assist the establishment of invasive bluegrass, the competitive advantage for bluegrass would continue to be facilitated by selective use of native grasses.

Invasive grasses have a high potential to continue increasing in the uplands of pasture 7 without coordinated efforts for control. Palatability of bluegrass is decreasing or low at the time of turn-in and is likely beginning to exert a greater degree of selective native grass utilization. However, the situation is not as severe as pastures 3 and 6 and the proportion of invasive grasses may not be sufficient to direct a change towards early season grazing in pasture 7.

Sharp-tailed Grouse – Two VOR transects in pasture 1 were dominated by smooth brome, as was an NDSU plot nearby, also in pasture 1. One VOR transect was High structure and the other Moderate. Smooth brome and Kentucky bluegrass, particularly monocultures, is not preferred habitat for sharp-tailed grouse (Norton 2005 and Rodgers and Hoffman 2005). It is expected that some grouse use could be occurring in pasture 1 and would continue for the foreseeable future. However, as plant composition continues to regress to a more invasive grass state, grouse use could become minimal due to the non-preferred habitats supplied by the invasive grass state.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 359 federal AMs.
- Continuing to monitor the woody draw bottom in pasture 7 to establish what is causing the adverse effects.

ADAPTIVE OPTIONS:

- Using prescribed fire to treat a portion of the woody draw located in pasture 7 and then fencing the treated area.
- Adjusting Authorized Use.
- Using drift or experimental fence to minimize impacts to woody draw bottoms.

Range

Initial Actions – Because the initial Authorized Use would remain the same as current management, the permittee would be allowed to harvest the same amount of forage in the same manner. Continuing to monitor the woody draw in pasture 7 would not have any affects on Authorized Use or the distribution of livestock.

Adaptive Options – Using prescribed fire to treat a portion of the woody draw in pasture 7 and fencing the treated area would have little to no change in livestock grazing if fenced area were kept to a small acreage. Forage within the fenced out area would no longer be available for livestock grazing. Depending on the size of the fenced out area, increased livestock grazing pressure may occur on remaining forage. There will be a cost to install these fences, and as a result there will be additional cost of maintenance of the fence to prevent livestock access to the woody draws.

Adjusting Authorized Use downward would require reducing the number of livestock since this allotment carries an inventory permit. Adjusting Authorized Use would not change the distribution of the livestock; however, the amount of forage harvested would be less than the existing forage harvested.

Using a drift or experimental fence to minimize impacts to woody draw bottoms would have little to no effect on livestock grazing since AMs would not be adjusted. Distribution would change around the drift or experimental fence because livestock would not have free access to trail through the woody draw. However, distribution throughout the pasture would not be affected due to the size of the treatment area.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws

Initial Actions – There are no proposed management changes that would affect woody draw conditions, so the current proportion of 71 percent less than Healthy woody draws would persist or increase.

Adaptive Options – Fencing woody draws, constructing drift fences to alter trailing routes, or decreasing Authorized Use would facilitate the regeneration of desired woody species and increase woody draw conditions by removing or decreasing livestock browsing and trampling disturbances. Exclusion of livestock disturbances through fencing would provide the fastest and greatest degree of woody draw improvement, but increasing litter and invasive grass layers with the removal of grazing would impede the rate and degree of woody species regeneration. Fencing of one woody draw would have a high potential to result in increased livestock disturbance within adjacent unfenced woody draws.

Prescribed burning in portions of the large woody draw in pasture 7 may provide information for increasing the regeneration of woody species in this and other sites. However, these treatments would be experimental, with the potential effects to woody draws to be determined before implementation on a larger scale.

Herbaceous Structure

Initial Actions – The Authorized Use level seems to be appropriate at this time to maintain the herbaceous structure, though the permittee appears to operate appreciably below this level according to recent AOIs/AWs. It is unknown what the effects may be if the Authorized Use was fully utilized, but it would likely result in reduced High structure.

Adaptive Options – Adjusting Authorized Use would have minimal impact on Kentucky bluegrass and smooth brome without adjusting timing and potentially incorporating other tools such as fire. Overall, it is projected that High structure will persist because Kentucky bluegrass and smooth brome will persist. Using fire and then fencing a portion of a woody draw in pasture 7 may have a minor and temporary impact on herbaceous structure around the site relative to the size and recovery time of the vegetation. Utilizing a drift fence to minimize impacts to woody draw bottoms could have a minor impact to the spatial arrangement of herbaceous structure because of the changed utilization patterns of the livestock.

Seral Stages

Initial Actions – There are no proposed management changes that would affect the trend of increasing invasive grasses and decreased maintenance of native plant communities, so the effects described under Alternative 2 would apply.

Adaptive Options – Fencing woody draws or constructing drift fences would not have an appreciable effect on plant composition due to the small size of the affected area and proximity to existing disturbances.

Neither decreases nor increases in Authorized Use would be effective in long-term control of Kentucky bluegrass and increased maintenance of native plant communities without consistently coordinating the grazing season with production and palatability of the invasive and native grass components in each pasture.

Sharp-tailed Grouse

Initial Actions – The current management system is providing High structure grasslands in the fall, particularly within the proximity of a known lek. However, smooth brome and other invasive species are not preferred habitats for brooding grouse, particularly in monocultures, (Rodgers and Hoffman 2005) even though smooth brome may provide attractive nesting cover (Runia 2009 but see Rodgers and Hoffman 2005). Since the permittee has been operating appreciably below the Authorized Use level, it is unknown what the effects may be if the Authorized Use was fully utilized, but it would likely result in reduced levels of potential grouse nesting habitat.

Adaptive Options – Adjusting Authorized Use would have little if any impact on grouse nesting since the current permittee isn't operating at the Authorized Use level and because of the requirements of managing invasive species. Using fire and then fencing a portion of a woody draw in pasture 7 may have a minor and temporary impact on grouse habitat around the site relative to the

size and recovery time of the vegetation within the treated site. Utilizing a drift fence to minimize impacts to woody draw bottoms could have a minor impact to the spatial arrangement of grouse habitat because of the changed utilization patterns of the livestock.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.
- Fence a woody draw in pasture 1 and monitor response.

ADAPTIVE OPTIONS:

- Use pasture 1 in summer rotation.

Range

Initial Actions – Authorized Use for this allotment would be 357 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 359 federal AMs converted to AUMs by adjusting for cow size is 413 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 14 percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment.

A woody draw exclosure would not change livestock distribution across the allotment or the Authorized Use. There will be a cost to install these fences and as a result there will be additional costs for maintenance of the fence to prevent livestock access to the woody draws.

Adaptive Options – Using pasture 1 in the summer rotation would spread out the Authorized Use across more acreage, thus reducing the livestock grazing pressure on all pastures. Because pasture 1 is currently used as winter pasture, the permittee would either have to find other pasture for winter use or fence out the private land in this pasture for continued winter use.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws

Initial Actions – Decreasing Authorized Use by 14 percent according to initial estimated carrying capacity and cow size would not assist improved woody draw conditions because recently reported use is appreciably less than the proposed level of Authorized Use. Additionally, most woody draws occur in pasture 1 that is used during the winter months with use that is not counted towards the

level of Authorized Use. Even if a 14 percent reduction in winter use was proposed, the level of decreased woody draw disturbances would probably not be sufficient to facilitate shifts from At Risk to Healthy conditions due to currently high stocking levels in pasture 1.

As described under Alternative 3, fencing of woody draws would increase the potential for improved conditions by removing all livestock browsing and trampling disturbances, but existing and potentially increasing invasive grass layers would impede the rate or degree of increased woody species regeneration. Monitoring the regeneration of desired trees and shrubs within fenced exclosures would document the effectiveness of this treatment and its potential application to other sites.

Adaptive Options – Additional decreases in Authorized Use would have the potential of improving woody draw conditions, but winter use in pasture 1 that is not counted towards Authorized Use would complicate the expected degree of improvement as discussed under Initial Actions.

Adding pasture 1 to the summer grazing rotation would result in the persistence of At Risk woody draw conditions in this pasture because they would continue to experience high levels of use during warmer summer temperatures. Potential benefits of grazing invasive grasses in the understory during the summer grazing season that might facilitate the regeneration of woody species would be countered by the increased level of browsing and trampling disturbances. However, greater accounting of total use with the cessation of winter use might contribute to the level of actual reductions in use that could assist woody draw improvement.

Herbaceous Structure

Initial Actions – The permittee appears to typically operate appreciably below the Authorized Use level, even below the adjustment associated with the initial estimated carrying capacity. The operating level of the permittee is apparently promoting High structure and invasive grass species.

Depending on the size of the woody draw exclosure relative to the size of the pasture, increased livestock grazing pressure on the remaining biologically capable habitat may have a minimal effect on the existing High structure.

Adaptive Options – Incorporating pasture 1 into the summer rotation (starting June 1st) could permit marginal improvement in the utilization of smooth brome and other cool season invasive grasses on early grazed years, but there would likely be little regrowth due to the later grazing timeframe. Overall, it is projected that High structure would persist at an unknown reduced level because of the lack of regrowth time expected for grass species.

Seral Stages

Initial Actions – Decreasing Authorized Use by 14 percent according to initial estimated carrying capacity and adjustments for cow size would not alter the trend of increasing invasive grasses and transitions to Invaded Grass States, and would decrease maintenance of native plant communities. The reduction in Authorized Use would have the potential of maintaining or increasing the accumulation of plant litter that could assist further increases of invasive grasses. However, the effect of reducing Authorized Use would be negated by currently reported levels of use that are less than the proposed level of Authorized Use. Hay feeding and high winter livestock concentrations in pasture 1 would continue to assist the spread of invasive grasses. Invasive grasses in pastures 3 and

6 would remain relatively unpalatable during most of the grazing season, and selective use of the relatively small proportion of native grasses would assist the further spread of invasive grasses. These effects are potentially increasing in pasture 7 and would continue.

Adaptive Options – Adding pasture 1 to the summer grazing rotation would increase the utilization of smooth brome in the pasture that remains more palatable than bluegrass and annual brome during the summer months. Trends of increasing bluegrass in pastures 3 and 6 would continue. The potential would exist to graze pastures 3 and 6 early in the season to utilize bluegrass, and rotate to pasture 1 later in the season to utilize smooth brome, but this is not specifically proposed.

Neither decreases nor increases in Authorized Use would be effective in long-term control of Kentucky bluegrass and increased maintenance of native plant communities without consistently coordinating the grazing season with the production and palatability of the invasive and native grass components in each pasture.

Sharp-tailed Grouse

Initial Actions – The permittee appears to typically operate appreciably below the Authorized Use level, even below the adjustment associated with the initial estimated carrying capacity. The operating level of the permittee is apparently promoting High structure and invasive grass species, which could be providing marginal quality nesting habitat at this time.

Depending on the size of the woody draw exclosure relative to the size of the pasture, increased livestock grazing pressure on the remaining biologically capable habitat may have a minimal effect on grouse habitat within pasture 1.

Adaptive Options – Incorporating pasture 1 into the summer rotation starting June 1st could permit marginal improvement in the utilization of smooth brome and other cool season invasive grasses on early grazed years. But there would likely be little regrowth due to the later grazing timeframe. Overall, it is projected that grouse nesting habitat would persist at an unknown reduced level because of the expected lack of regrowth time and expected reduction in the cover and quantity in what native species may be present.

ALLOTMENT 243

Table 243.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 243 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 6.1 – Rangeland With Broad Resource Emphasis	792	100	
Total allotment acres	1880	100	
NFS acres	792	42	
State land acres	0	0	
Private land acres	1088	58	
Current permitted livestock grazing (AMs) on NFS lands			375
Initial estimated carrying capacity (AUMs) on NFS lands			347
Number of pastures containing NFS lands			2

Table 243.2 — Allotment 243 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	There are no perennial or intermittent stream reaches in this allotment.	None
Woody draws	67 percent of the woody draws sampled were Healthy and 33 percent are At Risk due to heavy stock use and low regeneration.	Increase seedling/sapling understory survival.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Meeting Objectives High – Below Objectives 2004 Transects: 1.69; 1.4; 1.99 2004 Stations percent: Low-63.33/Moderate-36.67/High-0	**Manage allotment to maintain and ensure meeting structure objectives.
Seral stages	Mid seral stages with intermixed invasive grasses are predominant where transitions to Invaded Grass States have not occurred. Few areas along upper slopes and ridgelines contain relatively intact native grassland communities.	Decrease or limit the predominance of invasive grasses while increasing the maintenance of native grass communities and range of seral stages.
Sharp-tailed grouse	There are two known leks within the allotment boundary. A total of approximately 650 acres of the allotment overlaps within the 1 mile proximity radius of these leks.	Manage to enhance sharp-tailed grouse nesting and brooding habitat by increasing the quality and quantity of High vegetative structure on biologically capable sites.
Remarks	No known noxious weeds on NFS lands.	

**** Based on a review of field notes and observations, the IDT determined that this allotment was meeting structure objectives.**

Table 243.3 — Allotment 243 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action	Alternative 3A	Alternative 4
• Authorized Use is 375 federal AMs. • Three-year average permitted use is 345 federal AMs.* • Permit type: Turn-in. • Rotation: Modified twice-over rotation. • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 375. • Annually change season of use within the grazing rotation. • Add a stock tank in southern end of pasture 1. **Adaptive Options** • Fence high-value woody draws. • Establish drift fence in pasture 1 to deflect livestock from woody draws. • Adjust Authorized Use.	**Initial Actions** • Authorized federal AMs: 375. • Annually change season of use within the grazing rotation. • Add a stock tank in southern end of pasture 1. • Develop a spring in pasture 1 on the southwest quarter of Section 3, T143N, R99W. **Adaptive Options** • Fence high-value woody draws. • Establish drift fence in pasture 1 to deflect livestock from woody draws. • Adjust Authorized Use.	**Initial Actions** • Authorized federal AUMs: 347. • Fence high-value woody draws. • Implement two-pasture deferred rotation. **Adaptive Options** • Adjust Authorized Use.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every 3 years. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3	**Monitoring** • Same as Alternative 3

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 243 — Existing Condition

Range – This allotment is approximately 1,880 acres in size and contains both private and NFS lands with 792 acres of NFS lands. Currently, this allotment is issued a turn-in permit for 275 head for 3.5 months by the MGA. This allotment has two pastures that both include intermingled private and NFS lands and range in size from 929 to 950 acres. Current AMs provided by NFS lands can be found in Table 243.1. This allotment is located in the Rolling Prairie geographic area. Water developments within this allotment include reservoirs and a private well and stock tank.

The grazing system in this allotment is a modified twice-over rotation, where only one pasture is grazed twice in a season and the following year the other pasture is grazed twice, alternating which pasture is started on from year to year. The plant composition in this allotment is a mix of primarily introduced species such as Kentucky bluegrass and crested wheatgrass with native species until you get to the eastern portion of the NFS lands in pasture 1, where the mix ratio changes to more of a native dominated with intermingled introduced species.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there were no known state listed noxious weeds or county listed weeds within this allotment.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

In pasture 1, there is a pooled area below a low bluff that may be supplied by seepage from the base of the bluff. This is the only area that could qualify as a spring and is located adjacent to the main drainage. This area appears to have been historically shaped to act like a dugout for livestock watering, which is occurring at present. There is riparian vegetation present in the pooled area, which was seasonally high from spring runoff.

Woody Draws – Of the two major woody draws sampled in pasture 1, one was Healthy while the second was At Risk. The single woody draw on NFS land in pasture 2 was Healthy. There was evidence of green ash trees expanding into outlying shrub patches around this site. Livestock use occurred in all draws and conditions varying from Healthy to At Risk were present within each site.

Herbaceous Structure – There were three random sampled VOR transects measured in 2004. One was Low structure and the other two were Moderate structure. Station averages showed Low structure at 63 percent and Moderate structure at 37 percent. No High structure transects or stations were recorded.

During IDT meetings it was determined through the use mapping exercise and other individual field visits that the southern portion of pasture 1 is likely meeting herbaceous structure objectives. No VOR transects were established or performed in this area to verify.

Seral Stages – Invasive grasses occurred in high amounts through most of the two pastures, and large areas were at or approaching Invaded Grass States. A Thin Claypan ecological site sampled by NDSU along the north shoulder of a plateau at the north end of pasture 1 was at a mid seral stage with Kentucky bluegrass and crested wheatgrass frequencies of 21 percent and 14 percent. However, forage production clippings contained no invasive grasses. A sere plot 1,200 feet southwest of the above sample within broken land was largely comprised of crested wheatgrass and

Canada bluegrass and approaching an Invaded Grass State (Figure 243.1). Bluegrass had been grazed in the sample plot and litter was not excessive. Dominant species recorded in two Robel transects located between the NDSU and sere plots ranged from bluegrass and crested wheatgrass to native grasses with lesser amounts of bluegrass.

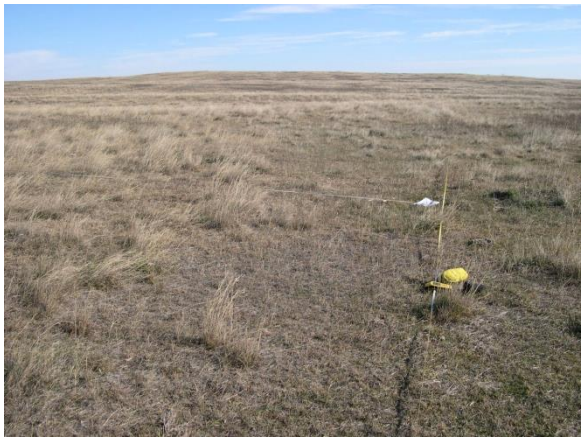


Figure 243.1 — Sere plot at the northwest end of pasture 1 with tall clumps of crested wheatgrass and shorter interspaces of Canada bluegrass and sedge.

A sere plot in the central portion of the pasture was at an Invaded Grass State with dominance of Canada bluegrass, low levels of grazing, and high amounts of litter. Bluegrass was recorded as the dominant species in a belt transect 500 feet east of the sere plot. A ridgeline and upper slopes in the southeast corner of the pasture contained relatively uninfested native communities of sand dropseed (*Sporobolus cryptandrus* (Torr.) A. Gray) and sand bluestem (*Andropogon hallii* Hack.).

An NDSU sample near the center of NFS land in pasture 2 was dominated by Kentucky and Canada bluegrass that constituted 75 percent of the grass production at the end of May. Western wheatgrass was frequent and along with other native grasses would decrease the relative proportion of invasive grasses with progression of the growth season, but it is apparent that the site was at an Invaded Grass State. A Robel transect in the southeast quarter of NFS land also reported dominance of bluegrass.

Sharp-tailed Grouse – There are two known leks within the allotment boundary – one in the north portion on private land and one in the south on NFS land. A total of approximately 650 acres of the allotment overlaps within the 1 mile proximity radius of these leks.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed 2 years later.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would now be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely

responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian condition of the unnamed spring in pasture 1, as described in the existing condition, would continue and evolve toward the potential riparian community.

Woody Draws – Conditions of the At Risk sample site as well as the two Healthy sites would increase with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. Invasive grasses were not overwhelmingly dominant throughout the woody draws but potential increases of these species as a result of increasing litter with the removal of livestock grazing would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock, there would be an appreciable increased opportunity for the development of High and Moderate herbaceous structure, and a decrease in the amount of Low herbaceous structure. In the longer term, it is probable that invasive species could dominate the allotment.

Seral Stages – The removal of livestock grazing would facilitate increased litter accumulation that would assist continued increases of bluegrass and other invasive grasses. Transitions to Invaded Grass States that have already occurred in large portions of the two pastures would continue at a rapid rate with the removal of livestock grazing. Native dominant communities that occur along some ridgelines and plateaus might persist for 10 years.

Sharp-tailed Grouse – The increase in High structure from removal of livestock disturbance would enhance nesting and brooding habitat for sharp-tailed grouse. However, in the long term, the expected decrease in forb diversity could decrease foraging opportunities. Over time, nesting and brooding quality and quantity would also decrease because of lower quality spring habitat provided by invasive grasses.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by a turn in grazing association permit, and Authorized Use is 375 federal AMs.
- Cow/calf pairs are run in a modified twice-over rotation.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian condition of the unnamed spring in pasture 1, as described in the existing condition, would continue.

Woody Draws – Continuation of current management would maintain the proportion of two Healthy and one At Risk woody draws. Authorized Use 24 percent greater than initial estimated carrying capacity after adjusting for cow size would maintain the potential for high woody draw use, as would seasons of use throughout the warm summer months with low palatability of invasive grasses throughout much of the uplands. However, the location of the primary water sources more than 0.6 miles from the woody draws contributes to less than the potential amount of use and disturbance. Several water sources on private land in pasture 2 along with evenly dispersed woody draws decreases the concentration of disturbances within individual draws that facilitates Healthy conditions of the measured site on NFS land.

Herbaceous Structure – Current management would continue to facilitate the existing herbaceous structure distribution, but with a limited potential to enhance the proportion of High herbaceous structure and the herbaceous structure distribution in general. Based on a review of on-the-ground knowledge (use mapping and other walk-throughs), it was determined that this allotment is likely addressing herbaceous structure goals in the south-southeastern portions of pasture 1.

Seral Stages – Invasive grasses and transitions to Invaded Grass States would continue under current management. Authorized Use that exceeds initial estimated carrying capacity by 24 percent after adjusting for cow size contributes to high utilization, with potentially low plant vigor assisting the spread of invasive grasses. Invasive grasses that now constitute large portions of both pastures are of low palatability during most of the grazing season and contribute to selective and potentially excessive use of the native component. The degree of this effect increases with increasing proportions of the invasive component. Reported attainment of High structure in the allotment supports the occurrence of low invasive grass utilization in areas distant from the primary water sources.

Sharp-tailed Grouse – Though existing management has been determined by the IDT to be addressing herbaceous structural goals, existing management actions would not enhance or ensure grouse nesting habitat on an annual basis. On an alternating yearly basis, when pasture 1 is subject to twice-over grazing, the proportion of High structure may not be ensured in the southern portion of pasture 1, but this may require monitoring to validate. A potential longer-term issue affects the management of Kentucky bluegrass. This could have longer-term consequences such as decreased quality and quantity of grouse nesting habitat due to nature of the weak-stemmed bluegrass to lay down over winter and lose cover value by spring.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 375 federal AMs.
- Annually changing season of use within the grazing rotation.
- Adding a stock tank in southern end of pasture 1.

ADAPTIVE OPTIONS:

- Fencing high-value woody draws.
- Establishing drift fence in pasture 1 to deflect livestock from woody draws.
- Adjusting Authorized Use.

Range

Initial Actions – Because the initial Authorized Use would remain the same as current management, the permittee would be allowed to harvest the same amount of forage. Annually changing the season of use within the grazing rotation would not affect Authorized Use or livestock distribution, as this type of management is occurring presently.

Installing a stock tank in the southern end of pasture 1 would change the distribution of livestock in this portion of the pasture because there is no livestock water development in this area of the pasture. It would shift grazing pressure that normally occurs more on the northern end of the pasture to the southern end. The additional tank would also provide the permittee flexibility in water management so that livestock use could be shifted from the northern to the southern end of the pasture as water is turned on or off during the grazing season.

Adaptive Options – Fencing out high-value woody draws would have little to no change in livestock distribution across the allotment. Forage within the exclosures would no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may occur on remaining forage. There will be a cost to install these fences and associated fence maintenance costs to prevent livestock access to the woody draws.

Establishing a drift fence in pasture 1 would not change the distribution of livestock in this pasture much; however, it would force livestock to take an alternate route around the woody draw. Livestock would still have access to the woody draw because the whole woody draw would not be fenced out.

Adjusting Authorized Use downward would result in fewer livestock numbers, fewer grazing days, or both because of the turn-in permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock; however, the amount of forage harvested would be less than the current forage harvest level.

Riparian – There are no initial or adaptive actions proposed for riparian management.

Woody Draws

Initial Actions – Construction of an additional stock tank at the south end of pasture 1 to augment existing reservoirs located along the west-central pasture boundary would decrease the amount of secondary range with a high potential for increased livestock disturbances within woody draws on the east side of the pasture. Thus, conditions of the Healthy and At Risk woody draws would have the potential to decrease with a closer water source.

Switching from a modified deferred rotation to a straight deferred rotation would have minimal effects on woody draw conditions because the seasons and length of pasture use would not be appreciably different.

Adaptive Options – Fencing woody draws or decreasing Authorized Use would facilitate the regeneration of desired woody species and increase woody draw conditions by removing or decreasing livestock browsing and trampling disturbances. However, decreased disturbances within woody draws associated with decreases in Authorized Use could be negated by increased disturbances resulting from the proposed water tank. Exclusion of livestock disturbances through fencing would provide the fastest and greatest degree of woody draw improvement, but increasing litter and invasive grass layers that would occur with the removal of grazing could impede the regeneration of woody species. Additionally, fencing of one woody draw would have a high potential to result in increased livestock disturbance and decreased conditions within adjacent unfenced woody draws.

Herbaceous Structure

Initial Actions – Installing a stock tank in the south portions of pasture 1, in combination with maintaining the Authorized Use, would result in an appreciable loss of assumed High herbaceous structure in the south end of the pasture .Increasing the structure on the north side could result in homogenizing herbaceous structure throughout the pasture. However, management flexibility could be recognized by adding water in this general location of pasture 1 which could aid in managing Kentucky bluegrass.

Adaptive Options – Adjusting the Authorized Use downward would improve the potential for increasing and ensuring the proportion of High herbaceous structure within the allotment and improve the overall herbaceous structure distribution. Fencing woody draws would have a relatively small effect on the overall herbaceous structure distribution but would be relative to the size and location of the exclosure. Placing a drift fence is projected to have only negligible effects to the overall herbaceous structure distribution, but somewhat similar to fencing out a woody draw. The spatial arrangement of structure may be altered depending on the location of the structure.

Seral Stages

Initial Actions – The additional stock tank proposed at the south end of pasture 1 would contribute to the increased evenness of livestock grazing and potentially increase the use of invasive grasses, or at least decrease the rate of litter accumulation in areas distant from the existing reservoirs located along the west central pasture boundary. However, poor coordination of the grazing season with high palatability of invasive grasses would continue to contribute to high utilization of the native component. The desired mosaic of grazing pressure would be reduced by the additional water development, and relatively late seral stages of Sandy ecological sites along the ridge at the south end of the pasture would have the potential to shift towards early seral stages.

Switching to a deferred rotation from the modified deferred rotation would perpetuate selective utilization of the native grass component because the seasons and length of pasture use would remain similar to current conditions.

Adaptive Options – Neither decreases nor increases in Authorized Use would be effective in long-term control of Kentucky bluegrass and increased maintenance of native plant communities without consistently coordinating the grazing season with the production and palatability of invasive and native grass components in each pasture.

Sharp-tailed Grouse

Initial Actions – Installing a stock tank in the south portion of pasture 1, in combination with maintaining the Authorized Use, would not enhance grouse nesting habitat. The water source would turn the area into primary range from its relative secondary range status. The action could also reduce use on the north side of the pasture and result in homogenizing habitat throughout the pasture. However, management flexibility is recognized, and adding water in this general location of pasture 1 could aid in managing Kentucky bluegrass, which is not a preferred species for nesting grouse or other ground nesting species.

Adaptive Options – Adjusting the Authorized Use downward would improve the potential for ensuring and enhancing grouse nesting habitat within the allotment. Although reducing the Authorized Use, combined with the grazing system, could promote Kentucky bluegrass, which does not provide preferred habitat for many upland birds. Fencing woody draws would have a relatively small effect on grouse nesting cover as they typically nest in the uplands. Placing a drift fence is projected to have only negligible effects to grouse nesting habitat, somewhat similar to fencing out a woody draw. The spatial arrangement of habitat may be altered depending on the location of the structure.

Effects of Alternative 3A

The effects of Alternative 3A are the same as Alternative 3 with the following stated exceptions.

INITIAL ACTIONS:

- Develop a spring in pasture 1 on the southwest quarter of Section 3, T143N, R99W.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 3A are the same as Alternative 3.

Range

Initial Actions – This action needs to be reviewed by an engineer and hydrologist to assure that the area has potential for a reliable spring development. A field visit was conducted by the Forest Service hydrologist and range specialist on April 22, 2010 to assess the potential of a spring development (see Project Record, Specialist Reports and Notes, Watershed Report for details). If the site is a viable location for a spring development, an effect of this action would be that livestock would have an additional source of water in the vicinity of the existing reservoir located just down the drainage from this area of the pasture. Livestock grazing distribution would not change much, if at all, since there is another livestock water source in the vicinity. Another effect of this action would be the cost of installation and maintenance of the spring development. Lastly, depending upon the amount of collection area developed for the spring, the reservoir downstream, especially during dry hot periods, would be less likely to be a reliable water source.

Riparian

Initial Actions – Developing the unnamed spring in pasture 1 would have the following effects. The amount of spring discharge was unable to be determined during the site visit, but if developed

and a significant level of water is removed from the pooled area, the riparian habitat would diminish in area and function in relation to the loss of water.

Woody Draws

Initial Actions – Development of a spring in the southwest portion of pasture 1 to supplement several dugout ponds along the west-central pasture boundary would have a neutral or slight beneficial effect on woody draw conditions because all draws are located along the east side of the pasture. Along with dugout ponds, the spring development would contribute to maintaining use along the west side of the pasture and minimize use among woody draws on the east side. However, an additional water source proposed at the south end of the pasture would contribute to increased woody draw disturbances compared to current conditions, and the spring development would only slightly decrease this potential.

Herbaceous Structure

Initial Actions – It is not expected that a spring development near an existing water source will have an appreciable effect to the herbaceous structure distribution, but this depends on the exact location of the spring development. The water tank may be "fresher" than the reservoir and be more desirable, but that is expected to be minor, except in dry years when it may have a stronger effect.

Seral Stages

Initial Actions – Developing a spring in the southwest quarter of pasture 1 would not have an appreciable effect on seral stages or the maintenance of native plant communities because the western edge of the pasture is currently the primary use area, and there would be minimal change in livestock distribution and utilization.

Sharp-tailed Grouse

Initial Actions – It is expected that the proposed spring development would have no additional appreciable effects to sharp-tailed grouse habitat.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.
- Implement two-pasture deferred rotation.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 4 are the same as Alternative 3.

Range

Initial Actions – Authorized Use for this allotment would be 347 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 375 federal AMs

converted to AUMs by adjusting for cow size is 431 federal AUMs. The effect of setting an Authorized Use limit at the initial estimated carrying capacity equates to a 20 percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment.

Implementing a two-pasture deferred rotation would be a change from current management because livestock would not be allowed to return to the pasture a second time. Livestock use would be extended in each pasture, and because of changes in forage quality as the growing season progresses, livestock distribution would be expected to change slightly as well. Because there would not be a second livestock use period in one of the pastures, herbaceous species would have a longer recovery period in between livestock grazing periods.

Riparian – There are no initial or adaptive actions proposed for riparian management.

Woody Draws

Initial Actions – Reducing Authorized Use by 20 percent according to initial estimated carrying capacity and adjustments for cow size would increase the potential for maintenance or improvement of woody draw conditions as a result of decreased livestock browsing and trampling disturbances. Fencing portions of one or more of three primary woody draws would maximize the potential for improved conditions by excluding all livestock disturbances that would facilitate the regeneration of desired trees and shrubs. However, increased litter and invasive grasses with the removal of livestock grazing would decrease or slow the rate of potential woody draw improvement, and fencing of one woody draw would have the potential of increasing disturbances within adjacent unfenced draws.

Herbaceous Structure

Initial Actions – The decreased Authorized Use and the proposed deferred rotation system should continue to improve and ensure, in the short term, the existing IDT determination that this allotment is addressing herbaceous structure objectives. However, longer term management could be necessary to manage Kentucky bluegrass.

Seral Stages

Initial Actions – The 20 percent decrease in Authorized Use and implementation of a deferred rather than modified deferred rotation would have little or no effect on the current trend of increasing invasive grasses and decreasing native communities. Palatability of invasive grasses would continue to be poorly coordinated with grazing seasons in each pasture at least every other year, and remaining native grass components would continue to experience selective grazing that would assist the spread of invasive grasses.

Sharp-tailed Grouse

Initial Actions – It appears that sharp-tailed grouse habitat could be enhanced under this alternative over the next 10 to 15 years due to the changed Authorized Use level and the change to a two-pasture deferred grazing system. However, relative to the quality of nesting habitat provided by Kentucky bluegrass, the longer-term picture could change depending on the invasive grass prevalence and expansion rate in the allotment, especially in pasture 1.

ALLOTMENT 244

Table 244.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 244 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 6.1 – Rangeland With Broad Resource Emphasis	554	100	
Total allotment acres	570	100	
NFS acres	554	97	
State land acres	0	0	
Private land acres	16	3	
Current permitted livestock grazing (AMs) on NFS lands			236
Initial estimated carrying capacity (AUMs) on NFS lands			241
Number of pastures containing NFS lands			2

Table 244.2 — Allotment 244 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	Whitetail Creek flows through part of this allotment. The '98 survey rated the creek at PFC. The 2004 and 2006 surveys rated the creek at FAR-D.	Move creek back towards PFC.
Woody draws	Approximately 75 percent of the sampled woody draws were Healthy, and 25 percent were At Risk. At Risk woody draws exhibit low regeneration and sapling count, impacted shrub layer, and stock use.	Increase seedling/sapling understory and enhance shrubs.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Below Objectives High – Below Objectives 2004 Transects: 1.31 2004 Stations percent: Low-65/ Moderate-35/High-0	Manage for additional Moderate and High structure on biologically capable habitats.
Seral stages	Two pastures respectively contain 32 percent and 47 percent broken land. Both broken and unbroken land consist of intermixed and intermingled invasive and native grasses.	Limit the expansion of invasive grasses and maintain or increase the proportion of native grasses.
Sharp-tailed grouse	There is one known lek within 1 mile of this allotment. A total of approximately 482 acres of the allotment overlaps within the 1 mile proximity radius of this lek.	Manage for increased High vegetative structure on biologically capable sites to enhance nesting and brooding habitat.
Remarks	No known noxious weeds on NFS lands.	

Table 244.3 — Allotment 244 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action	Alternative 3A	Alternative 4
• Authorized Use is 236 federal AMs. • Three-year average permitted use is 222 federal AMs.* • Permit type: Turn-in. • Rotation: Two-pasture deferred rotation. • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 236. • Annually change season of use within the grazing rotation. • Cross-fence pasture 2, north to south. Cross-fencing will create a crested wheatgrass pasture on the east side of pasture 2, which will be grazed early. The additional pasture, created through the cross fence, allows the implementation of a two-pasture deferred grazing rotation between remaining pastures. **Adaptive Options** • Fence high-value woody draws. • Move the south boundary fence to Whitetail Road. • Adjust Authorized Use.	**Initial Actions** • Authorized federal AMs: 236. • Annually change season of use within the grazing rotation. **Adaptive Options** • Fence high-value woody draws. • Move the south boundary fence to Whitetail Road. • Adjust Authorized Use.	**Initial Actions** • Authorized federal AUMs: 241. • Cross-fence pasture 2, north to south. Cross-fencing will create a crested wheatgrass pasture on the east side of pasture 2, which will be grazed early. The additional pasture, created through the cross fence, allows the implementation of a two-pasture deferred grazing rotation between remaining pastures. **Adaptive Options** • Treat pasture 2 (west) as a riparian pasture, grazing it from 15 to 30 days per year maximum. • Fence high-value woody draws. • Move the south boundary fence to Whitetail Road. • Adjust Authorized Use.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every 3 years. • Complete Properly Functioning Condition survey once every 3 years then once every 5 years if a positive trend has been established. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** Same as Alternative 3	**Monitoring** • Same as Alternative 3

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 244 — Existing Condition

Range – This allotment is approximately 570 acres in size with 544 acres of NFS lands. Currently, this allotment is issued a turn-in permit for 30 head for 8 months by the MGA. This allotment has been divided up into two pastures. Pasture 1 is 334 acres and contains both private and NFS lands; pasture 2 is 236 acres and contains solely NFS lands. Current AMs provided by NFS lands can be found in Table 244-1. This allotment is located in the Rolling Prairie geographic area. Water developments within this allotment include a spring and reservoir.

This allotment is managed by a two-pasture, deferred rotation with a typical turn-in date of May 1st. Each pasture is usually grazed for approximately 4 months. The plant composition in the allotment is intermixed crested wheatgrass, Kentucky bluegrass, and native species. In pasture 2, the plant composition is particularly challenging due to the domination of introduced species on the eastern side. Whitetail Creek dissects the pasture, approximately in the middle, with its associated riparian vegetation. The western side of the pasture is a mix of introduced and native herbaceous species. The topography in pasture 2 determines where the livestock access the three distinct areas of plant composition mentioned above.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there were no known state listed noxious weeds or county listed weeds within this allotment.

Riparian –

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
244-02	Whitetail Creek (2)	0.26					0.26
244-02	Whitetail Creek (3)				0.51		0.51

Whitetail Creek (Reaches 2 and 3) flows through pasture 2 of Allotment 244. The upper 0.3 mile has a functionality rating of PFC. The lower 0.5 mile had a functionality rating of PFC in 1998, but was rated as Functional at Risk in the 2006 survey. Consequently, the IDT gave this reach a functionality rating of FAR-D, even though the riparian function was close to PFC.

Problems noted in the lower reach included:

- Livestock trampling evident along accessible banks,
- Plant diversity very low,
- Banks contained some bare patches, leaving them susceptible to erosion and collapse,
- Width/depth ratio was high, perhaps from repeated livestock entry and egress from the channel.

Woody Draws – Six of eight sampled woody draws across the allotment were Healthy while two sites were At Risk. All three sampled woody draws in pasture 1 were Healthy, and observations of other draws in the pasture indicated similar conditions. One woody draw contained a developed spring, but with only moderate impacts to the immediately surrounding area compared to most similar developments. Three of five woody draws in pasture 2 were Healthy and two were At Risk.

The At Risk communities occurred along the corridor of Whitetail Creek, which is the primary area of use in the pasture.

Herbaceous Structure – In 2004, there was one random sampled VOR transect in this allotment. It measured as a Low structure transect. The station averages were 65 percent in Low and 35 percent in Moderate. No High structure stations were measured. This transect was not resurveyed in 2005.

Seral Stages – Approximately 32 percent of pasture 1 is composed of several parcels of broken land dominated by crested wheatgrass with intermixed invasive and native grasses. Pasture observations indicate varying amounts of crested wheatgrass, Kentucky and Canada bluegrass, and smooth brome mixed with native grasses throughout areas of unbroken land. Cover of sweet clover can be very high during some years. A sere plot in broken land in the northeast quarter of the pasture was at a mid seral stage with crested wheatgrass, blue grama, and light amounts of bluegrass. A belt transect in unbroken land in the northwest quarter of the pasture, and a Robel transect in the southwest quarter, reported western wheatgrass, bluegrass, and needle-and-thread as the dominant species.

The east half of pasture 2 contained a reservoir surrounded by broken land dominated by crested wheatgrass and bluegrass. The central area of the pasture is characterized by the drainage corridor of Whitetail Creek with smooth brome dominance along open terraces. A small plateau overlooking the creek constitutes the west edge of the pasture with intermixed invasive and native grasses.

Sharp-tailed Grouse – There is one known lek within 1 mile of this allotment. A total of approximately 482 acres of the allotment overlaps within a 1-mile radius of this lek.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed after 2 years.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment and there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian conditions along Whitetail Creek, as described in the Existing Condition, would improve and evolve toward desired riparian conditions over time. Improvement would result from the establishment of riparian vegetation, which would capture sediment and build stream banks.

Woody Draws – Woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. However, existing and potential increases of invasive grasses as assisted by increasing litter with the removal of livestock grazing would slow or decrease the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock, there would be an appreciable increased opportunity for the development of High and Moderate herbaceous structure, and a decrease in the amount of Low herbaceous structure. Over time, it is probable that invasive species may dominate the allotment, decreasing the quantity and quality of High herbaceous structure.

Seral Stages – The removal of livestock grazing would facilitate increased litter accumulation that would assist increases of bluegrass and transitions to Invaded Grass States with decreased maintenance of native plant communities during the next 10 years.

Sharp-tailed Grouse – The increase in High structure from removal of livestock disturbance would initially enhance nesting and brooding habitat for sharp-tailed grouse. However, over time the decrease in forb diversity could decrease foraging opportunities. Also, over time, nesting and brooding quality would also decrease because of lower quality habitat associated with invasive grasses, especially Kentucky bluegrass, that would expand within the pastures. Currently, the intermixed nature of native and introduced species is likely not negatively impacting habitat appreciably.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by a turn in grazing association permit, and Authorized Use is 236 federal AMs.
- Cow/calf pairs are run in a two-pasture deferred rotation.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian condition along Whitetail Creek, as described in Existing Condition, would continue.

Woody Draws – Continuation of current management would maintain 75 percent of the sampled woody draws in a Healthy condition. The greatest woody draw disturbances and At Risk conditions would continue along the corridor of Whitetail Creek. Low palatability of crested wheatgrass and invasive grasses in the pasture uplands every other year would contribute to increased use and disturbances of woody draws along the creek.

Herbaceous Structure – Based on one random VOR transect located in pasture 1 and the Authorized Use relative to the initial estimated carrying capacity, current management is projected to continue to facilitate the existing herbaceous structure distribution with a limited potential to improve the proportion of High herbaceous structure and distribution.

Seral Stages – Apparent trends of increasing invasive grasses would continue under current management. The deferred rotation results in poor coordination of the grazing season with high palatability of crested wheatgrass and bluegrass in each pasture during alternate years. Early season grazing periods during alternate years in each pasture, have the potential of utilizing crested wheatgrass early in the season and the native component later in the season. However, the intermingled nature of these components increases the potential for premature grazing of the native component that can decrease plant vigor and assist spread of the invasive component. There is also a high potential for selective and excessive grazing of the native component during large portions of the grazing season in both pastures when palatability of invasive grasses decreases during mid-June, thereby conferring a competitive disadvantage to the invasive component. Authorized and reported use 12 percent greater than initial estimated carrying capacity after adjusting for cow size compounds the effect of selective native grass grazing.

Sharp-tailed Grouse – Based on one random VOR transect located in pasture 1 and the Authorized Use relative to the initial estimated carrying capacity, current management is projected to continue to facilitate the existing herbaceous structure distribution. High structure grassland habitat is not projected to be enhanced due to an Authorized Use level that is 12 percent higher than the initial estimated carrying capacity, though the rotation (deferred rotation) and the timing (May 1st through December) also contribute to the assessment. This strategy would not allow for regrowth on the first pasture and would remove herbaceous structure gained during the summer in the second pasture.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 236 federal AMs.
- Annually changing the season of use within the grazing rotation
- Cross fencing pasture 2, north to south. Cross fencing will create a crested wheatgrass pasture on the east side of pasture 2, which will be grazed early. The additional pasture allows the implementation of a two-pasture deferred grazing rotation.

ADAPTIVE OPTIONS:

- Fencing high-value woody draws.
- Moving the southern boundary fence to Whitetail Road.
- Adjusting Authorized Use.

Range

Initial Actions – Because the initial Authorized Use would remain the same as current management, the permittee would be allowed to harvest the same amount of forage. Annually

changing the season of use within the grazing rotation would not affect Authorized Use or livestock distribution as this type of management is occurring presently.

Cross fencing pasture 2 from north to south will create a crested wheatgrass pasture on the eastern side. This pasture will be grazed early to defer grazing of the remaining pastures containing mainly native species. The remaining two pastures would have a deferred rotation system implemented providing the opportunity for initial growth and/or regrowth of existing herbaceous species. This action would also confine/restrict livestock to a smaller area to even out the distribution in the two smaller pastures.

Adaptive Options – Fencing high-value woody draws would have little to no change in livestock distribution across the allotment. Forage within the exclosures would no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may occur on remaining forage. There will be a cost to install and maintain these fences.

Moving the southern boundary fence would provide additional forage to livestock when grazing the eastern side of pasture 2. Because the additional acreage added to the pasture is minimal, AMs should not be adjusted. Due to the small acreage changes in livestock distribution would not be expected. The cost of moving the southern boundary would also be an effect of this action.

Adjusting Authorized Use downward would result in fewer livestock numbers, fewer grazing days, or a combination of the two, because of the turn in permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock. However, the amount of forage harvested would be less than the current levels.

Riparian

Initial Actions – Annually change season of use within the grazing rotation. Cross fencing pasture 2, north to south. Cross fencing will create a crested wheatgrass pasture on the east side of pasture 2, which will be grazed early. The additional pasture allows the implementation of a two-pasture deferred grazing rotation

These actions would decrease overall forage consumption in riparian areas and should provide longer recovery intervals between grazing periods benefitting riparian conditions.

A concern with this allotment is the amount of time the livestock use the pastures. The entire allotment is 570 acres. Meyers (1989) found that riparian areas tended to be degraded when pastures are used more than 30 continuous days. Exceeding the 30 days in the riparian pasture could negate some of the benefits of creating a riparian pasture due to increased bank damage from hoof action and overgrazing.

It is expected that desired conditions on Whitetail Creek would be achieved in 10 to 15 years.

Adaptive Options – Fencing high-value woody draws in pasture 2 in the vicinity of Whitetail Creek could have a negative effect on riparian conditions because of additional livestock use in the riparian corridor for cover. Longer periods in the riparian area would result in over grazing and bank damage from hoof action. Fencing high-value woody draws in pasture 1 would have no effect on riparian conditions along Whitetail Creek due to pasture separation.

Moving the southern boundary fence to Whitetail road would distribute livestock use more and have no effect on riparian conditions along Whitetail Creek.

Reducing Authorized Use should help improve the uplands vegetation, which reduces overland flow, further benefitting riparian conditions along Whitetail Creek. A reduction in overland flow would reduce stream velocities and allow for the establishment of riparian vegetation to build stream banks.

It is expected that desired conditions on Whitetail Creek would be achieved in 2 to 5 years.

Woody Draws

Initial Actions – Splitting pasture 2 into two pastures with broken land in the east pasture would have the potential of decreasing Healthy conditions of the one woody draw that would occur in the east pasture due to increased use in the area. However, the majority of increased use would occur at the upper end of the draw below a reservoir due to steep drainage slopes with dense woody structure that impede livestock access along the lower half of the drainage. Woody draw conditions along the corridor of Whitetail Creek in the newly created west pasture would persist in an At Risk condition because the season of use, and livestock distribution along the creek corridor would remain similar to current conditions. There would be some potential for increased disturbance due to the decreased pasture size. Healthy woody draw conditions would persist in pasture 1 because management would remain relatively unchanged.

Adaptive Options – Fencing woody draws or decreasing Authorized Use would facilitate the regeneration of desired woody species and increased woody draw conditions by removing or decreasing livestock browsing and trampling disturbances. Exclusion of livestock disturbances through fencing would provide the fastest and greatest degree of woody draw improvement, but regeneration of woody species could be impeded by increasing litter and invasive grasses that would occur with the removal of grazing. Additionally, fencing of one woody draw would have a high potential to result in increased livestock disturbance and decreased conditions within adjacent unfenced woody draws.

Relocating the south boundary fence would enlarge pasture 2 by as much as 20 acres and potentially include additional woody draw and riparian habitat depending on the fence location. The reintroduction of grazing in these areas would decrease current conditions in at least a portion of the draws, but could disperse current use and facilitate increased conditions of At Risk draws along the central and north end of the pasture.

Herbaceous Structure

Initial Actions – Implementing a crested wheatgrass pasture and grazing early could potentially improve fall herbaceous structure due to potential regrowth of the crested wheatgrass unit. However, Angell (1997) indicates negative effects to tiller density and standing crop of crested wheatgrass under heavy stocking rates, thereby negatively affecting herbaceous structure. The Authorized Use level is approximately 12 percent higher than the initial estimated carrying capacity. This would contribute to limiting the proportion of High herbaceous structure, overall, due to its impact on residual cover levels.

Adaptive Options – Adjusting the Authorized Use downward would improve the potential for increasing the proportion of High herbaceous structure within the allotment and improve the overall herbaceous structure distribution in general by increasing residual cover. Fencing woody draws could affect herbaceous structure relative to size of the exclosure. If southeastern boundary fence is moved, it could help offset any potential livestock adjustments.

Seral Stages

Initial Actions – Splitting pasture 2 into two pastures with broken land and crested wheatgrass in the east pasture for early season grazing would increase the utilization of invasive grasses and halt the premature use of native grasses in the west half of the pasture as well as pasture 1. However, the deferred rotation implemented with pasture 1 and the west half of pasture 2 starting in early to mid-June would maintain poor coordination of the grazing season with the palatability of crested wheatgrass and bluegrass in these pastures, thereby maintaining selective use of the native component and assisting the spread of invasive grasses. Authorized Use that is 12 percent greater than initial estimated carrying capacity and assumes equal utilization of all forage would compound the degree and effect of selective use of the native component.

Adaptive Options – Relocating the south fenceline of pasture 2 closer to the road edge would add as many 20 acres to the pasture and decrease the apparent level of excessive stocking, but would not alter the apparent trend of increasing invasive grasses.

Fencing woody draws to exclude grazing would result in increased plant litter that can assist the spread or increase of invasive grasses, but this would not have an appreciable effect on plant composition and current trends outside the fence exclosure.

Neither decreases nor increases in Authorized Use would be effective in long-term control of Kentucky bluegrass or increased maintenance of native plant communities without consistently coordinating the grazing season with the production and palatability of the invasive and native grass components in each pasture.

Sharp-tailed Grouse

Initial Actions – A slight potential improvement in spring cover could be realized with the establishment of a crested wheatgrass pasture. However, Authorized Use could negate improvement and turn-in dates could also decrease structure with a later turn out preferred because of potential disruption to nesting grouse hens and their habitat. The implementation of a deferred rotation would likely maintain the herbaceous structure distribution due to no reduction in Authorized Use and the timing and length of use in the non-crested wheat pastures.

Adaptive Options – By adjusting the Authorized Use, potentially increasing the proportion of High herbaceous structure, there would be a commensurate enhancement in grouse nesting and brooding habitat. Fencing woody draws could potentially affect grouse nesting habitat relative to size of the exclosure. If southeastern boundary fence is moved, it could help offset any potential livestock adjustments.

Effects of Alternative 3A

The effects of Alternative 3A are the same as Alternative 3 with the following stated exceptions.

INITIAL ACTIONS:

- Dropping the initial action of cross fencing pasture 2 north to south.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 3A are the same as Alternative 3.

Range
Initial Actions – Dropping the initial action of cross fencing pasture 2 north to south would have the effect of continuing current management in the allotment. Authorized Use and livestock distribution would be the same as described under Alternative 2.

Riparian
Initial Actions – The effects of Alternative 3A are the same as Alternative 3 with the following exception: The initial actions in Alternative 3 would be deleted. Riparian condition along Whitetail Creek would continue as described in the existing condition above.

Woody Draws
Initial Actions – As discussed under Alternative 3, dividing pasture 2 into two pastures would not have an appreciable effect on At Risk woody draw conditions that occur along Whitetail Creek in the west side of the pasture, so dropping this proposal would have no effect on the condition of these draws. Increased disturbances at the upper end of the Healthy woody draw that extends into the east side of the pasture would be avoided by not splitting the pasture.

Herbaceous Structure
Initial Actions – The effects of this action would be similar to those described under Alternative 2.

Seral Stages
Initial Actions – Not separating the east half of pasture 2 that is dominated by crested wheatgrass and implementing early season grazing would perpetuate the low utilization of about half the forage component in the pasture and contribute to concentrated use along the terraces and lower slopes of Whitetail Creek for a longer period of each grazing season. However, regardless of whether pasture 2 is split into two pastures, the apparent trend of increasing invasive grasses and decreasing maintenance of native plant communities on the west side of the pasture and across most of pasture 1 would persist.

Sharp-tailed Grouse
Initial Actions – The effects of this action would be similar to those described under Alternative 2.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.

ADAPTIVE OPTIONS:

- Treat pasture 2 (west) as a riparian pasture, grazing it from 15 to 30 days per year maximum.

Range

Initial Actions – Authorized Use for this allotment would be 241 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 236 federal AMs converted to AUMs by adjusting for cow size is 271 federal AUMs. The effect of setting an Authorized Use limit at the initial estimated carrying capacity equates to a 11 percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in cow size when calculating the number of head and the grazing season when planning the rotation for the allotment.

Adaptive Options – Treating pasture 2 (west) as a riparian pasture would allow more control of the grazing pressure along Whitetail Creek and would change the distribution within the two pastures because the duration of livestock use would be limited to a very short period of time. An analysis of the available AUMs for the remaining pastures would be needed to see if those pastures would be able to absorb the additional livestock use, otherwise an adjustment in Authorized Use would be necessary. The initial cost of the installation of the cross fence would also be an effect of this action.

Riparian

Initial Actions – Alternative 4 is identical to Alternative 3, except the Authorized Use would change from 236 AMs to 241 AUMs. The effects of Alternative 4 are the same as Alternative 3 as described above.

Adaptive Options – The effects of Alternative 4 are the same as Alternative 3 with the following exception: Treat pasture 2 (west) as a riparian pasture, grazing it from 15 to 30 days per year. The amount of time livestock are on the riparian corridor of Whitetail Creek would be reduced below 30 days. If livestock use on the riparian corridor is less, condition would improve by minimizing trailing and trampling of stream banks, allowing for riparian vegetation recovery.

Woody Draws

Initial Actions – Decreasing the level of Authorized Use by 11 percent after adjusting for cow size would facilitate the maintenance or slight improvement of current woody draw conditions by decreasing browsing and trampling disturbances that would assist the regeneration and growth of desired woody species. As discussed under Alternative 3, splitting pasture 2 into two pastures would result in the persistence of livestock concentrations and At Risk woody draw conditions

along Whitetail Creek, and the proposed level of reduction would not be sufficient to achieve Healthy conditions in this area.

Adaptive Options – Using the west half of pasture 2 as a riparian pasture for 15- to 30-day grazing periods would facilitate improved conditions of At Risk woody draws along Whitetail Creek by decreasing the period of browsing and trampling disturbances by 50 to 75 percent, assuming the number of livestock would not be appreciably increased.

Herbaceous Structure

Initial Actions – Implementing an Authorized Use adjustment to the initial estimated carrying capacity could improve fall herbaceous structure due to potential regrowth, improved standing crop, and improved tiller production over heavy use in crested wheatgrass stands.

Adaptive Options – Using the west side of pasture 2 as a riparian pasture with shortened grazing periods could increase High structure levels due to decreased length in grazing events resulting in increased levels of residual cover.

Seral Stages

Initial Actions – As discussed under Alternative 3, cross fencing pasture 2 would increase the utilization of crested wheatgrass in the east half of the pasture but would not decrease the spread of invasive grasses in the remaining pastures. Decreasing Authorized Use by 11 percent under Alternative 4 and implementing a deferred rotation would not change these effects because grazing seasons would remain poorly coordinated with invasive grass palatability during most of the grazing season in each pasture and contribute to selective/excessive use of the native component.

Adaptive Options – Using the west side of pasture 2 as a riparian pasture with shortened grazing periods would increase opportunities for native grass and wetland plant development along portions of the Whitetail Creek corridor that are not dominated by smooth brome. Creation of the riparian pasture would have minimal influence on the apparent trend of increasing invasive grasses in the adjacent uplands because grazing seasons would remain poorly coordinated with invasive grass palatability on a frequent, annual basis. Decreased use of the west pasture would contribute to increasing litter that would facilitate the spread or increase of invasive grasses. Increasing invasive grass trends in pasture 1 would not change because management would remain similar to current conditions. The shortened grazing season in the riparian pasture would result in decreased levels of allotment use unless stocking levels are increased in other pastures, but this would contribute to adverse effects of selective native grass utilization in these pastures.

Sharp-tailed Grouse

Initial Actions – By adjusting the Authorized Use, potentially increasing the proportion of High herbaceous structure by increasing the residual cover level, there would be commensurate enhancement in grouse nesting and brooding habitat.

Adaptive Options – Using the west side of pasture 2 as a riparian pasture with shortened grazing periods could increase High structure levels due to decreased length of grazing events, resulting in potential enhanced levels of grouse nesting habitat.

ALLOTMENT 248

Table 248.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 248 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 6.1 – Rangeland With Broad Resource Emphasis	616	100	
Total allotment acres	617	100	
NFS acres	616	100	
State land acres	0	0	
Private land acres	1	0	
Current permitted livestock grazing (AMs) on NFS lands			312
Initial estimated carrying capacity (AUMs) on NFS lands			261
Number of pastures containing NFS lands			2

Table 248.2 — Allotment 248 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	There are no perennial or intermittent stream reaches in this allotment.	None
Woody draws	There are no woody draws in the allotment.	None
Herbaceous structure	Transect Results: Low – Exceeding Moderate – Meeting Objectives High – Below Objectives 2004 Transects: 1.45; 1.9 2004 Stations percent: Low-50/Moderate-50/ High-0 2005 Transects: 1.68; 2.28 2005 Stations percent: Low-37.5/Moderate-62.5/High-0	**Manage allotment to maintain meeting structure objectives.
Seral stages	Three of four sample sites were at an Invaded Grass State and the fourth site was approaching this state.	Limit the expansion of invasive grasses and increase the proportion of native grasses.
Sharp-tailed grouse	There are two sharp-tailed grouse leks within one mile of the allotment. Within the allotment, there are less than 40 acres of overlap within the one mile proximity radius of these leks.	Manage to enhance sharp-tailed grouse nesting and brooding habitat by increasing the quality and quantity of High vegetative structure on biologically capable sites.
Remarks	No known noxious weeds on NFS lands.	

**** Based on a review of field notes and observations, the IDT determined that this allotment was meeting structure objectives.**

Table 248.3 — Allotment 248 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 312 federal AMs. • Three-year average permitted use is 259 federal AMs.* • Permit type: Turn-in. • Rotation: Recently, twice-over rotation, historically, two-pasture deferred rotation. • Class(s) of Livestock: Cow/calf pairs or Yearlings. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 312. • Continue current management. **Adaptive Options** • Adjust Authorized Use.	**Initial Actions** • Authorized federal AMs: 312. • Implement a 2-pasture deferred rotation starting May 1st. **Adaptive Options** • Monitor species composition and adjust starting date if initial action does not decrease Kentucky bluegrass. • Adjust Authorized Use.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Gather Visual Obstruction Readings once every 3 years. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 248 — Existing Condition

Range – This allotment is approximately 617 acres and contains 616 acres of NFS lands. Currently, this allotment is issued a turn-in permit for 52 head for 6 months by the MGA. This allotment has been divided up into two approximately equal pastures. Current AMs provided by NFS lands can be found in Table 248.1. This allotment is located in the Rolling Prairie geographic area. Water developments within this allotment include two reservoirs.

The current rotation is a two-pasture modified twice-over rotation beginning May 15th and lasting through approximately the beginning of November. Historically, the rotation was a modified two-pasture deferred rotation. In recent years, the livestock class has changed back and forth from

cow/calf pairs to yearlings, and increased livestock numbers with a shortened grazing season has been approved. The plant composition consists of dominantly introduced species such as Kentucky bluegrass and crested wheatgrass with intermixed native species throughout the allotment.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there were no known state listed noxious weeds or county listed weeds within this allotment.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – No woody draws were present in the allotment.

Herbaceous Structure – In 2004, two randomly selected VOR transects were surveyed in herbaceous dominated habitat types. One was measured in the Low structure class (dominant species: western wheatgrass) and the other in the Moderate structure class (dominant species: Kentucky bluegrass/threadleaf sedge). The consolidated station averages showed an even split between Low and Moderate structure stations at 50 percent each. No High structure stations were measured.

Both transects were remeasured in 2005, with both in the Moderate structure class. The consolidated station averages were 37.5 percent in the Low structure class and 62.5 percent in the Moderate structure class. No High structure stations were measured. Kentucky and Canada bluegrass were the dominant species on both transects.

The VOR sampling intensity did not capture the apparent lightly used area in the western portion of pasture 2. This area was reported by the range personnel use-mapping exercise and visually assessed as High structure, and this classification was agreed to by the members of the IDT.

Seral Stages – Broken land was not identified in the allotment, but plant composition is at or approaching an Invaded Grass State throughout most of the pasture acreage. Kentucky and Canada bluegrass averaged 45 percent of the grass production on two Claypan ecological sites sampled by NDSU in pasture 1 during late May/early June. Western wheatgrass was co-dominant. A Robel transect and belt transect located between the two NDSU sites recorded similar plant dominance. A pace transect measured in 1978 on the east side of the pasture resulted in 15 percent relative frequency of bluegrass, but this site was not remeasured because drift fences and a holding pen had been constructed and the transect location could not be confidently located.

Bluegrass constituted 59 percent of the grass production on a Loamy ecological site in pasture 2 sampled at the end of May by NDSU. Crested wheatgrass and smooth brome were also present along the transect, but western wheatgrass and sedge were co-dominant species. Canada bluegrass comprised 82 percent of the relative grass cover on a sere plot measured along a low ridgeline near the center of the pasture. A nearby Robel transect and a belt transect on the east side of the pasture recorded bluegrass and western wheatgrass as the dominant species.

Sharp-tailed Grouse – There are two sharp-tailed grouse leks within 1 mile of the allotment. In the allotment, there are less than 40 acres of overlap within the 1-mile proximity radius of these leks. Despite the IDT determination that this allotment is meeting herbaceous structure objectives, the quality of the structure is in doubt. This allotment is dominated by Kentucky and Canada bluegrass

as aptly demonstrated by the VOR transects and the NDSU sample plot data. These species do not hold their cover value over a typical winter in North Dakota.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, livestock would be removed 2 years later.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment, resulting in no contribution toward CP funds. Removal or maintenance of existing range infrastructure would be Forest Service responsibility. There is potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – There are no intermittent or perennial streams in this allotment. There are no riparian issues in the allotment.

Woody Draws – There are no woody draws in this allotment.

Herbaceous Structure – The removal of livestock grazing would result in an increase in High structure within the allotment. Kentucky bluegrass would continue to provide high amounts of litter contributing to fall readings of High structure.

Seral Stages – The removal of livestock grazing would facilitate the accumulation of plant litter and rapid transitions to Invaded Grass States where they have not already occurred. Bluegrass would attain overwhelming dominance across the allotment in less than 10 years and the maintenance of native plant communities would be lost.

Sharp-tailed Grouse – Given the questionable value of bluegrass species to nesting and brooding hens, this allotment is unlikely to provide significant habitat enhancement for sharp-tailed grouse nesting and brooding hens.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by a turn in grazing association permit, and Authorized Use is 312 federal AMs.
- Cow/calf pairs or yearlings are run in a modified two-pasture deferred rotation.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious

weed control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – There are no intermittent or perennial streams in this allotment. There are no riparian issues in the allotment.

Woody Draws – There are no woody draws in this allotment.

Herbaceous Structure – Current management would continue to facilitate the existing herbaceous structure distribution, which is assumed to be meeting herbaceous structure distribution objectives. Kentucky bluegrass is expected to continue to provide High herbaceous structure throughout the allotment in the fall in most years, while the allotment overall is projected to address the herbaceous structure objectives.

Seral Stages – The upward trend of bluegrass would continue under current management with further transitions to Invaded Grass States. The rate of transitions would be slower than Alternative 1 because livestock grazing would impede the accumulation of plant litter that assists the spread of bluegrass.

High stocking levels associated with Authorized Use 38 percent above initial estimated carrying capacity after adjusting for cow size have contributed to excessive use and decreased vigor of the native component that has and would continue to assist the spread of invasive grasses. Excessive use of the native component occurs with low palatability of invasive grasses during much of the grazing season that results in selective grazing of the native component, further assisting the spread of invasive grasses. Selective grazing of the native component would have increased in pasture 2 when it was consistently the second pasture of use, and where invasive grasses appear to have gained the greatest degree of dominance.

Premature grazing of native grasses with the mid-May turn-in date that decreases plant vigor would also have assisted the spread of invasive grasses. Current turn-in dates create the potential for early season use of the invasive component and later season use of the native component, but the grazing system does not facilitate this event at sufficient frequency or intensity to halt or reverse the trend of increasing invasive grasses and decreasing native grasses. Recent promotion of a deferred rotation now alternates the degree of selective grazing in each pasture, but the end result will be more equal dominance of invasive grasses across the allotment. Reported achievement of High structure objectives are influenced by the relatively low utilization of invasive grasses.

Sharp-tailed Grouse – For an indeterminate timeframe, this allotment could potentially be providing nesting and brooding habitat in portions of the allotment. It is projected, however, the continued expansion of the bluegrass species would continue to displace native species and potential nesting habitat for grouse would appreciably decrease in quality and quantity.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 312 federal AMs.
- Continuing current management.

ADAPTIVE OPTIONS:

- Adjusting Authorized Use.

Range

Initial Actions – Because the initial Authorized Use would remain the same as current management, the permittee would be allowed to harvest the same amount of forage.

Adaptive Options – Adjusting Authorized Use downward would result in fewer livestock numbers, fewer grazing days, or a combination of the two because of the turn-in permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock; however, the amount of forage harvested would be less than the current forage harvest levels.

Riparian – There are no intermittent or perennial streams in this allotment. There are no known riparian issues in the allotment.

Woody Draws – There are no woody draws in this allotment.

Herbaceous Structure

Initial Actions – Same as Alternative 2.

Adaptive Options – Adjusting Authorized Use downward could further increase the amount of High herbaceous structure and ensure the allotment is meeting the herbaceous structure objectives.

Seral Stages

Initial Actions – Proposed management is the same as current management, and the effects are discussed under Alternative 2.

Adaptive Options – Neither decreases nor increases in Authorized Use would be effective in long-term control of invasive grasses or increased maintenance of native plant communities without consistently coordinating the grazing season with the production and palatability of the invasive and native grass components in each pasture.

Sharp-tailed Grouse

Initial Actions – Same as Alternative 2.

Adaptive Options – Reducing Authorized Use would continue the downward trend in habitat quality and quantity of spring nesting habitat via the probable continuing trend of bluegrass expansion. Bluegrass retains no height-density cover value over the winter.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Implementing a two-pasture deferred rotation starting May 1st.

ADAPTIVE OPTIONS:

- Monitoring species composition and adjust starting date if initial action does not decrease Kentucky bluegrass.

Range

Initial Actions – Implementing a two-pasture deferred rotation starting May 1st would address the mixed plant composition of native and introduced species. Close monitoring of the native species would be required so that early grazing pressure of the native species doesn't start to negatively affect the native herbaceous species. Livestock distribution changes should be minimal given the relatively small size of the pastures.

Adaptive Options – Monitor species composition and adjust the starting date if the actions do not decrease Kentucky bluegrass. It would not have an effect on Authorized Use or livestock distribution.

Riparian – There are no intermittent or perennial streams in this allotment. There are no riparian issues in the allotment.

Woody Draws – There are no woody draws in this allotment.

Herbaceous Structure

Initial Actions – Given the Authorized Use level compared to the initial estimated carrying capacity and the May 1st start, there will be increased utilization of the invasive species. However, since the grazing in the early pasture would continue for 3 to 4 months, potential regrowth opportunities may not be appreciably different than existing management, therefore generally maintaining the current levels of herbaceous structure.

Adaptive Options – In combination with the deferred system from the initial actions, adjusting Authorized Use could further increase the amount of assumed High herbaceous structure but facilitate bluegrass expansion in the allotment at the same time.

Seral Stages

Initial Actions – The trend of increasing invasive grasses and decreasing native plant communities would persist under this alternative. Advancing the turn-in date by about 2 weeks to May 1st would increase the utilization of invasive grasses during the first half of the grazing season in the first pasture of use. However, decreasing palatability of invasive grasses during the second half of the grazing period in the first pasture would increase selective use of native grasses, and would be compounded by levels of Authorized Use that exceed initial estimated carrying capacity by 38

percent. Selective use of the native component would occur throughout the grazing season in the second pasture of the rotation, and this situation would be reversed between pastures during alternate years. Consistent implementation of the deferred rotation would remain impaired by the need to open gates between pastures to ensure water access during some years. The result would not be appreciably different from current management.

Adaptive Options – Adjusting the turn-in date or level of Authorized Use while continuing the deferred rotation and 6 month grazing season would have no effect on the trend of increasing invasive grasses for reasons described above.

Sharp-tailed Grouse

Initial Actions – For an indeterminate timeframe, portions of the allotment could potentially be providing sharp-tailed grouse nesting and brooding habitat. It is projected, however, that under this alternative, the trend in expansion of the bluegrass species would continue to displace native species, and potential nesting habitat for grouse would decrease in quality and quantity as a result.

Adaptive Options – Reducing Authorized Use would continue the downward trend in habitat quality and quantity of spring nesting habitat given the probable continuing trend of bluegrass expansion. Bluegrass retains no height-density cover value over the winter, which would typically be beneficial for nesting grouse hens seeking existing cover.

ALLOTMENT 249

Table 249.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 249 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 3.65 – Rangelands With Diverse Natural-Appearing Landscapes	622	100	
Total allotment acres	622	100	
NFS acres	622	100	
State land acres	0	0	
Private land acres	0	0	
Current permitted livestock grazing (AMs) on NFS lands			204
Initial estimated carrying capacity (AUMs) on NFS lands			194
Number of pastures containing NFS lands			1

Table 249.2 — Allotment 249 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	There are no perennial or intermittent stream reaches in this allotment.	None
Woody draws	Sampled woody draws were Healthy.	Maintain current woody draw conditions.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Below Objectives High – Below Objectives 2004 Transects: 1.0 2004 Stations percent: Low-100/Moderate-0/ High-0	Manage for additional Moderate and High structure on biologically capable habitats.
Seral stages	Native plant communities dominate with a mosaic of seral stages. Issues of rangeland health/plant composition are associated with two water tanks located on ridgelines.	Maintain native plant communities and mosaic of utilization and seral stages to achieve objectives. Impede invasive grass establishment.
Sharp-tailed grouse	There is one grouse lek on the allotment. The 1-mile proximity radius overlaps nearly the entire allotment with approximately 618 acres.	Manage to enhance sharp-tailed grouse nesting and brooding habitat by increasing the quality and quantity of High vegetative structure on biologically capable sites.
Remarks	Some leafy spurge and Canada thistle noted along road.	

Table 249.3 — Allotment 249 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 204 federal AMs. • Three-year average permitted use is 205 federal AMs.* • Permit type: Turn-in. • Rotation: One-pasture (3.5 month season). • Class(s) of livestock: Cow/calf pairs or Yearlings. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 204. • Manage existing tank system to rotate use. • Change season of use – Alternate turn-in dates over a 3-year period. First year turn in starts June, second July, and third August. • Rotate salt and supplement to pull livestock off ridge tops. **Adaptive Options** • Add a stock tank in the southwest quarter of allotment. • Compress season of use. • Adjust Authorized Use. • Add Allotment 158 into the grazing rotation.	**Initial Actions** • Authorized federal AUMs: 194. • Manage existing tank system to rotate use. • Change season of use – Alternate turn-in dates over a 3-year period. First year turn in starts June, second July, and third August. • Rotate salt and supplement to pull livestock off ridge tops. **Adaptive Options** • Add a stock tank in the southwest quarter of allotment or move a tank to southwest quarter. • Compress season of use. • Adjust Authorized Use. • Add Allotment 158 into the grazing rotation.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every 3 years. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** Same as Alternative 3

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 249 — Existing Condition

Range – This allotment is approximately 622 acres of NFS lands and contains one pasture. Currently, this allotment is issued a turn-in permit for 68 head for 3 months by the MGA. Current AMs provided by NFS lands can be found in Table 249.1. This allotment is located in the Badlands geographic area. There has been a recent change in ownership of base property (2007), and there have been two different permittees in the last 5 years. In review of the AWs, the allotment was grazed from June 5th to September 5th, with 68 head during the 2003 and 2004 grazing seasons. In 2005, non-use was approved for the grazing season. In 2006, there was a change in permittee and 51 cow/calf pairs grazed from June 1st to September 30th during the 2006 and 2007 grazing seasons.

Review of past notes in the 2210 file indicates there have been some concerns with the ridge tops (uplands) within this allotment. The major ecological sites, based on the NRCS soils map, on these ridge tops are thin loamy to shallow loamy. During the 2004 grazing season, the permittee was asked to remove his livestock early due to the amount of forage utilized on the ridges. Field visits were conducted at that time by Forest Service range staff and the MGA director on the areas of concern, who found that there was a more than desirable amount of blue grama and threadleaf sedge on these sites. Although desirable species were there, they were not getting a chance to express themselves in a normal fashion. The rest of the allotment was in good condition. The location of the two livestock water developments creates a challenge in preventing livestock from accessing these ridge tops. The permittee and the owner of the base property were informed of the concerns on the allotment and changes were made as described in the 2006 and 2007 grazing season. In 2006 and 2007, the permittee made efforts to move supplements around and utilize the stock tanks by turning them on and off to help with the distribution of livestock.

Also during the 2006 season, the permittee and the owner of the base property were informed about leafy spurge and Canada thistle growing along the roadside and the threat of it migrating into the woody draw on the south side of Blacktail Road. The Billings County Weed board has made an effort to treat these areas of infestation. The percentage of control is unknown at this time.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there were no known state listed noxious weeds or county listed weeds within this allotment. However, during field visits in 2006 and 2007, leafy spurge and Canada thistle were found along Forest System Road 703.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – Three sampled woody draws were Healthy. Two of the sampled sites were at the low range of Healthy and precariously located along a two-track and livestock trails leading to water tanks along two ridgelines. These travel routes adversely affect hydrologic characteristics along portions of the adjacent drainage due to rutting that intercepts runoff to the woody communities. Concentrated runoff has also contributed to downcutting along portions of the drainages, but this affords a degree of protection from livestock disturbances due to decreased access. Rocky Mountain juniper woodlands occupied north aspect slopes above woody draw drainages.

Herbaceous Structure – There is one randomly placed VOR transect in the allotment. In 2004 it was measured as Low structure. All stations were in the Low structure class and no Moderate or High structure stations were measured. Dominant vegetation along the transect was clubmoss and western wheatgrass. This transect was not resurveyed in 2005. It is also recognized that the ridge tops are heavily grazed.

Seral Stages – Native grass communities dominated across the single pasture of the allotment. A Robel transect, belt transect, and field observations indicated high utilization and early seral stages with dominance of blue grama, sedges, and clubmoss along the two ridgelines containing water tanks. Patches of annual brome were also present on the ridges, and extensive trailing impacts occur in sandy soils on some of the ridge slopes. Based on the proportional area of the ridgelines, there is likely to be an excess of early seral stages compared to desired conditions. A sere plot in secondary range near the south boundary of the pasture with lower utilization was at a mid-late seral stage. Pasture observations indicate a relatively high potential for the occurrence of late seral stages in secondary range influenced by slope positions or long distance to water.

Sharp-tailed Grouse – There is one known lek on the allotment. The 1-mile proximity radius overlaps approximately 618 acres of the 622 acre allotment.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed after 2 years.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would now be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – Woody draws would improve from current conditions at the low range of Healthy with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. Natural restoration or improvement of hydrologic characteristics along two of the sampled sites would increase the potential for improved woody draw conditions. Existing invasive grasses within portions of the woody draws, and potential increases of these species as a result of increasing litter with the removal of livestock grazing, would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock, there would be an appreciable increased opportunity for the development of High and Moderate herbaceous structure, and a decrease in the amount of Low herbaceous structure, particularly along the ridge tops.

Seral Stages – The removal of livestock grazing disturbances would facilitate shifts towards late seral stages that would be most notable along the ridgelines that are heavily utilized. High amounts of clubmoss along the ridges would impede or slow the development of late seral stages. Increases of plant litter with the removal of livestock grazing would improve conditions for the establishment or spread of invasive grasses that occur in light amounts or localized areas, but native plant communities would persist for an extended period, barring heavy disturbances or invasive plant introductions.

Sharp-tailed Grouse – The increase in potential High structure grasslands from the removal of livestock would likely enhance nesting and brooding habitat for sharp-tailed grouse. Given the relatively early seral state of the ridge-tops, this may take an indeterminate amount of time to reach High structure, but the ridge tops could serve in other capacities, such as loafing and brooding habitat, as they advance through the seral and structural phases.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by a turn-in grazing association permit, and Authorized Use is 204 federal AMs.
- Cow/calf pairs or yearlings are run 3.5 months on one pasture.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weed control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – Woody draw conditions at the low range of Healthy would persist under current management. The potential exists for downward trends along portions of two of the sampled sites due to their position along livestock and management travel routes that contribute to browsing and trampling disturbances and adverse effects to hydrologic characteristics of the associated drainages. Authorized Use and currently reported use that exceeds initial estimated carrying capacity by 21 percent would maintain the potential for relatively high woody draw disturbances.

Herbaceous Structure – Current management would continue to perpetuate the herbaceous structure distribution with a limited potential to promote an increase in the proportion of High herbaceous structure and the overall herbaceous structure in general. Retaining the current Authorized Use level is projected to continue to promote a lack of residual standing crop/biomass.

Seral Stages – The current proportion of seral stages that have the potential to meet objectives would be maintained under present management. However, the level of reported and Authorized Use that is 21 percent greater than initial estimated carrying capacity may inhibit the development

of late seral stages except in the most distant or steep secondary range. Levels of utilization in primary areas of use such as the ridgelines would maintain early seral conditions, with some indicators of poor rangeland health such as high clubmoss and the spread or increase of invasive grasses. The June through September grazing season is appropriate for the native species composition, but annual repetition of the same grazing season with current levels of use can decrease plant vigor and production by providing insufficient opportunity for the completion of critical growth stages.

Sharp-tailed Grouse – Existing management actions, notably the Authorized Use level that is 30 percent greater than initial estimated carrying capacity after adjusting for cow size, would not enhance High structure grasslands, thus limiting the potential to enhance grouse nesting and brooding habitat in this allotment.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 204 federal AMs.
- Managing existing tank system to rotate use.
- Changing season of use – Alternate turn-in dates over a 3-year period. First year turn in starts June, second July, and third August.
- Rotating salt and supplement to pull livestock off ridge tops.

ADAPTIVE OPTIONS:

- Adding a stock tank in the southwest quarter of allotment.
- Compressing season of use.
- Adjusting Authorized Use.
- Adding Allotment 158 into the grazing rotation.

Range

Initial Actions – Because the initial Authorized Use would remain the same as current management, the permittee would be allowed to harvest the same amount of forage. However, the use of these federal AMs would be different than the existing condition because forage would be harvested at different times of the grazing season compared to the current rotations.

Managing the existing stock tank system to rotate use would alter grazing pressure around the south tank site. Current management allows livestock to use both tanks; however, livestock prefer the south tank more than the north and this is where most of the grazing pressure occurs. Livestock would be forced to use one or the other because tanks would be turned off at certain times of the grazing season. There would also be an increase in the intensity of management between the permittee and Forest Service throughout the grazing season in making adjustments as needed in utilization levels in areas grazed when one or the other tank is in use. Tank management would not have an effect on Authorized Use because the same amount of AMs would be available.

Annually changing the season of use would not have an effect on the Authorized Use because the same amount of AMs would be available for livestock grazing. Changes in distribution of livestock would be minimal because of the size and topography of the pasture. However, there would be differences in the palatability of herbaceous species throughout the growing season and timing of livestock grazing would increase grazing pressure in areas of the pasture with the most palatable species. Herbaceous plant species would be grazed during different growth stages through the year, which would allow for proper recovery time before and after grazing.

Rotating salt and supplement to pull livestock off of ridge tops would reduce the grazing pressure on the ridge tops and increase grazing pressure in the area(s) supplements are placed. However, due to the topography and size of this allotment, overall livestock distribution would not be affected.

Adaptive Options – Adding a stock tank in the southwest quarter of the allotment would allow the manager to utilize three tanks and would even out the use throughout the pasture, reducing grazing pressure on the ridge tops where the existing livestock water developments exist.

Compressing season of use would provide herbaceous species more time for initial growth and recovery because of the low frequency of grazing by livestock. However, there would be an increase in intensity because of the increased livestock numbers. There would be no affects on Authorized Use because the same amount of AMs would be available; however, they would be harvested in a shorter time period than the existing 3.5 months.

Adjusting Authorized Use downward would result in fewer livestock numbers, fewer grazing days, or a combination of the two because of the turn-in permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock; however, the amount of forage harvested would be less than the existing forage harvested.

Adding Allotment 158 pastures into the rotation with Allotment 249 would add additional native pastures and would add additional recovery time with a compressed season because the duration of livestock within the pasture would be less than the 3.5 months. There would be no changes in Authorized Use because federal AMs would still be available; however, they would be harvested at different periods of the grazing season. Each allotment would still be managed as two separate allotments through the MGA.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws

Initial Actions – As discussed under Alternative 2, current levels of reported and Authorized Use should result in the persistence of Healthy woody draw conditions, but with the potential for gradually decreasing conditions of woody draws situated along livestock and vehicle trails. Staggering the turn-in date by 1 month every year would be unlikely to have an appreciable influence on woody draw conditions because temperatures and insect pests would remain similar to current grazing seasons. Increased upland plant vigor and production facilitated by the staggered grazing seasons, as well as more frequent grazing during periods of fall regrowth, might contribute to increased use of the uplands and decreased woody draw disturbances. However, extended green periods and other woody draw amenities would continue to attract livestock during a large portion of the grazing season. Moving salt and supplement off the ridgelines could contribute to increased

disturbances within woody draws in the adjacent valleys, but could be avoided by proper selection of the mineral locations. Managing the two water tanks to rotate utilization around the two ridgelines would tend to equalize the degree of livestock browsing and trampling disturbances in woody draws nearest to the ridges unless the tanks are managed to achieve a range of utilization and grazing disturbance.

Adaptive Options – Adding a water tank in the southwest quarter of the allotment would increase browsing and trampling disturbances of woody draws occurring in this area. Because the affected woody draws comprise a large portion of samples in the allotment, the proportion of 100 percent Healthy woody draws would have a high potential to decrease to less than 80 percent.

Compressing the season of use with increased livestock numbers would increase the evenness of livestock grazing across the pasture with potentially increased disturbance and decreased woody draw conditions. Although more time would be available for the recovery of browsed woody plants, annual repetition of browsing would impede successful regeneration or sapling advancement to larger size classes.

Adding the allotment into the rotation with Allotment 158 would result in a compressed grazing season with effects described above.

Decreasing the level of Authorized Use would facilitate increased woody draw conditions by decreasing livestock browsing and trampling disturbances that would contribute to the increased regeneration of woody species.

Herbaceous Structure

Initial Actions – Authorized Use exceeds the initial estimated carrying capacity level by 17 percent after adjusting for cow size. This alternative proposes to rotate livestock utilizing the tank system, supplements, and changing season of use. It is projected that the proposed and existing Authorized Use level of this alternative would not be overcome by rotating spatially—water and supplements, or temporally—season of use, and will not achieve appreciably higher productivity that would aid in higher residual standing crop in the fall.

Adaptive Options – Adjusting the Authorized Use is the most effective tool available to begin to adjust the herbaceous structure towards meeting project goals. Adding a stock tank would distribute the livestock more evenly in the allotment but result in more homogenized herbaceous structural conditions as well. Shortening the season, increasing stocking, or providing a longer recovery time, would not be able to overcome the Authorized Use. Plus, it is doubtful that the shortened season would provide a long enough time for regrowth to occur. As the Authorized Use level is reduced, there could be longer-term benefits to composition on the ridge tops that could eventually result in improved herbaceous structure on the ridge tops. Integrating this allotment into 158 could potentially provide benefits to herbaceous structure, again, in accordance with an improved Authorized Use and initial estimated carrying capacity balance in addition to potential growing recovery timeframes.

Seral Stages

Initial Actions – Staggering the turn-in date by about 1 month during successive years would contribute to maintaining plant vigor and increase the potential for achieving the desired proportion

of seral stages by increasing opportunities for plants to complete critical growth stages. Greater management of the two stock tanks and placement of mineral supplement would decrease or stagger utilization within primary use areas and contribute to rangeland health. Continuation of reported and Authorized Use that exceeds initial estimated carrying capacity by 21 percent after adjusting for cow size would have the potential to decrease these benefits.

Adaptive Options – Adding a third stock tank in the southwest quarter of the 640-acre pasture would increase the evenness of livestock grazing and reduce secondary range and mid-late seral stages measured in this area. Livestock disturbances around all three tanks would remain relatively high and early seral stages along the ridgelines of the existing two tanks would persist.

Compressing the season of use with increased livestock numbers would increase the evenness of grazing with potential reductions in secondary range and late seral stages. However, shorter and staggered grazing seasons would provide opportunities for plant recovery and the completion of critical growth stages with the potential for maintaining current seral conditions. Increased grazing distribution would assist in impeding the accumulation of plant litter that has the potential to occur in secondary range and that can facilitate the establishment of invasive grasses. The effects of adding the pasture to the rotation with the several pastures of Allotment 158 would be the same as a compressed grazing season.

Decreasing Authorized Use would decrease the level of utilization and livestock grazing disturbances, thereby increasing plant vigor and facilitating shifts towards late seral stages. Sufficiently reduced levels of use would contribute to increased plant litter with the potential of facilitating invasive grasses.

Sharp-tailed Grouse

Initial Actions – Despite the Low structure recorded for the one VOR transect in the allotment, it is assumed that suitable nesting sites do exist in some areas of the allotment, as evidenced by the presence of a lek on the allotment. Increasing distance from the water sources to the edges of the allotment and on some of the grassy slopes are a couple such opportunities for nesting grouse. However, given the status of the ridge tops, existing nesting habitat options are currently limited on these sites. This alternative proposes to rotate livestock utilizing the tank system, supplements, and changing season of use. It is projected that the proposed and existing Authorized Use level of this alternative would not be overcome by rotating spatially—water and supplements, or temporally—season of use, and will not achieve appreciably higher productivity that would aid in improving spring grouse nesting habitat.

Adaptive Options – By adjusting the Authorized Use, potentially increasing the proportion of High herbaceous structure, there would be a commensurate enhancement in potential grouse nesting and brooding habitat. Adding a stock tank could aid the ridge tops but at the expense of the increased distribution across the allotment and homogenized vegetation. Shortened season and increased stocking could aid the ridge tops if Authorized Use and initial estimated carrying capacity is balanced. However, it is debatable if enough time would be permitted for sufficient regrowth to occur under this tool. By integrating Allotments 158 and 249, as long as the Authorized Use is balanced with the initial estimated carrying capacity, it seems that the increased number of pastures

adds potential management flexibility. For example, improved timing and the use of other grazing systems, such as rest rotation, could be provided.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3; therefore Alternative 3A would have the same effects as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.

ADAPTIVE OPTIONS:

- Add a stock tank in the southwest quarter of allotment or move a tank to southwest quarter.

Range

Initial Actions – Authorized Use for this allotment would be 194 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 204 federal AMs converted to AUMs by adjusting for cow size is 235 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 17 percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment.

Adaptive Options – If one of the existing stock tanks is moved to the southwest quarter of the allotment, livestock distribution would change since there would be water in the southwest quarter to pull livestock use to that area. Also, there would no longer be two livestock water developments in the northeast quarter of the pasture. The action may cause livestock distribution to be more evenly distributed throughout the allotment.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws

Initial Actions – Decreasing Authorized Use by 17 percent according to initial estimated carrying capacity and adjustments for cow size would facilitate increased woody draw conditions by decreasing the level of browsing and trampling disturbances that would assist the regeneration of desired woody species.

Adaptive Options – The effects of adding a stock tank to the southwest quarter of the pasture were discussed under Alternative 3. The potential of also removing one of the existing tanks from ridgelines in the northeast quarter of the pasture would not have an appreciable effect on the

expected decrease in the proportion of Healthy woody draws. The current tank locations do not have a large effect on existing woody draws, but the new tank location would increase livestock disturbances within Healthy draws. The effects of other Adaptive Options were discussed under Alternative 3.

Herbaceous Structure

Initial Actions – By balancing the Authorized Use with the initial estimated carrying capacity, there should be positive movement of the allotment towards herbaceous structure objectives.

Adaptive Options – Moving one of the livestock tanks in the southwest quarter of the 640-acre pasture could increase the evenness of livestock grazing and remove or reduce secondary range, but to an appreciably less degree than adding an additional tank to the allotment.

Seral Stages

Initial Actions – Decreasing Authorized Use by 17 percent according to initial estimated carrying capacity and adjustments for cow size would decrease livestock grazing disturbances and facilitate increased plant vigor and shifts towards late seral stages.

Adaptive Options – The effects of adding a stock tank to the southwest quarter of the pasture were discussed under Alternative 3. However, the potential of also removing one of the existing tanks from ridgelines in the northeast quarter of the pasture would facilitate shifts towards late seral stages in the surrounding area. Therefore, decreasing seral stages around the new tank location would be countered by increased stages around the old tank location, depending on travel routes and the tank chosen for removal, and contribute to the maintenance of current seral stage proportions across the pasture.

Sharp-tailed Grouse

Initial Actions – With the reduction of Authorized Use and potential development of later seral vegetation community through the use of the additional tools of rotations and distribution, this alternative should eventually enhance grouse nesting brooding habitat.

Adaptive Options – Moving one of the livestock tanks in the southwest quarter of the 640-acre pasture could increase the evenness of livestock grazing and remove or reduce secondary range, but to an appreciably less degree than adding an additional tank to the allotment.

ALLOTMENT 256

Table 256.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 256 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 3.65 – Rangelands With Diverse Natural-Appearing Landscapes	5504	99	
Newly acquired NFS lands with unassigned Management Area	82	1	
Total allotment acres	6160	100	
NFS acres	5586	91	
State land acres	218	4	
Private land acres	355	5	
Current permitted livestock grazing (AMs) on NFS lands			1591
Initial estimated carrying capacity (AUMs) on NFS lands			1678
Number of pastures containing NFS lands			3

Table 256.2 — Allotment 256 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	PFC surveys conducted in 2004 and 2006 rated a majority of Blacktail Creek and the unnamed tributary to Blacktail as NF with a small portion rated as FAR-NA and PFC.	Start streams back toward PFC.
Woody draws	Of the woody draws sampled, 50 percent were Healthy and 50 percent were At Risk. At Risk woody draws had low or no regeneration, and a heavily impacted or missing shrub layer. Water developments near woody draws are having an adverse effect on woody draws.	Increase seedling/sapling understory and enhance shrubs.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Meeting Objectives High – Below Objectives 2004 Transects: 1.51; 2.83; 1.64; 1.1; 1.01; 1.81; 1.0 2004 Stations percent: Low-62.14/Moderate-37.14/High-0.71 2005 Transects: 1.25 2005 Stations percent: Low-60/Moderate-40/ High-0	Manage for additional High structure on biologically capable habitats.
Seral stages	Three sample sites were at mid seral stages and one site was at a late-mid stage. Two remeasured ecoplot sites exhibited an increase of invasive grasses and one of the sites was approaching an Invaded Grass State.	Maintain native grass communities and limit or decrease the extent of invasive grasses.
Sharp-tailed grouse	There is one grouse lek on the allotment and one additional lek within 1 mile of the allotment. The 1-mile proximity radius for these two leks overlaps the allotment with approximately 1,584 acres.	Manage to enhance sharp-tailed grouse nesting and brooding habitat by increasing the quality and quantity of High vegetative structure on biologically capable sites.
Remarks	Black henbane along creek. Sensitive population of Dakota buckwheat (*Eriogonum visheri* A. Nels.) in allotment.	

Table 256.3 — Allotment 256 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 1,591 federal AMs. • Three-year average permitted use is 1,381 federal AMs.* • Permit type: Turn-in (common allotment). • Rotation: Seasonlong and two-pasture deferred rotation (two herds). • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 1,591. • Construct approx. 1.5 miles of fence south of Blacktail Creek in pasture 2 to create a riparian pasture. • Drill a stock well in the northwest quarter of Section 24 in pasture 2; construct approx. 1.5 miles of water pipeline to supply two stock tanks, one located in the new riparian pasture and one in the southeast quarter of Section 24. • Create a four-pasture deferred rotation utilizing Allotments 230 pasture 1, Allotment 288 pasture 2, Allotment 256 pasture 2, and the proposed riparian pasture in Allotment 256. • Fence existing reservoir and portion of adjacent woody draw in Section 25 in pasture 2. **Adaptive Options** • Fence high-value woody draws. • Adjust Authorized Use. • Utilize herding to move livestock off of Blacktail Creek. • In pasture 2, create water gaps. Harden gaps and trail crossing Blacktail Creek in Section 24. • In pasture 3, cut encroaching junipers and use the material to control livestock access to Blacktail Creek. Drift fences could also be used in combination with the native materials.	**Initial Actions** • Authorized federal AUMs: 1,678. • Construct approx. 1.5 miles of fence south of Blacktail Creek in pasture 2 to create a riparian pasture. • Drill a stock well in the northwest quarter of Section 24 in pasture 2; construct approx. 1.5 miles of water pipeline to supply two stock tanks, one located in the new riparian pasture and one in the southeast quarter of Section 24. • Create a four-pasture deferred rotation utilizing Allotment 230 pasture 1, Allotment 288 pasture 2, Allotment 256 pasture 2, and the proposed riparian pasture in Allotment 256. • Fence existing reservoir and portion of adjacent woody draw in Section 25 in pasture 2. • In pasture 3, on Blacktail Creek, construct a 76-acre riparian exclosure. No grazing of exclosure for first 3 years • Suspend waived 154 AUMs associated with pasture 3 that have been historically non-used. • In pasture 3, utilize drift fences, native materials (i.e., encroaching juniper trees), rocks to control access to Blacktail Creek. **Adaptive Options** • Fence high-value woody draws. • Utilize herding to move livestock off of Blacktail Creek. • In pasture 2, create water gaps. Harden gaps and trail crossing Blacktail Creek in Section 24. • Create riparian pasture in pasture 3. • Riparian Exclosure: At end of year 3, conduct vegetation survey. If survey reveals that vegetation and stream channel condition can withstand some grazing, initiate a late or dormant season compressed prescribed graze. Prescribed grazing would be identified in the AOI.

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
		• Construct three riparian exclosures in pasture 2 on Blacktail Creek. The exclosures are 38, 19, and 27 acres in size, respectively (Reaches 14,15,16) • In pasture 3, construct a 23-acre riparian exclosure on Blacktail Creek (Reach 18) • Adjust Authorized Use.
Monitoring • Review annual planned management identified in Allotment Worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every 3 years. • Complete Properly Functioning Condition survey once every 3 years then once every 5 years if a positive trend has been established. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 256 — Existing Condition

Range – This allotment is approximately 6,160 acres in size and contains private, state, and NFS lands with 5,586 acres of NFS lands. This allotment is a common allotment, and is divided into three pastures. The allocated AMs for this allotment are divided among six permittees. Permittees in this allotment do not all run together in one herd, therefore the historical management is essentially treating each pasture as its own allotment. Only one out of the six permittees grazes in all three pastures at this time. Currently, the common is permitted through each permittee's associated headquarters permit by the MGA. Current AMs provided by NFS lands is 1,591. This allotment is located in the Badlands geographic area. Water developments within this allotment include a spring development, a well and stock tank, and several reservoirs.

Pasture 1 is approximately 2,188 acres in size. Two permittees run in this pasture, and the current management changes the season of use by going in early one year, May 15th, and late the following year, August 1st. In a normal year, this pasture is stocked with 208 head for 3 months. Water facilities include two reservoirs and a well with a stock tank. Use in the northwestern/west portions of this pasture is very light and limited due to the topography. Also, there are deep drainages going into Blacktail Creek that limit livestock access. Native species composition and litter cover is generally pretty good throughout this pasture; however, there is a large expression of blue grama in areas of heavier use. Distribution of livestock indicated that the heaviest used areas are concentrated around the water facilities and Blacktail Road.

Pasture 2 is the smallest of the three pastures at approximately 1,848 acres in size, and three out of the six permittees run in this pasture. Approximately 64 head normally are turned out into this pasture around May 15th. Around June 10th, an additional 24 head are turned out. The length of the grazing season varies from year to year; however, livestock are normally removed from the allotment around October10th for weaning. Two of the three permits, in a normal year, bring approximately 94 head back into the pasture around October 25th, and graze until December 15th. Although the Forest Service range staff did not spend a lot of time in this pasture for distribution mapping, the topography of the northern half and some of the southern half is rough, which limits the distribution of livestock. The southeastern portion of this pasture receives the heaviest of use due to water and topography. Water facilities within the pasture include a developed spring north of Blacktail Creek, which has a very slow flow watering approximately 15 to 25 head at best, according to the permittees, and two reservoirs south of Blacktail Creek, both of which were cleaned out in 2007.

Pasture 3 is approximately 2,107 acres in size, and two of the six permittees have numbers allocated to this pasture. The number of head allocated to this pasture is 125. For at least the last 10 years one of the permittees has not run the 44 head allocated to him. This pasture has been grazed with 60 to 88 head for the last four grazing seasons. The livestock in this pasture are normally rotated between this pasture and pasture 1 in a two-pasture deferred rotation. The topography of the northern half and some of the southern half is rough enough to limit the distribution of livestock. The southeastern portion of the pasture receives the heaviest use due to water and topography. The 2210 file shows that there are four reservoirs in the pasture; however, the reservoir in the northwest quarter of section 11 is silted in and nonfunctional. The other three reservoirs are seasonal, so livestock use Blacktail Creek as the primary water source.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there were no known state listed noxious weeds or county listed weeds within this allotment. However, during a PFC survey along Blacktail Creek in 2006, black henbane was found growing along the creek bank.

Oil and gas development on NFS lands in this allotment has removed a total of approximately 5.5 acres from livestock access. A total of approximately 23.8 acres of oil and gas pads and access roads have been reclaimed and are or will be available for livestock access. Associated forage from these acres is approximately 1.5 and 6.5 AUMs, respectively.

Riparian –

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
256-02	Blacktail Cr (3)	0.09					0.09
256-02	Blacktail Cr (4)					1.76	1.76
256-02	Unnamed Trib to Blacktail (9)					0.45	0.45
256-02	Unnamed Trib to Blacktail (10)			0.75			0.75
256-03	Blacktail Cr (4)					1.83	1.83

256-03	Blacktail Cr (5)	0.7	0.7

Blacktail Creek (reach 4) flows through pastures 2 and 3 of Allotment 256 (Figure 256.1). In addition, an unnamed tributary (reaches 9, 10) flows north through pasture 2 into Blacktail Creek. Brooks (2005) rated the unnamed tributary reach as NF (reach 9) and the unnamed tributary (reach 10) as FAR-NA. Blacktail Creek was resurveyed by the interdisciplinary team in 2006. The team gave a functionality rating of NF to most of Blacktail Creek, except for the lower 0.7-mile reach in pasture 3 that had a functionality rating of FAR-NA and reach 3 which was at PFC.

Problems noted in these reaches include:

- Presence of noxious weed, black henbane, on point bars.
- Point bars largely devoid of vegetation; riparian vegetation is very patchy.
- Vegetation cover is sparse and inadequate to protect channel and banks from incision and erosion. The banks have almost continuous bare ground.
- Excess sediment is coming from uplands and forming large fans at nearly every tributary confluence.
- Channel is very wide and cobble-lined, suggesting very flashy hydro-period and very high rates of sedimentation and sediment transport.
- Historical incision of about 5 to 7 meters (15 to 20 feet) is evident from the position of mature cottonwoods. Furthermore, there are signs of recent, ongoing channel incision.
- There is no regeneration of cottonwood trees and only a single patch of peach leaf willows (*Salix amygdaloides* Anderrs.).

Figure 256.1 — Reach 4 of Blacktail Creek is incised and shows evidence of continued channel incision.

Woody Draws – Rocky Mountain juniper was the dominant woodland type throughout the allotment, but of 18 sampled green ash woody draws, half were Healthy and half were At Risk (Figure 256.2). Topographic constraints that control livestock distribution and the presence of developed reservoirs were major factors affecting woody draw conditions.

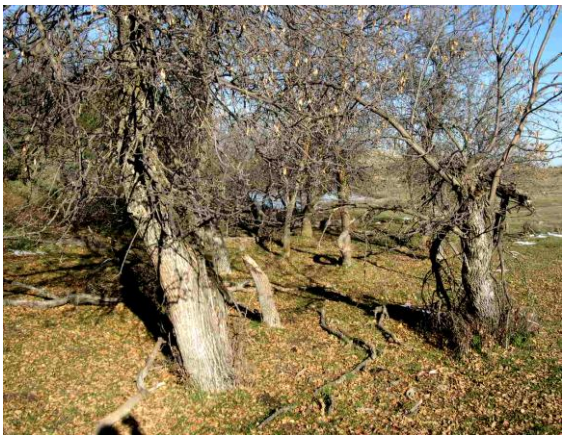


Figure 256.2 — Examples of Healthy, on the left, and At Risk, on the right, woody draws in Allotment 256.

Herbaceous Structure – In 2004, seven randomly selected VOR transects were surveyed. Three were measured in the Low structure class, and four were measured in the Moderate class. No High structure transects were measured. The consolidated station averages were Low structure stations at 62 percent and Moderate stations at 37 percent. Approximately 1 percent of the stations were measured in the High category ($\geq$5.5 inches).

One transect was resurveyed in 2005. It surveyed in the Low structure class. The actual measurement was slightly higher than the 2004 reading. The station data showed 60 percent of the stations were Low and 40 percent were Moderate. No High structure stations were measured.

Seral Stages – Numerous ecoplots, Robel transects, belt transects, and field observations indicated a predominance of native plant communities at mid seral stages with high amounts of blue grama and/or buffalo grass. Invasive grasses primarily involving bluegrass and lesser amounts of annual brome occurred along roadways, reclaimed well sites, and some primary use areas. Blacktail Creek extends through the center of the allotment and the creek corridor and adjacent tributaries are primary areas of use. Significant portions of all three pastures contained steep rugged topography with barren south aspect slopes and north aspect slopes of dense Rocky Mountain juniper that are minimally utilized by livestock.

Kentucky bluegrass occurred at a frequency of 36 percent on a Claypan ecological site sampled by NDSU in pasture 1, but constituted less than 3 percent of the grass production from the clipped plots. This site was rated at a mid seral stage with western wheatgrass, blue grama, sedge, Junegrass, and relatively low production. A remeasured ecoplot north of the NDSU sample site remained at a mid seral stage between 1998 and 2008, but frequency of Kentucky bluegrass increased from 0 to 15 percent. A cluster of six adjacent ecoplots were also at mid seral stages with absent or light amounts of invasive grasses during the late 1990s.

Relative grass canopy cover of bluegrass increased from 16 percent to 30 percent between 1998 and 2008 on a remeasured ecoplot in pasture 2. Seral stage decreased from late-mid to mid and the site was approaching an Invaded Grass State. Two nearby ecoplots were at mid seral stages during 1998. A Robel transect along Blacktail Road recorded crested wheatgrass as the dominant species, while a belt transect and Robel transect in secondary range in the north half of the pasture recorded native grass dominance suggestive of mid seral stages.

A sere plot in pasture 3 was at a late-mid seral stage with light amounts of bluegrass. Species recorded along two of three Robel transects were suggestive of mid seral stages while the third transect was suggestive of earlier stages and contained bluegrass. A belt transect on the west side of the pasture was suggestive of mid to late seral stages.

Sharp-tailed Grouse – There is one grouse lek on the allotment and one additional lek within 1 mile of the allotment. The 1-mile proximity radius for these two leks overlaps the NFS portions of the allotment with approximately 1,584 acres.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed two years later.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would now be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructure. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian condition along Blacktail Creek and the unnamed tributary as described in the existing condition would improve and evolve toward desired riparian conditions over time. Improvement would result from the establishment of riparian vegetation, which would capture sediment and build stream banks.

Woody Draws – Woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. Existing invasive grasses within woody draws, and potential increases of these species as a result of increasing litter with the removal of livestock grazing, would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock, there would be an appreciable increased opportunity for the development of High and Moderate herbaceous structure, and a decrease in the amount of Low herbaceous structure.

Seral Stages – The removal of livestock grazing disturbances would facilitate shifts towards late seral stages. Increased litter accumulation that would occur with the removal of grazing would assist the spread of invasive grasses and transitions to Invaded Grass States in portions of the allotment, but native grass communities would persist for an extended period in large areas of the allotment with less abundant invasive grasses.

Sharp-tailed Grouse – The increase in potential High structure grasslands from the removal of livestock would likely enhance nesting and brooding habitat for sharp-tailed grouse. However, over time (more than 10 to 15 years) the decrease in forb diversity could decrease foraging opportunities. Also, over time (>10 to 15 years), nesting and brooding quality would decrease because of lower quality habitat associated with invasive grasses that could invade the pastures.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by turn-in (Common Allotment) grazing association permits, and Authorized Use is 1,591 federal AMs.
- There are three cow/calf herds that run in this allotment. One in pasture 2 seasonlong, one in pasture 1 in a deferred rotation with the associated headquarters allotment, and one in a deferred rotation with pastures 1 and 3.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weed control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian conditions along Blacktail Creek and the unnamed tributary, as described in the existing condition, would continue.

Woody Draws – Woody draw proportions of about 50 percent Healthy and 50 percent At Risk would persist under current management. High degrees of woody draw disturbance occur with seasonlong grazing, rough topography that results in livestock trailing along drainages, and the close proximity of developed water sources. Although reported use is significantly less than Authorized Use, several woody draws exhibit a lack of tree and shrub regeneration and have the potential to revert to grass or shrub communities. Potentially increased stocking to the level of Authorized Use would increase the level of woody draw disturbances and decrease the proportion of 50 percent Healthy woody draws.

Herbaceous Structure – Current management would continue to perpetuate the herbaceous structure distribution with a limited potential to promote an increase in the proportion of High herbaceous structure and the overall herbaceous structure in general. Retaining the current Authorized Use level is projected to continue to promote a lack of residual cover in the surveyed

transect areas. However, AOI/AW data indicates that recent planned use has been less than the initial estimated carrying capacity.

Seral Stages – Continuation of current management would perpetuate the predominance of mid seral conditions with the potential for gradually increasing invasive grasses. Potentially, increased stocking to the level of Authorized Use would result in shifts towards early seral stages with an increased potential to assist invasive grass spreading. The initial estimated carrying capacity is likely to be high as a result of lower forage production than production estimates used to estimate carrying capacity, and steep slopes and long distances to water affecting a large portion of the allotment. Areas of late seral stages have the potential to occur in poorly accessible areas or distant secondary range with potential communities of little bluestem and prairie sandreed.

Figure 256.3 — Four photos indicate various trailing impacts that decrease hydrologic function and the ability to produce vegetation.

Other impediments to the development of late stages and facilitation of invasive grass spreading occur with premature turn-in dates for native grass communities, seasonlong grazing, and high utilization within primary use areas. Indications of poor range condition were evident in primary use areas (Figure 256.3) and are influenced by the topography and relatively poor soils.

Sharp-tailed Grouse – Existing management actions, notably the projected high Authorized Use levels, would not enhance High structure grasslands, thus limiting the potential to enhance grouse nesting and brooding habitat in this allotment.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 1,591 federal AMs.
- Constructing approximately 1.5 miles of fence south of Blacktail Creek in pasture 2 to create a riparian pasture.
- Drilling a stock well in the northwest quarter of section 24 in pasture 2, constructing approximately 1.5 miles of water pipeline to supply two stock tanks, one located in the new riparian pasture and one in the southeast quarter of Section 24.
- Creating a four-pasture deferred rotation utilizing Allotment 230 pasture 1, Allotment 288 pasture 2, Allotment 256 pasture 2, and the proposed riparian pasture in Allotment 256.
- Fencing existing reservoir and portion of adjacent woody draw in Section 25 in pasture 2.

ADAPTIVE OPTIONS:

- Fencing high-value woody draws.
- Adjusting Authorized Use.
- Utilize herding to move livestock off of Blacktail Creek.
- In pasture 2, creating water gaps. Harden gaps and trail crossing Blacktail Creek in Section 24.
- In pasture 3, cut encroaching junipers and use the material to control livestock access to Blacktail Creek. Drift fences could also be used in combination with the native materials.

Range

Initial Actions – Authorizing 1,591 federal AMs would appear to be the same as existing condition; however, this authorization would be an increase in the amount of AMs harvested because one of the permittees has not utilized the allocated AMs available to him for at least the last 10 years. The federal AMs have been waived back to the MGA, who in turn have reallocated the AMs. Currently, the Forest Service is not approving these AMs for annual authorization, so the 154 AMs would be subtracted from the initial Authorized Use to reflect 1,437 federal AMs. Other than these 154 AMs, the permittees would be allowed to harvest the same amount of forage. However, the use of these federal AMs would be different than the existing condition because forage would be harvested at different times of the grazing season compared to the current rotations.

Constructing a mile and a half cross fence south of Blacktail Creek would create an additional pasture, which would increase the intensity of livestock management within pasture 2. Because the pasture would be split into two separate pastures, AMs available in each pasture would be determined and would identify the number of grazing days for each pasture with the number of livestock to be grazed. Distribution of livestock would change because livestock would be confined to individual pastures and would no longer have free access to the entire pasture. Distribution throughout the two pastures would be more even than the existing spot grazing occurring by livestock. The duration and time of livestock grazing would force livestock to utilize species that are undesirable at different periods of the growing and grazing season. Additional livestock water would be required because of the locations of existing livestock water developments.

Drilling a livestock water well, constructing a pipeline, and placing two tanks would provide reliable livestock water throughout the grazing season in both pastures. The existing water development in the proposed riparian pasture would not supply enough water for the number of livestock grazing the current pasture, and is the only water source north of Blacktail Creek besides the creek itself. Utilization levels would increase around the new developments; however, the level of utilization would relate to the duration and number of livestock grazing the pastures.

Creating a four-pasture deferred rotation would not change the distribution of livestock in the smaller pastures because of the size and topography of the pastures. The larger pasture's, Allotment 256 pasture 2, livestock distribution would change because of the change in timing of grazing, forage quality of graminoid species, climatic conditions during grazing period, and the initial action of splitting the pasture into two pastures. The amount of federal AMs harvested would not change from the existing conditions; however, the forage would be harvested during different parts of the growing season. A four-pasture deferred rotation would change the season of use within the pastures and would allow for proper recovery and initial growth of individual native graminoid species throughout periods of the growing season. Two of the three permittees would be combining herds into one herd rather than splitting livestock into different herds.

Fencing of the existing reservoir and portion of the adjacent woody draw would assist in controlling the distribution of livestock in pasture 2 because the existing reservoir would no longer be accessible to livestock when gates are shut causing the livestock to have to use an alternate watering source. There will be a cost to install these fences, and there will be additional cost of maintenance of the fence to prevent livestock access to the reservoir and woody draw.

Adaptive Options – Fencing high-value woody draws would have little to no change in livestock distribution across the allotment. Forage within the exclosures would no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may occur on remaining forage. There will be a cost to install these fences, and there will be additional cost of maintenance of the fence to prevent livestock access to the woody draws.

Adjusting Authorized Use downward would result in fewer livestock numbers, fewer grazing days, or a combination of the two because of the turn-in permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock; however, the amount of forage harvested would be less than the existing forage harvested.

Due to the size of pastures 2 and 3, the use of herding would directly affect the distribution of the livestock away from Blacktail Creek. Herding is effective in disturbing typical distribution and would move livestock away from currently heavily grazed areas to less utilized areas. Over time, this would result in increased forage availability for livestock grazing due to the sites recovering from the heavy grazing pressure that currently exists. Initial start-up cost of hiring a rider or the permittees' time would create additional costs. Livestock grazing would occur in areas of secondary range.

Creating water gaps and hardening gaps and trails crossing Blacktail Creek in Section 24 would not change overall livestock distribution within pasture 2 because of the topography of the pasture, and livestock would still move freely across Blacktail Creek. Livestock would typically prefer the

hardened gaps and trails due to the stability of the crossing, and livestock use would also increase in the areas where gaps were placed.

Using natural materials and drift fences would decrease the amount of access points to Blacktail Creek by livestock in pasture 3, because the materials or fences would prevent livestock from using the current access points. Changes in overall livestock distribution in pasture 3 would be minimal because of the size and topography; however, use around the existing access points would decrease over time. Livestock would still have the ability to move freely up and down Blacktail Creek if all access points were not blocked by the natural materials or drift fences.

Riparian

Initial Actions – The creation of a riparian pasture to limit the time when livestock can access the stream in pasture 2 would improve riparian conditions in this reach. The new water sources developed in the riparian pasture and in pasture 2 to pull livestock away from the riparian corridor would benefit riparian conditions by minimizing bank sloughing, trailing, trampling, and loafing in the riparian area, allowing for herbaceous and woody riparian vegetation recovery.

Creating a four-pasture deferred rotation would provide some flexibility in reducing the duration of livestock grazing near Blacktail Creek. If an increase in herbaceous production should occur near the creek, then a reduction in overland flow would occur. A reduction in overland flow delivered to the creek would result in a reduction in stream velocities, allowing for the establishment of riparian vegetation which would rebuild stream banks.

Fencing of the existing reservoir and a portion of the adjacent woody draw would assist in controlling the distribution of livestock in pasture 2, which could benefit riparian conditions along Blacktail Creek and the unnamed tributary by controlling the amount and timing of use in the creek corridors.

It is expected that desired conditions on Blacktail Creek and unnamed tributary in pasture 2 would be achieved in a period from 10 to 15 years.

Adaptive Options – Fencing high-value woody draws should have no effect on riparian conditions along Blacktail Creek and the unnamed tributary because there would be no expected change in livestock distribution and the distance of separation.

Reducing Authorized Use should help improve the upland vegetation, which in turn reduces overland flow and would further benefit the riparian conditions along Blacktail Creek and the unnamed tributary. A reduction in overland flow delivered to the creek would result in reduced stream velocities, allowing for the establishment of riparian vegetation that would build stream banks.

Herding livestock out of the riparian area would benefit the riparian corridor by minimizing bank sloughing, trailing, trampling, and loafing in the riparian area, allowing for herbaceous and woody riparian vegetation recovery.

Hardening the watering areas and gaps of Blacktail Creek would benefit stream conditions through this reach by protecting banks from livestock trampling and trailing.

The addition of drift fences and native materials (e.g., juniper trees, rocks) in critical areas along the stream to control access should reduce impacts to the banks from hoof action and provide additional time for riparian plants to recover.

It is expected that desired conditions on Blacktail Creek and the unnamed tributary would be achieved in a period from 5 to 10 years.

Woody Draws

Initial Actions – Woody draw conditions would have a high potential to increase within a riparian pasture created by splitting pasture 2 into two pastures. The reduced intensity and season of grazing within the riparian pasture required to achieve and maintain PFC conditions would provide a high potential for improved woody draw conditions in the riparian pasture, north half of pasture 2.

Woody draw conditions in the south half of pasture 2 would have a lower potential to improve as a result of using the two pastures in a four-pasture deferred rotation with two pastures of other allotments. Increased livestock density associated with the shorter grazing season and decreasing pasture size would increase the evenness of grazing disturbances across the pasture, thereby maintaining or increasing the potential for high browsing and trampling disturbances within woody draws. Increased periods without browsing provided by the deferred rotation would not be sufficient for woody species to recover from and escape future browsing disturbances due to their relatively slow growth response.

Constructing a fence around a portion of an Unhealthy woody draw adjacent to a reservoir in the south half of pasture 2 would improve conditions by removing livestock browsing and trampling disturbances. Fencing of the reservoir would allow the management of livestock distribution by controlling water access, thereby increasing the potential for improved conditions of other nearby woody draws.

Drilling a new water well and constructing a water tank in each of the new pastures created by splitting pasture 2 would contribute to increased browsing and trampling disturbances and decreased conditions in adjacent woody draws in both pastures.

Current management would continue in pastures 1 and 3. These pastures contained the greatest proportion of woody draws, and At Risk conditions of more than half of the sample sites would persist. Potentially increased stocking to the level of Authorized Use would contribute to decreasing woody draw conditions. Delaying turn-in by 2 weeks appropriate for the native grass-dominated allotment would not appreciably improve woody draw conditions because this period represents a small portion of the total grazing season and use should be relatively low due to cooler temperatures and fewer insect pests.

Adaptive Options – Fencing woody draws or decreasing Authorized Use would facilitate the regeneration of desired woody species and improve woody draw conditions by removing or decreasing livestock browsing and trampling disturbances. Exclusion of livestock disturbances through fencing would provide the fastest and greatest degree of woody draw improvement, but regeneration of woody species could be impaired by increasing litter and invasive grass layers that would occur with the removal of grazing. Fencing of one woody draw would have a high potential to increase disturbances within adjacent unfenced woody draws.

Livestock herding, construction of drift fences, hardening stream crossings, and piling of juniper slash to decrease livestock disturbances and improve riparian conditions along Blacktail Creek would facilitate improved conditions and increasing extent of woody draw patches along the creek margins.

Herbaceous Structure

Initial Actions – Authorized Use exceeds the initial estimated carrying capacity, which could be amplified by the rough terrain. Creating a riparian pasture and integrating pasture 2 into a four-pasture deferred rotation could be beneficial to composition and herbaceous structure but would be limited due to the Authorized Use level. Fencing the reservoir and associated woody draw would aid herbaceous structure in the area around the development due to the loss of the attractant, (i.e., water source) depending on the size of the exclosure. But this could also lead to more use around other attractants. It is assumed that access into the reservoir would be given under specific time frames.

Adaptive Options – Adjusting the Authorized Use would be the most effective tool available to begin to adjust the herbaceous structure distribution because of an increase in residual cover. Utilizing herding could further contribute to homogenizing herbaceous structure across the pasture because of the focus of moving livestock to ensure that overuse doesn't occur in one area. Effects of fencing specific woody draws would be relative to the size and location of the exclosure(s) but is expected to result in minimal effects because of the small amount of woody draws projected to be fenced. Using on-site, encroaching juniper trees to aid in controlling livestock use in woody draws could result in an increase in herbaceous dominated areas with increased potential forage for cattle and herbage for grassland structure.

Seral Stages

Initial Actions – Shifts towards late seral stages would be facilitated in the proposed riparian pasture created by splitting pasture 2 into two pastures. Shorter grazing periods or decreased stocking levels implemented in the riparian pasture to achieve and maintain PFC conditions along Blacktail Creek would result in decreased grazing disturbances within the upland herbaceous communities with an increased potential for the development of late seral stages.

Implementing a four-pasture deferred rotation with the newly created pastures and two pastures of other allotments would increase opportunities for the development of late seral stages in the new pastures. Although increased livestock density associated with shorter grazing seasons would increase the evenness of grazing disturbances in the new pastures, shorter and fluctuating grazing seasons of the deferred rotation would increase opportunities for plant recovery and the completion of critical growth stages, which would increase plant vigor and potential shifts towards late seral stages. Increased evenness of livestock grazing would contribute to decreased accumulation of plant litter, which can assist the spread of invasive grasses. An exception may occur in the riparian pasture, where decreased levels of use might be required to maintain PFC conditions along Blacktail Creek.

Drilling a new water well and constructing pipelines to supply two water tanks in each of the new pastures created by splitting pasture 2 would result in high grazing and trampling disturbances

around the tanks with shifts to early seral stages and the potential spread of invasive grasses around the tanks and pipeline corridors.

Delaying turn-in by 2 weeks would halt premature grazing of native grasses in all pastures and assist increased plant vigor at current levels of reported use. However, continuation of current stocking levels and seasonlong use in pasture 3, and to a lesser extent in pasture 1, would decrease the potential for shifts towards late seral stages and maintain the potential for increasing invasive grasses. Potentially, increased stocking to the level of Authorized Use that is usually appreciably greater than reported use would also impede potential increases in plant vigor and seral development.

Fencing the reservoir and woody draw at the south end of pasture 2 would create the potential for development of late seral stages along the perimeter of the exclosures, but invasive grasses would have a high potential to increase and dominate in this area due to their present occurrence or conditions of woody draw habitats that are readily invaded. Managing access to the reservoir would assist in controlling livestock distribution and the potential for excessive utilization in the surrounding area.

Adaptive Options – Decreasing Authorized Use would facilitate shifts towards late seral stages in proportion to the amount of reduction compared to currently reported levels of use. Sufficiently large decreases in actual use would facilitate increased litter accumulation that would have the potential of assisting the spread and increased dominance of invasive grasses.

Implementing a variety of measures to decrease livestock access along Blacktail Creek would contribute to increased grazing disturbances in the uplands, with the potential of impeding the development or maintenance of late seral stages. Fencing woody draws would not have an appreciable effect on upland seral conditions due to the smaller size of the fence exclosures.

Sharp-tailed Grouse

Initial Actions – Authorized Use exceeds the initial estimated carrying capacity. Higher levels of livestock use would limit residual cover and habitat for grouse. However, recent AOI/AW data suggests that the allotment is currently operated at lower levels than the initial estimated carrying capacity, which could be amplified by the rough terrain. Creating a riparian pasture and integrating pasture 2 into a four-pasture deferred rotation with other allotments may be beneficial to grouse nesting habitat, assuming improvement to the herbaceous structure distribution, though higher VOR readings may not be prevalent due to the presumed Authorized Use level. Fencing the reservoir (Section 25) and associated woody draw could aid grouse nesting habitat in the area around the development due to the loss, or perhaps management, of the attractant (i.e., water source). This could also lead to more use around other water sources, reducing grouse habitat potential. Creating new water could contribute to increased potential for homogenization of herbaceous structure and, subsequently, grouse habitat.Management flexibility could be realized as well, but there are no detailed plans at this time. There are no apparent proposed changes to management in pastures 1 and 3 where the grouse lek occurs. In these pastures, it is expected that current management would retain a limited amount of potential grouse nesting habitat.

Adaptive Options – Adjusting the Authorized Use could be the most effective tool available to begin to enhance grouse nesting habitat because of increasing levels of residual cover. Utilizing herding could further contribute to homogenizing potential grouse habitat because of the focus of moving livestock to ensure that overuse doesn't occur in one area compared to another area of under-utilization. Effects of fencing specific woody draws would be relative to the size and location of the exclosure(s) but is expected to result in minimal effects to grouse nesting due to the small amount of woody draws projected to be fenced. Using on-site, encroaching juniper trees to aid in controlling livestock use in woody draws could result in an increase in herbaceous dominated areas with increased potential forage for cattle and potential grouse habitat.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3; therefore Alternative 3A would have the same effects as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- In pasture 3 on Blacktail Creek, constructing a 76-acre riparian exclosure. No grazing of exclosure for first 3 years.
- Suspending waived 154 AUMs associated with pasture 3 that have been historically non-used.
- In pasture 3, utilizing drift fences, native materials (i.e., encroaching juniper trees), rocks to control access to Blacktail Creek.

ADAPTIVE OPTIONS:

- Creating a riparian pasture in pasture 3.
- Riparian exclosure: At end of year 3 conduct vegetation survey. If survey reveals that vegetation and stream channel condition can withstand some grazing, initiate a late or dormant season compressed prescribed graze. Prescribed grazing would be identified in the AOI.
- Constructing three riparian exclosures in pasture 2 on Blacktail Creek. The exclosures are 38, 19, and 27 acres in size, respectively (Reaches 14, 15, 16).
- In pasture 3, constructing a 23-acre riparian exclosure on Blacktail Creek (Reach 18).

Range

Initial Actions – Authorized Use for this allotment would be 1,678 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 1,591 federal AMs converted to AUMs by adjusting for cow size is 1,830 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to an 8 percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have

to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment.

Constructing a 76-acre exclosure in pasture 3 on Blacktail Creek would remove approximately 34 to 37 AUMs from livestock grazing for 3 years. Authorized Use for the first 3 years would be adjusted for the loss of AUMs because forage within the exclosure would not be available to livestock. Livestock distribution changes would be minimal because of the size and location of the exclosure in relation to the overall size of pasture 3.

Suspending the waived 154 AUMs associated with pasture 3 would not have an effect on livestock grazing in pasture 3 because they have not been used for at least 10 years according to the permittee who waived the AUMs back to the MGA. MGA would no longer collect grazing fees for the 154 AUMs.

Utilizing drift fences or native materials to control livestock access to Blacktail Creek would decrease the amount of access points to Blacktail Creek by livestock in pasture 3 because the materials or fences would prevent livestock from using the current access points. Changes in overall livestock distribution in pasture 3 would be minimal because of the size and topography; however, use around the existing access points would decrease over time. Livestock would still have the ability to move freely up and down Blacktail Creek if all access points were not blocked by the natural materials or drift fences.

Adaptive Options – Creating a riparian pasture in pasture 3 would allow more control of the grazing pressure along Blacktail Creek and would change the distribution within the two pastures because the duration of livestock use would be limited to a very short period of time. An analysis of the available AUMs for the remaining pastures would be needed to see if those pastures would be able to absorb the additional livestock use; otherwise an adjustment in Authorized Use would be necessary. The initial cost of the installation of the cross fence would also be an effect of this action.

At the end of 3 years, the riparian exclosure initiated in the initial action would now become a riparian pasture, which would become available to livestock grazing. The AUMs removed would be reinstated and managers would have the ability to choose when and how much livestock grazing would occur in the riparian pasture, if vegetative surveys show that the riparian area can withstand livestock grazing. Grazing within the riparian pasture would be administered through the AOI.

Creating three additional riparian exclosures in pasture 2 would remove available AUMs from livestock grazing, because the forage within the exclosures would no longer be available for livestock grazing. Livestock distribution changes would be minimal because of the size and topography of pasture 2. However, livestock grazing pressure would switch to the uplands, because forage in the riparian areas would no longer be available. There will be a cost to install these fences and as a result there will be additional cost of maintenance of the fence to prevent livestock access to the riparian exclosures.

An additional riparian exclosure in pasture 3 would remove approximately 23 acres and associated AUMs from livestock grazing. Because the forage within the exclosure would no longer be available, and considering the size of the exclosure, there would be minimal adjustments in the

available AUMs within pasture 3. Livestock distribution changes would be minimal because of the overall size, topography, and location of existing livestock water developments.

Implementing all riparian exclosures within pastures 2 and 3 would remove forage that is currently available to livestock. Because forage is being removed from livestock, adjustments in Authorized Use would be made. Grazing pressure would change along Blacktail Creek from the existing condition because livestock would not have free access to all existing livestock crossings along Blacktail Creek. The fences associated with the exclosures would funnel livestock to areas unfenced.

Riparian

Initial Actions – The 76-acre riparian exclosure proposed for pasture 3 would provide the best opportunity for riparian vegetation to reestablish itself in the least amount of time by excluding livestock from the riparian corridor in the area treated. Typically areas recommended for exclosures have been chronically overgrazed or trampled by livestock trailing, and there is currently insufficient vegetation to protect banks and channels from erosion. The use of riparian pastures and exclosures has proven to be effective in the Little Missouri Badlands (e.g., note the riparian response within the exclosures along Ash Coulee) in reestablishing desired riparian vegetation and controlling sediment loads.

Suspending the waived 154 AUMs associated with pasture 3 would not have an effect on riparian conditions along Blacktail Creek because the related livestock use has not occurred in a long period.

It is expected that desired conditions on Blacktail Creek and unnamed tributary would be achieved in a period from 5 to 10 years.

Adaptive Options – The riparian exclosures proposed for pasture 2 and 3 would provide the best opportunity for riparian vegetation to reestablish itself in the least amount of time by excluding livestock from the riparian corridor in areas treated and preventing the related effects such as trailing and trampling. Typically, areas recommended for exclosures have been chronically overgrazed or trampled by livestock trailing, and there is currently insufficient vegetation to protect banks and channels from erosion. The use of riparian pastures and exclosures has proven to be effective in the Little Missouri Badlands (e.g., note the riparian response within the exclosures along Ash Coulee) in reestablishing desired riparian vegetation and controlling sediment loads. The creation of a riparian pasture in pasture 3 would provide greater control of animal distribution by limiting the length of season and determining the season of use of riparian areas.

It is expected that desired conditions on Blacktail Creek and unnamed tributary would be achieved in a period from 2 to 5 years.

Woody Draws

Initial Actions – Decreasing Authorized Use by 8 percent would have minimal effect on woody draw conditions because the level of potential use would remain greater than use reported for most years. The proposal of suspending 154 AUMs associated with non-use in pasture 3 by one of the permittees would result in a total decrease in Authorized Use of 16 percent after adjusting for cow size, and would affect a greater or more consistent reduction in actual use for pasture 3, with an increased potential for improved woody draw conditions.

Creating a 76-acre riparian pasture in pasture 3 would facilitate the improvement or expansion of woody draw patches that occur along the margins of the exclosure due to a 3-year rest period and relatively low grazing levels thereafter to facilitate the maintenance or trend towards PFC conditions.

Adaptive Options – The effects of fencing additional woody draws, creating several additional riparian pastures or exclosures, hardening stream crossings, herding livestock off Blacktail Creek, and decreasing Authorized Use would all provide a degree of benefit to woody draw communities by decreasing or removing livestock browsing and trampling disturbances as discussed under Alternative 3. However, additional decreases in Authorized Use would likely be required to account for the acreage of pasture affected by several potential riparian exclosures in order to avoid increased grazing disturbance throughout the remainder of the allotment that would contribute to decreased conditions of unfenced woody draws.

Herbaceous Structure

Initial Actions – By setting Authorized Use at the initial estimated carrying capacity, there could be movement of the allotment towards herbaceous structure objectives. However, recent AOI/AW data indicate that the allotment has been operating below the initial estimated carrying capacity. Creating a small riparian pasture in pasture 3, 76 acres, with no grazing for the first 3 years may create a negligible amount of High herbaceous structure due to the size of the allotment compared to the size of the pasture, the expected configuration, and the focus being on the improvement of the riparian area. Suspending the 154 AUMs within pasture 3 could contribute to improving the amount of residual cover. Utilizing various tools to control access to Blacktail Creek could increase use around existing water developments, homogenizing herbaceous structure in these areas. No management changes are apparently proposed for pastures 1 and 2 except for the AUM adjustment. However, as noted elsewhere, recent planned levels of use (via AOIs/AWs) indicate operations are below the Authorized Use level after adjusting for initial estimated carrying capacity and cow size. Therefore, effects to herbaceous structure from the adjustment to AUMs would be limited and perhaps be similar to existing conditions

Adaptive Options – Adjusting the Authorized Use would be the most effective tool available to adjust herbaceous structure towards meeting project objectives because of potential positive changes in residual cover. However, recent AOI/AW data suggests that allotment is currently operating below the initial estimated carrying capacity. Therefore, depending on how much below initial estimated carrying capacity the allotment is operating, appreciable changes to herbaceous structure may not be expected initially. Creating another riparian pasture in pasture 3 would have similar effects as the initially created riparian pasture in the Initial Actions: it is not expected that an appreciable amount of potential upland habitat types would be available to improve the herbaceous structure distribution. Creating a 23-acre riparian exclosure in pasture 3 would, again, contribute a negligible amount of potential upland habitat toward the herbaceous structure distribution. Creating three small riparian exclosures in pasture 2 would have, generally, the same effects as the aforementioned riparian pastures in pasture 3. These pastures may be somewhat permanent due to the small sizes and general lack of upland habitat potential.

Seral Stages

Initial Actions – Decreasing Authorized Use by 8 percent would have minimal effect to seral conditions because the level of potential use would remain greater than use reported for most years. The proposal of suspending 154 AUMs associated with non-use in pasture 3 by one of the permittees would result in a total decrease in Authorized Use of 16 percent after adjusting for cow size, and would affect a greater or more consistent reduction in actual use for pasture 3 with the potential of facilitating shifts towards late seral stages.

Constructing a 76-acre riparian pasture/exclosure along Blacktail Creek in pasture 3 would have a small affect on upland seral conditions because the exclosure would comprise less than 4 percent of the pasture.

Adaptive Options – Construction of several additional riparian pastures would contribute to increased use of upland herbaceous communities with the potential to impede the development of late seral stages unless stocking levels are decreased accordingly. Decreasing the level of Authorized Use would facilitate shifts towards late seral stages in proportion to the amount of reduction in actual use and decreased grazing and trampling disturbances.

Sharp-tailed Grouse

Initial Actions – Sharp-tailed grouse habitat would be enhanced under this alternative over the next 10 to 15 years due to the changed Authorized Use level. However, recent AOI/AW data indicate that the allotment has been operated below the initial estimated carrying capacity which may nullify or limit the amount of improvement in grouse habitat from the initial changes in Authorized Use. Creating a small riparian pasture in pasture 3 with no grazing for the first 3 years may create a small amount of grouse habitat. However, the riparian pasture could promote an ecological trap for grouse due to its location, shape, and vegetative composition that may receive increased attention from predators (Manzer and Hannon 2005). Suspending the 154 AUMs within pasture 3 could contribute to improving the amount of residual cover and improve potential grouse nesting habitat within that pasture. Utilizing various tools to control access to Blacktail Creek could increase use around existing water developments, homogenizing habitat structure in these areas. No management changes are apparently proposed for pastures 1 and 2 except for the AUM adjustment, which would likely result in no changes to the herbaceous structure distribution; therefore, the change will not enhance grouse nesting habitat. Recent planned use indicates operations are below the initial estimated carrying capacity at this time.

Adaptive Options – Adjusting the Authorized Use could be the most effective tool available to improve residual herbaceous structure and enhance potential grouse nesting and brooding habitat. Creating another riparian pasture in pasture 3 could have similar effects as the initially proposed riparian pasture proposed in the Initial Actions. It is not expected that an appreciable amount of potential upland habitat types would be available to improve the herbaceous structure distribution. The construction of three riparian exclosures in pasture 2, entailing approximately 84 acres, and one in pasture 3, of about 23 acres, may have similar effects as the riparian pasture in the proposed Initial Action. These even smaller exclosures could create ecological traps for grouse by promoting increased attention from predators.

ALLOTMENT 258

Table 258.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 258 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 3.65 – Rangelands With Diverse Natural-Appearing Landscapes	5393	96	
Management Area 6.1 – Rangeland With Broad Resource Emphasis	213	4	
Total allotment acres	5792	100	
NFS acres	5605	97	
State land acres	7	0	
Private land acres	180	3	
Current permitted livestock grazing (AMs) on NFS lands			2071
Initial estimated carrying capacity (AUMs) on NFS lands			1694
Number of pastures containing NFS lands			2

Table 258.2 — Allotment 258 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	The 98/99 survey rated Ash Coulee Creek as FAR-NA and FAR-D. The 2006 survey rated the creek as PFC for 2 miles and FAR-D for 0.5 miles.	Move FAR-D reach of Ash Coulee Creek towards PFC.
Woody draws	86 percent of the sampled woody draws are Healthy and 14 percent are Unhealthy due to low regeneration.	Maintain current woody draw conditions.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Below Objectives High – Below Objectives 2004 Transects: 2.69; 1.15; 2.34; 1.74; 1.1; 1.46; 1.3; 1.05; 1.53; 1.3. 2004 Stations percent: Low-60.5/Moderate-35.5/ High-4 2005 Transects: 1.0; 1.38; 1.13 2005 Stations percent: Low-85/Moderate-15/ High-0	Manage for additional Moderate and High structure on biologically capable habitats.
Seral stages	Of five sample sites, four were at mid seral stages and one was at a late seral stage. All sites contained light to moderate amounts of invasive grass, but there is a moderately high potential for seral objectives to be met.	Maintain dominance of native grass communities and limit or decrease the spread of invasive grasses.
Sharp-tailed grouse	There are no known sharp-tailed grouse leks within the allotment. One lek is within a 1-mile radius of the allotment. The approximate overlap encompasses 840 acres.	Manage to enhance sharp-tailed grouse nesting and brooding habitat by increasing the quality and quantity of High vegetative structure on biologically capable sites.
Remarks	Approx. 2 acres of Canada thistle, leafy spurge, and burdock are being treated. Sensitive plant species blue-eyed Mary (*Collinsia parviflora* Dougl. ex Lindl.) and Hooker's Townsendia were found in this allotment; however the populations are not being affected by livestock grazing.	

Table 258.3 — Allotment 258 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action	Alternative 3A	Alternative 4
• Authorized Use is 2071 federal AMs. • Three-year average permitted use is 1510 federal AMs.* • Permit type: Turn-in (Common Allotment). • Rotation: Two-pasture deferred rotation. • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 2071. • Manage livestock tank system to better distribute livestock. • Extend pipeline proposed in Allotment 136 and place tank in north central portion of pasture 1 to draw cattle away from Ash Coulee Creek. • Create a 3-acre riparian exclosure by installing a fence in the southwest quarter of the northeast quarter of Section 13 north of Ash Coulee Creek; allow prescribed grazing once riparian area has reached PFC (or if excess litter builds up) as directed by the AOI/AW. **Adaptive Options** • Fence high-value woody draws. • Adjust Authorized Use. • Add a tank to the existing rangeland pipeline in the southwest quarter of Section 7.	**Initial Actions** • Authorized federal AMs: 2071. • Manage livestock tank system to better distribute livestock. • Extend pipeline proposed in Allotment 136 and place tank in north central portion of pasture 1 to draw cattle away from Ash Coulee Creek. • Create a 3-acre riparian exclosure by installing a fence in the southwest quarter of the northeast quarter of Section 13 north of Ash Coulee Creek; allow prescribed grazing once riparian area has reached PFC (or if excess litter builds up) as directed by the AOI/AW. • On native pastures, defer turnout until the second or third week of May. **Adaptive Options** • Fence high-value woody draws. • Adjust Authorized Use. • Add a tank to the existing rangeland pipeline in the southwest quarter of Section 7.	**Initial Actions** • Authorized federal AUMs: 1694. • Manage livestock tank system to better distribute livestock. • Extend pipeline proposed in Allotment 136 and place tank in north central portion of pasture 1 to draw cattle away from Ash Coulee Creek. • Create a 3-acre riparian exclosure by installing a fence in the southwest quarter of the northeast quarter of Section 13 north of Ash Coulee Creek; allow prescribed grazing once riparian area has reached PFC (or if excess litter builds up) as directed by the AOI/AW. **Adaptive Options** • Fence high-value woody draws. • Add a tank to the existing rangeland pipeline in the southwest quarter of Section 7. • Adjust Authorized Use.

Alternative 2 - Current Management	Alternative 3 - Proposed Action	Alternative 3A	Alternative 4
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every 3 years. • Complete Properly Functioning Condition survey once every 3 years then once every 5 years if a positive trend has been established. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3.	**Monitoring** • Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 258 — Existing Condition

Range – This allotment is approximately 5,792 acres in size and contains private, state, and NFS lands with 5,605 acres of NFS lands. This allotment is a common and is divided into two pastures. The allocated AMs for this allotment are divided among five permittees. Currently, the common is permitted through each permittees' associated headquarters permit by the MGA; however, one permittee has no associated headquarters allotment and is issued a turn-in permit for the common. The present AMs, including NFS lands, state land and private lands, allocated to this allotment are 2,140; however, in the past 5 years there have been drought reductions of which 3 of those 5 years the permittees have taken voluntary reductions. They have been running between 1,300 and 1,500 AMs. Current AMs provided by NFS lands can be found in Table 258-1. This allotment is located in the Badlands geographic area. Water developments within this allotment include a spring development, a well and pipeline system with stock tanks, and reservoirs. The current management has been a two-pasture deferred rotation.

Pasture 1 is the larger of the two pastures with approximately 3,825 acres. The northern portion of this pasture is fairly rough with badlands topography. This portion of the pasture has been affected by a fire that occurred in the late 1980's, which is the same fire that had effects in Allotment 135. There is evidence that the north-facing slopes contained Rocky Mountain juniper, but now these areas consist of herbaceous and deciduous woody species. The northern portion of this pasture also has areas that have a mixture of native and crested wheatgrass. Crested wheatgrass areas are very noticeable. These communities are from old reclaimed oil roads and well pads. Livestock distribution is affected by the topography in this pasture, so the south portion of this pasture receives the majority of the grazing pressure and therefore, has a good dominant blue grama

expression in the plant community. In the south portion of this pasture desirable species such as needle and thread grass, western wheatgrass, and green needle grass within and adjacent to the blue grama flats can be located. Crested wheatgrass is also present along Forest System Road 738 and in areas that have been disturbed by oil and gas activity. The very eastern portion of Section 8 does receive heavier grazing than the north-central portion of the allotment; however, topography again plays a role in this. Again, blue grama expresses itself well in this eastern portion, and one will also find crested wheatgrass and some Japanese brome in areas of disturbance.

Pasture 2 is approximately 1,967 acres in size. This pasture is fairly well watered, and distribution of livestock is more even throughout, with the exception of the far south portion of the pasture, where it gets into more of the rough badland topography. Pasture 2 also has the majority of Ash Coulee running through the North portion of the pasture. On a September 8, 2004 visit, livestock were dispersed throughout the pasture. Cattle were observed on the north-facing slopes going down into Ash Coulee.

Common to both pastures is the number of gullies or steep drainages that can be found. These drainages alter the distribution of the livestock. If livestock access one side of the drainage, they need to go all the way back down to the road and cross to get to the other side. Due to this condition, livestock trailing is very evident in certain areas of both pastures.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there are approximately two acres of leafy spurge, Canada thistle, and burdock. There are scattered patches of Canada thistle within the old burn area, but they're difficult to access. The Billings County weed board has been informed of these infestations and has made an attempt to control some of these infestations.

Oil and gas development on NFS lands in this allotment has removed a total of approximately 104.9 acres from livestock access. A total of approximately 68.4 acres of oil and gas pads and access roads have been reclaimed and are or will be available for livestock access. Associated forage from these acres is approximately 28.7 and 18.6 AUMs, respectively.

Riparian –

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
258-02	Ash Coulee (0)			1.13			1.13
258-01	Ash Coulee (1)	0.06					0.06
258-01	Ash Coulee (2)				0.32		0.32
258-02	Ash Coulee (1)	1.15					1.15
258-02	Ash Coulee (2)				0.13		0.13
258-02	Ash Coulee (3)	0.8					0.8

Ash Coulee (reaches 0, 1, 2 and 3) flow through Allotment 258. In the 1998 and 1999 surveys, these reaches of Ash Coulee had functionality ratings of FAR-NA and FAR-D. Small livestock exclosures (Figure 258.1a and b) were constructed along the most severely degraded reaches of Ash Coulee. The IDT resurveyed Ash Coulee in 2006 and gave a functionality rating of FAR-D to 0.5 miles of channel and a functionality rating of PFC to 2.0 miles of channel. Much of the improvement in the past decade is attributed to the livestock exclosures, which have permitted

establishment of adequate riparian vegetation to stabilize banks, reduce erosion, and decrease sediment transport.

The degraded reach occurs in a fenced corner where Ash Coulee flows from pasture 2 into pasture 1 and then back into pasture 2. Livestock tend to bunch in this reach. Problems with this reach include:

- Lack of regeneration of woody plants, especially willows and cottonwood trees.
- Poor conservation of water in the riparian zone due to high, flashy stream flows.
- Paucity of riparian plants to stabilize banks and to prevent erosion.
- Excessive erosion of point bars.
- Lateral bank migration from bank sloughing.
- Invasion of upland plants (such as the weakly rooted Kentucky bluegrass) into riparian zone due to poor conservation of rangeland and riparian moisture.

Ash Coulee reach 0 was rated as FAR-NA in the 1998 survey and was not reevaluated in 2006.

Figure 258.1a — The reaches of Ash Coulee within livestock exclosures have attained riparian functionality ratings of PFC in less than 5 years. Riparian vegetation has established on the banks and effectively trapped sediment that is transported from reaches upstream of the exclosures. Leafy spurge infestations have nearly completely disappeared within the exclosures as desired riparian vegetation and high soil moisture have largely driven the noxious weed out of the exclosure reaches.

Figure 258-1b. — Within the exclosures, the channel of Ash Coulee is aggrading, channel width depth ratios have been modified, the floodplain has been rebuilt, flood processes have been restored, and moisture is stored in the alluvial banks. The floodplain is regularly inundated with floodwaters (note the return flow rilling across the natural levee). The two livestock exclosures along Ash Coulee prove that rapid riparian recovery is possible when livestock access to stream channels is carefully controlled.

Figure 258.1c — Outside the livestock exclosures, the channel of Ash Coulee has a high width depth ratio, high rates of channel and bank erosion, high rates of sediment transport, and very little riparian vegetation.

Woody Draws – Woody draw communities were sparse relative to the size of the pastures and usually occurred as small patches, with more extensive Rocky Mountain juniper woodlands occurring on steep north aspect slopes. Of seven woody draw samples, 86 percent were Healthy and 14 percent were Unhealthy.

Herbaceous Structure – In 2004, 10 randomly selected herbaceous dominated VOR transects were surveyed. Six transects were measured in the Low structure class and four transects were measured in the Moderate class. No High structure transects were measured. The consolidated station averages were Low structure stations at 61 percent and Moderate stations at 36 percent. Approximately 4 percent of the stations were measured in the High category ($\geq$5.5 inches).

Three of these transects were resurveyed in 2005. All three measured in the Low structure class. Two of three transects showed a lower VOR than the 2004 reading. The station data showed 85 percent of the stations were Low and 15 percent were Moderate. No High structure stations were measured.

Seral Stages – Of five NDSU and sere plots, four were at mid seral stages and one was at a late stage. The allotment contained minimal area of broken land, but oil and gas related disturbances were relatively high and contributed to areas of crested wheatgrass and annual brome. Road networks and associated culverts have contributed to several deeply downcut drainages that have lowered water tables, impaired hydrologic function, and inhibited livestock distribution in some areas of the allotment. Significant portions of both pastures, but especially the north half of pasture 1, contained barren land and rugged topography that impede livestock access and distribution. Short grass species of blue grama and sedges often dominate primary use areas in both pastures.

An NDSU sample plot on a Loamy ecological site in pasture 1 was at a mid-early to early seral stage with high amounts of blue grama, sedge, and clubmoss. Needle-and-thread was the dominant late seral grass from biomass clippings, and Kentucky and Canada bluegrass constituted about 11 percent of the grass production. A sere plot on the west side of the pasture was at a late-mid seral stage with only light amounts of Kentucky bluegrass and annual brome. Several Robel transects and belt transects supported the dominance of native grasses with occasional areas of bluegrass, and

tended to suggest mid seral stages of western wheatgrass, blue grama, or needle-and-thread, and sedge.

Two NDSU samples on Claypan ecological sites in pasture 2 were at mid seral stages with dominance of western wheatgrass and needle-and-thread. Bluegrass and lesser amounts of annual brome comprised about 7 percent of the average grass production from the clipped plots. Intermediate wheatgrass was also present. A sere plot in pasture 2 was at a mid seral stage with dominance of western wheatgrass, blue grama, needle-and-thread, and high amounts of moss. Similar to pasture 1, a belt transect and several Robel transects supported the dominance of native grasses with occasional areas of invasive grasses.

Sharp-tailed Grouse – There are no known sharp-tailed grouse leks within the allotment. One lek is within 1-mile radius of the allotment. The approximate overlap encompasses 840 acres.

Effects of Alternative 1

Initial Actions:

- After notification to the affected permittee, all livestock would be removed 2 years later.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would now be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian condition along Ash Coulee, as described in the existing condition, would improve and evolve toward desired riparian conditions over time. Improvement would result from the establishment of riparian vegetation, which would capture sediment and build stream banks.

Woody Draws –At Risk and Healthy woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. The relatively small extent of existing woody draw patches would have an increased potential to increase in extent. Invasive grasses within woody draws, and potential increases of these species as a result of increasing litter with the removal of livestock grazing, would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock, there would be an appreciable increased opportunity for the development of High and Moderate herbaceous structure and a decrease in the amount of Low herbaceous structure on biologically capable habitats.

Seral Stages – The removal of livestock grazing disturbances would facilitate shifts toward late seral stages. Increased litter accumulation that would occur with the removal of grazing would assist

the spread of invasive grasses, but native grass communities would persist for an extended length of time in large areas of both pastures due to the currently low proportion or extent of invasive grasses.

Sharp-tailed Grouse – The increase in potential High structure grasslands from the removal of livestock would enhance nesting and brooding habitat for sharp-tailed grouse. However, over time (>10 to 15 years) the potential decrease in forb diversity could decrease grouse foraging opportunities. Also, over time (>10 to 15 years), nesting and brooding quality could also decrease because of lower quality habitat associated with potential invasive grasses that could invade the pastures.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by turn-in (Common Allotment) grazing association permits, and Authorized Use is 2071 federal AMs.
- Cow/calf pairs are run in a two-pasture deferred rotation.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weed control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian conditions along Ash Coulee, as described in the existing condition, would continue.

Woody Draws – Consistent stocking at levels reported during 2005 through 2008 according to annual fluctuations in precipitation and plant production would facilitate the persistence of 86 percent Healthy woody draw conditions. Increased stocking at the present level of Authorized Use, which exceeds initial estimated carrying capacity by 41 percent after adjusting for cow size, would increase browsing and trampling disturbances and decrease woody draw conditions.

Herbaceous Structure – Current management would continue to perpetuate the herbaceous structure distribution with a limited potential to improve the herbaceous structure distribution. Retaining the current Authorized Use level is projected to continue to promote a lack of residual cover although recent AOI/AW data indicates that the allotment is operating below the initial estimated carrying capacity after accounting for cow size. The two-pasture deferred rotation does not generally promote regrowth.

Seral Stages – Continued stocking at levels reported during 2005 through 2008 that have been at or less than initial estimated carrying capacity would result in the persistence of mid to mid-early seral stages in primary use areas. Turn-in dates during May that are premature for native grasses during most years would impede plant vigor, production, and the development of late seral stages. The initial estimated carrying capacity likely exceeds true carrying capacity because adjustments were

not implemented for steep slopes and long distances to water, which are particularly influential in this allotment. Current forage production in primary use areas is likely to be lower than assumptions used to estimate carrying capacity, potentially contributing to an overestimate of carrying capacity. Potentially, increased stocking towards the level of Authorized Use that exceeds initial estimated carrying capacity by 41 percent would facilitate shifts towards early seral stages and increase the potential for invasive grass expansion.

Sharp-tailed Grouse – Existing management actions would not enhance grouse nesting and brooding habitat. Retaining the current Authorized Use level is projected to continue to promote a lack of residual cover even though recent AOI/AW data indicates that the allotment is operating below the initial estimated carrying capacity after accounting for cow size. The two-pasture deferred rotation does not promote regrowth and enhancement of grouse habitat.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 2,071 federal AMs.
- Managing livestock tank system to better distribute livestock.
- Extending pipeline proposed in Allotment 136 and placing a tank in north-central portion of pasture 1 to draw cattle away from Ash Coulee Creek.
- Creating a 3-acre riparian exclosure by installing a fence in the southwest quarter of the northeast quarter of Section 13 north of Ash Coulee Creek; allow prescribed grazing once riparian area has reached PFC (or if excess litter builds up) as directed by the AOI/AW.

ADAPTIVE OPTIONS:

- Fencing high-value woody draws.
- Adjusting Authorized Use.
- Adding a tank to the existing rangeland pipeline in the southwest quarter of Section 7.

Range

Initial Actions – Because the initial Authorized Use would remain the same as current management, the permittees would be allowed to harvest the same amount of forage.

Managing livestock tanks to better distribute livestock would reduce livestock grazing pressure within the surrounding areas of the existing tanks. It would create a rotation within the pasture by manipulating the water availability in a particular area. However, this would increase the intensity of management because if tanks were left off or on too long, excess grazing pressure in areas where the stock tanks are on could occur. Stock tank management would allow areas of the pastures to be deferred and would allow a recovery period for herbaceous species before being grazed. Livestock would still have access to the whole pasture; however, due to the topography, size of pastures, location of existing developments, and existing gullies, livestock would be more likely to graze in the area surrounding the water development(s) left on.

Extending the pipeline proposed in Allotment 136 and adding a stock tank to the northern end of pasture 1 would allow for more flexibility in stock tank management, reducing grazing pressure in

heavily grazed areas along Ash Coulee Creek, and evening out the grazing pressure throughout the pasture. Currently there are no water developments in the proposed area of the pasture. A permittee within the common is currently placing supplements and herding livestock to this area; however, the permittee has had limited success in the early portion of the grazing season due to topography, climatic conditions, distance to reliable water, and supplemental needs of the livestock compared to the latter portion of the grazing season.

Creating a 3-acre riparian exclosure in the southwest quarter of the northeast quarter of Section 13 north of Ash Coulee creek would not have any effect on Authorized Use or the distribution of livestock within this pasture because of the small size of the proposed exclosure.

Adaptive Options – Fencing high-value woody draws would have little to no change in livestock distribution across the allotment. Forage within the exclosures would no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may occur on remaining forage. There will be a cost to install these fences, and there will be the additional cost of maintenance of the fence to prevent livestock access to the woody draws.

Adjusting Authorized Use downward would result in fewer livestock numbers, fewer grazing days, or a combination of the two because of the turn-in permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock; however, the amount of forage harvested would be less than the existing forage harvested.

Adding a tank in the southwest quarter of Section 7 would aid in controlling livestock grazing pressure in areas of the associated pasture because tanks could be turned off and on. It would also be another tool to draw livestock away from Ash Coulee Creek and reduce the grazing pressure along Ash Coulee Creek.

Riparian

Initial Actions – Managing the livestock tank system to better distribute livestock would benefit riparian conditions along Ash Coulee Creek by shortening the period of use on the riparian corridor. If livestock use on the riparian corridor was shorter, conditions would improve by minimizing trailing and trampling allowing for riparian vegetation maintenance or recovery.

Developing rangeland water and the installation of a stock tank in pasture 1 would move livestock concentration away from the riparian stream corridor and improve riparian conditions. Riparian conditions would improve by minimizing trailing and trampling in the riparian area, allowing for herbaceous and woody riparian vegetation recovery.

The riparian exclosure is a direct attempt to improve riparian conditions along Ash Coulee Creek by protecting stream banks and riparian vegetation from excess livestock use. Two other exclosures along Ash Coulee have led to rapid improvement in riparian conditions. A similar improvement is likely here.

There are no specific actions proposed to restore Ash Coulee reach 0 to desired conditions.

It is expected that desired conditions on Ash Coulee Creek, pasture 1 would be achieved in a period from 5 to 10 years.

Adaptive Options – Fencing high-value woody draws should have no effect on riparian conditions along Ash Coulee Creek because there would be no expected change in livestock distribution and the distance of separation.

Reducing Authorized Use should help improve the upland vegetation, which in turn reduces overland flow and would further benefit the riparian conditions along Ash Coulee Creek. A reduction in overland flow delivered to the creek would result in reduced stream velocities, allowing for the establishment of riparian vegetation which would build stream banks.

Developing rangeland water and the installation of a stock tank in Section 7 would move livestock concentration away from the riparian stream corridor and improve riparian conditions. Riparian conditions would improve by minimizing trailing and trampling in the riparian area, allowing for herbaceous and woody riparian vegetation recovery.

It is expected that desired conditions on Ash Coulee Creek would be achieved in a period from 5 to 10 years.

Woody Draws

Initial Actions – Existing woody draw conditions of 86 percent Healthy would likely persist under levels of use reported during 2004 through 2008, which are adjusted according to annual fluctuations in precipitation and plant production, and that have ranged from slightly to greatly less than initial estimated carrying capacity. Potentially, increased stocking at the level of Authorized Use, which is 41 percent greater than estimated carrying capacity, would increase browsing and trampling disturbances and decrease woody draw conditions.

Adding a fourth water tank in pasture 1 would increase the evenness of livestock distribution and utilization with the potential for decreasing the extent of secondary range. Depending on final location of the tank, browsing and trampling disturbances would increase and conditions would decrease in any adjacent woody draws. Managing the existing and proposed water sources to control livestock distribution could alleviate high or excessive woody draw utilization around individual water sources, but portions of Ash Coulee Creek and areas around a dugout pond and developed spring would require fencing or reclamation for maximum effectiveness of water tank management. Several permittees graze separate livestock herds in the allotment while maintaining the deferred rotation between the two pastures, with each permittee likely grazing different portions of each pasture. Potentially, decreased use and increasing woody draw conditions around Ash Coulee and other watering sites would be countered by increased use and decreasing conditions around the new water tank.

Constructing a 3-acre riparian pasture along a short segment of Ash Coulee Creek would facilitate improved conditions of the riparian system and small woody draw patches along the margins of the fenced exclosure by decreasing livestock browsing and trampling disturbances.

Adaptive Options – Fencing woody draws or decreasing Authorized Use would facilitate the regeneration of desired woody species and increase woody draw conditions by removing or decreasing livestock browsing and trampling disturbances. Exclusion of livestock disturbances through fencing would provide the fastest and greatest degree of woody draw improvement, but regeneration of woody species could be impaired by increasing litter and invasive grass layers that

would occur with the removal of grazing. Fencing of one woody draw would have a high potential to result in increased disturbance within adjacent unfenced woody draws.

Adding a fifth water tank in the southwest quarter of Section 7 in pasture 1 would increase the evenness of livestock grazing but would not appreciably effect the proportion of 86 percent Healthy woody draws because of the low development of woody draw patches in this area.

Herbaceous Structure

Initial Actions – The Authorized Use exceeds the initial estimated carrying capacity by approximately 29 percent after accounting for cow size. Recent AOI/AW data indicate that the allotment is generally operating under the initial estimated carrying capacity. The rough terrain (which may not be accounted for in the initial estimated carrying capacity) found in large portions of this allotment could be contributing to resource issues such as herbaceous structure due to its effect on the distribution of livestock and the forage resources. Creating a riparian exclosure could create positive results in herbaceous structure within the exclosure but would include very limited amounts of potentially suitable habitats due to its small size (3 acres). Adding a water tank to the northern portion of pasture 1 could homogenize herbaceous structure due to increased livestock dispersal. Managing the water tank system could promote management flexibility; however, it does not appear that a management system is proposed at this time, so the effects of such are unknown.

Adaptive Options – Adjusting the Authorized Use would be the most effective tool available to begin to adjust the herbaceous structure towards meeting project goals. Adding a water tank in Section 7 would further homogenize herbaceous structure because of the density of existing water sources currently paralleling Ash Coulee. Fencing specific woody draws could have effects relative to the size and location of the exclosure but is expected to be negligible due to the already existing positive woody draw health rating within the allotment and the small amount of woody draws to be fenced in the context of a larger allotment.

Seral Stages

Initial Actions – Continued stocking at currently reported levels that have generally been appreciably less than initial estimated carrying capacity would result in the persistence of high utilization and the predominance of mid to mid-early seral stages in primary use areas. Potentially increased stocking to the level of Authorized Use that exceeds initial estimated carrying capacity by 41 percent would facilitate shifts towards early seral stages and increase the potential for spreading invasive grasses. Delaying turn-in dates until June 1st would increase plant vigor and production of native grasses by providing greater opportunity for the completion of critical spring growth stages, but would be unlikely to facilitate shifts towards late seral stages in primary use areas. Resistance to invasive grass establishment or spreading may increase with the resulting increase in plant vigor.

Adding an additional water tank in pasture 1 would increase the evenness of livestock grazing and reduce the mosaic of grazing pressure. Potential decreases in grazing disturbance around existing water sources would be countered by increased disturbance around the new tank. However, adverse effects to native plant communities associated with the new tank could be avoided by placing it in an area of broken land/crested wheatgrass at the north end of Section 7. Based on the assumption of different portions of the pasture acreage allocated to different permittees and livestock herds,

management of the tank system would likely result in even or moderate utilization around each of the tank locations.

Constructing a 3-acre riparian exclosure along Ash Coulee Creek would increase plant vigor and facilitate shifts towards late seral stages along the perimeter of the exclosure by decreasing grazing disturbances, but would have a high potential to result in an increase of invasive grasses as assisted by increased plant litter.

Adaptive Options – Decreasing Authorized Use would increase the potential for facilitating increased plant vigor, production, and shifts towards late seral stages, but reductions of about 40 percent would be required to achieve a consistent reduction in actual use compared to currently reported use.

Adding another water tank to pasture 1 would further decrease the mosaic of grazing pressure and seral stages, with slight decreases in grazing disturbances around existing tanks countered by increased disturbance around the new tank.

Sharp-tailed Grouse

Initial Actions – Authorized Use exceeds the initial estimated carrying capacity, though recent AOI/AW data indicate that the allotment is generally operating under the initial estimated carrying capacity after accounting for cow size. The rough terrain (which may not be accounted for in the initial estimated carrying capacity) found in large portions of this allotment could be contributing to resource issues such as a lack of residual cover for nesting grouse. Creating a riparian pasture would create negligible increases in nesting habitat due to the very small size (3 acres). Adding a water tank to the northern portion of pasture 1 could homogenize herbaceous structure due to increased livestock dispersal. Managing the water tank system could promote management flexibility and grouse habitat; however, at this time a management plan isn't known, so the effects of such are unknown at this time.

Adaptive Options – Adjusting the Authorized Use would be the most effective tool available to begin to adjust grouse nesting habitat towards meeting project goals. Adding a water tank in Section 7 would further homogenize herbaceous structure, maintaining residual cover levels, due to the density of existing water sources currently paralleling Ash Coulee. Fencing specific woody draws could have effects relative to the size and location of the exclosure(s) but is expected to be minimal due to the already existing positive woody draw health rating within the allotment and the small amount of woody draws to be fenced in the context of a larger allotment.

Effects of Alternative 3A

The effects of Alternative 3A are the same as Alternative 3 with the following stated exceptions.

INITIAL ACTIONS:

- On native pastures deferring turnout until the second or third week of May.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 3A are the same as Alternative 3.

Range
Initial Actions – This action would not be any different than current management for this allotment. In most years given average climatic conditions, livestock grazing would begin on native grasses before range readiness has been reached.

Riparian
Initial Actions – This alternative is the same as Alternative 3 except for an adjustment in the timing of turnout. The effects are the same as Alternative 3.

Woody Draws
Initial Actions – Allowing continued turn-in onto the native dominated pasture during mid-May would not have an appreciable influence on woody draw conditions because cooler temperatures and fewer insects during the latter half of May result in relatively low levels of woody draw use compared to the remainder of the summer grazing season.

Herbaceous Structure
Initial Actions – The effects of not allowing turnout on native pastures until the second or third week of May is not different than current management. This action would continue the low potential to achieve a balanced herbaceous structure distribution on the allotment.

Seral Stages
Initial Actions – Premature grazing of native grasses during May can contribute to decreased plant vigor, production, and shifts towards early seral stages. These effects can be compounded when repeated on an annual basis and with frequent years of below normal precipitation. Continuation of May turn-in dates would contribute to the persistence of mid and mid-early seral stages and increase the susceptibility of plant communities to invasive grass establishment or spreading within primary use areas. There is an excess of underutilized crested wheatgrass and invasive grass pastures in other allotments within the project area that could be effectively utilized in the current or similar situations where permittees desire an early season pasture, and where an early season pasture could contribute to improvement of native dominated pastures.

Sharp-tailed Grouse
Initial Actions – On native pastures, deferring turnout until the second or third week of May would have the same effects as described in Alternative 3.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 4 are the same as Alternative 3.

Range

Initial Actions – Authorized Use for this allotment would be 1,694 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 2,071 federal AMs converted to AUMs by adjusting for cow size is 2,382 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 29 percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment.

Riparian

Initial Actions – Reducing Authorized Use from 2,071 AMs to 1,694 AUMs should help improve the uplands vegetation, which in turn reduces overland flow and would benefit the riparian condition along Ash Coulee as described above.

It is expected that desired conditions on Ash Coulee would be achieved in a period from 5 to 10 years.

Adaptive Options – The effects would be the same as described previously in Alternative 3.

It is expected that desired conditions on Ash Coulee would be achieved in a period from 5 to 10 years.

Woody Draws

Initial Actions – The effects of adding another water tank, managing the tank system, and creating a small riparian exclosure were discussed under Alternative 3. Decreasing Authorized Use by 29 percent according to initial estimated carrying capacity and adjustments for cow size would create potential levels of use 3 to 55 percent greater than use reported during 2005 through 2008. Current woody draw conditions would be maintained with recently reported levels of use, but would have the potential to decrease with consistent stocking at the proposed level of Authorized Use.

Adaptive Options – The general effects of fencing woody draws, decreasing Authorized Use, and adding a second additional water tank in pasture 1 were discussed under Alternative 3. Decreases in Authorized Use would have an increased potential to maintain or improve woody draw conditions due to the lower starting point from which reductions would occur.

Herbaceous Structure

Initial Actions – Adjusting the Authorized Use to approximate the initial estimated carrying capacity and accounting for cow size could result in an improvement in the potential to improve the herbaceous structure distribution within the allotment if it is assumed the allotment was being operated at this level. However, AOI/AW information indicates that the permittee(s) already operate

approximately at, or below, the initial estimated carrying capacity, after accounting for cow size. Therefore, adjusting the Authorized Use to a level that is already being operated at (or perhaps lower) would not likely alter herbaceous structure conditions at this time.

Seral Stages

Initial Actions – The effects of adding another water tank, managing the tank system, and creating a riparian pasture were discussed under Alternative 3. Decreasing Authorized Use by 29 percent according to initial estimated carrying capacity and adjustments for cow size would create potential levels of use 3 to 55 percent greater than use reported during 2005 through 2008. Current seral stages or trends in plant composition would be maintained at recently reported levels of use, but shifts towards early seral stages would occur with consistent stocking at the proposed level of Authorized Use.

Adaptive Options – Further decreases in Authorized Use would have an increased potential to maintain or increase seral stages due to the lower starting point from which reductions would occur.

Sharp-tailed Grouse

Initial Actions – Adjusting the Authorized Use to approximate the initial estimated carrying capacity could result in an improvement in the potential to enhance grouse nesting habitat within the allotment if it is assumed the allotment was being operated at the Authorized Use level. However, AOI/AW information indicates that the permittee(s) already operate approximately at, or below, the initial estimated carrying capacity, after accounting for cow size. Therefore, adjusting the Authorized Use to a level that is already being operated at (or less) would not likely alter residual cover conditions, thus no enhancement of grouse nesting conditions would occur at this time.

ALLOTMENT 272

Table 272.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 272 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 6.1 – Rangeland With Broad Resource Emphasis	2956	100	
Total allotment acres	2979	100	
NFS acres	2956	99	
State land acres	0	0	
Private land acres	23	1	
Current permitted livestock grazing (AMs) on NFS lands			1473
Initial estimated carrying capacity (AUMs) on NFS lands			1472
Number of pastures containing NFS lands			3

Table 272.2 — Allotment 272 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	There are no perennial or intermittent stream reaches in this allotment.	None
Woody draws	50 percent of the sampled woody draws are At Risk and 50 percent are Unhealthy. In the At Risk woody draws seedling/saplings are present but they are being continually grazed back. Unhealthy woody draws exhibit greater livestock trailing and less tree regeneration than the At Risk draw and only patchy shrub layers.	Establish tree regeneration and promote seedling/ sapling survival.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Meeting Objectives High – Below Objectives 2004 Transects: 1.09; 1.51; 2.49; 1.69; 1.0; 1.85; 1.08; 1.49 2004 Stations percent: Low-60.6/Moderate-39.4/ High-0 2005 Transects: 1.39 2005 Stations percent: Low-65/Moderate-35/ High-0	Manage for additional High structure on biologically capable habitats.
Seral stages	Of five sample sites, three were at mid seral stages and two were at Invaded Grass States. Broken land comprised 15 to 61 percent of the three pastures and varying mixtures of native and invasive grasses characterized vegetation across the allotment.	Maintain or increase the proportion of native grass communities and limit or decrease the spread of invasive grasses.
Sharp-tailed grouse	There is one known lek within the allotment. There are three known leks within 1 mile of the allotment encompassing approximately 1881 acres within the 1-mile proximity radius.	Manage to enhance sharp-tailed grouse nesting and brooding habitat by increasing the quality and quantity of High vegetative structure on biologically capable sites.
Remarks	Approximately 5 acres of Canada thistle and burdock.	

Table 272.3 — Allotment 272 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action	Alternative 3A	Alternative 4
• Authorized Use is 1473 federal AMs. • Three-year average permitted use is 1363 federal AMs.* • Permit type: Turn-in (common allotment). • Rotation: Complementary (spring pastures and seasonlong summer pasture). • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 1473. • Fence woody draw located in the southwest quarter of Section 30 with temporary electric fence. • In pasture 1, construct a rangeland water pipeline starting at the wellhead in Section 33, proceeding through Sections 28, 29, 30, and 33. Install four livestock tanks, one in each section. • After construction of the pipeline is complete, reclaim the dugout located in the southeast quarter of Section 29 pasture 1 and the reservoir located in the northwest quarter of the southeast quarter of Section 30 pasture 2. • Control livestock distribution through management of access to tanks and reservoirs. **Adaptive Options** • Fence additional area in high-value woody draws. • Adjust Authorized Use.	**Initial Actions** • Authorized federal AMs: 1473. • In pasture 1, construct a rangeland water pipeline starting at the wellhead in Section 33, proceeding through Sections 28, 29, 30, and 33. Install four livestock tanks, one in each section. • Control livestock distribution through management of access to tanks and reservoirs. • Develop a spring in pasture 2 in the northwest quarter of the southwest quarter of Section 30, T143N, R99W. **Adaptive Options** • Fence additional area in high-value woody draws. • Adjust Authorized Use.	**Initial Actions** • Authorized federal AUMs: 1472. • Fence woody draw located in the southwest quarter of Section 30 in pasture 2 with a temporary electric fence. • Construct 2.25 miles of rangeland water pipeline (also see Allot. 221) starting at the wellhead in Section 33 pasture 1, and install a livestock tank in Section 29 and one in Section 30. • Manage tank system to rotate use in pasture 1. **Adaptive Options** • Fence additional area in high-value woody draws in pasture 2. • Extend rangeland water pipeline and install a livestock tank in Section 28 and Section 33. • Fence or remove dugouts and reservoirs, as necessary, to control animal distribution. • Adjust Authorized Use.

Alternative 2 - Current Management	Alternative 3 - Proposed Action	Alternative 3A	Alternative 4
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings annually for 3 years then reevaluate survey frequency. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3	**Monitoring** • Same as Alternative 3

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 272 — Existing Condition

Range – This allotment is approximately 2,979 acres in size and contains both private and NFS lands with 2,956 acres of NFS lands. This allotment is a common and is divided into three pastures. The allocated AMs for this allotment are divided among five permittees. Currently, the common is permitted through two of the permittees' associated headquarters permit by the MGA; however, three permittees have no associated headquarters allotments and are issued a turn-in permit for the common. The pastures themselves range in size from 270 to 2,332 acres. Current AMs provided by NFS lands can found in Table 272.1. This allotment is located in the Rolling Prairie geographic area. Water developments within this allotment include a livestock well and stock tank, reservoirs, a dugout, and a spring.

The current management plan for this allotment is to split up the herd into two to allow early grazing of pastures 2 and 3, typically May 1st to June 16th. The two herds eventually converge into pasture 1 and graze the rest of the season until usually November 30th, although some permittees remove their livestock before this date. Plant composition in pastures 2 and 3 is dominated by introduced species, especially crested wheatgrass. Pasture 1 has more of a mixed native species component, but Kentucky bluegrass and crested wheatgrass can be dominant in areas.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there are approximately 5 acres of Canada thistle and burdock. The Billings County weed board has been informed of these infestations and has made an attempt to control some of these infestations.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

In pasture 2, in the northwest quarter of the southwest quarter of Section 30, T143N, R99W there was some riparian vegetation and long-term water sign at the lower end of a woody draw where the water table was near the surface. The length of the wet portion of the draw, which could be referred to as an unnamed spring, was approximately 200 feet in length. The location was adjacent to the allotment boundary fence and at the lowest portion of the pasture. Water collected at this location would have to be pumped and piped to the rest of the pasture to supply stock tanks.

Woody Draws – Only two woody draws were present in the allotment and occurred in pasture 2. One was At Risk and the other was Unhealthy (Figure 272.1). Although tree saplings were present in both draws, they exhibited evidence of multiple browsing and the general absence of trees in the next age classes indicated a lack of successful recruitment.

Figure 272.1 — At Risk and Unhealthy woody draws in pasture 2. Although periodic regeneration is evident in photo b from the stand of medium aged trees, high trailing and trampling disturbances have resulted in a lack of recent regeneration and understory structure.

Herbaceous Structure – In the fall of 2004, eight herbaceous dominated transects were surveyed. Four of the transects were Low structure and four were Moderate structure. No High structure transects were measured. The consolidated station averages showed 60 percent of the stations were in the Low class and 40 percent in the Moderate class. No stations were measured in the High structure class.

One of those transects was resurveyed in 2005 and was measured in the Low structure class. It improved approximately three-tenths of an inch from 2004. Station averages were 65 percent Low structure and 35 Moderate structure. None were measured in the High structure class.

In September of 2006, members of the IDT subjectively located two VOR transects in what was thought to have the highest potential height-density readings in pasture 1. One transect was recorded as 2.3 inches (Moderate class) and the other was 3.68 inches (High structure class). However, after checking through the rest of the allotment, it was the judgment of the members of the IDT present that the allotment did not have sufficient quantities of High herbaceous structure for the allotment to address the herbaceous structure distribution objectives. The station average for these two transects

was 12.5 percent in Low herbaceous structure with the balance, 87.5 percent, in Moderate herbaceous structure. No stations were measured in the High structure class.

Seral Stages – Several plant composition measurements and field observations indicated relatively widespread bluegrass invasions and a general intermixing of native and invasive grasses throughout the three pastures of the allotment. Broken land constituted 15 to 25 percent of pastures 1 and 2 and 61 percent of pasture 3.

An NDSU sample on a Loamy ecological site in the southeast portion of pasture 1 was at an Invaded Grass State with dominance of Kentucky bluegrass that constituted 55 percent of the grass production from clipped plots. Needle-and-thread and Junegrass were the dominant native species and comprised about 42 percent of the grass production. A resampled ecoplot north of the NDSU plot indicated relative grass canopy cover of Kentucky bluegrass increased from 2 percent to 20 percent between 1998 and 2007. However, relative canopy cover of green needlegrass increased by a similar amount and seral stage increased from early to mid. Two sere plots on Thin Claypan (Figure 272.2) and Loamy ecological sites along the west side of the pasture were at mid seral stages with invasive grasses comprising 13 to 17 percent of the relative grass canopy cover. Another sere plot on a Shallow Loamy ecological site on a plateau along the north central area of the pasture was at or approaching an Invaded Grass State with almost 40 percent of the relative grass basal cover composed of invasive grasses. Dominant plant species recorded from seven Robel transects, two belt transects, and six additional ecoplots substantiated the general pattern of intermixed native and invasive grasses across the pasture. There is a high potential for invasive grasses proportions to have increased among the ecoplots since the initial measurements in 1998, similar to the re-measured ecoplot discussed above. However, a repeated pace transect in a small patch of broken land on the west boundary of the pasture was one of the few measurements in the project area that indicated a decrease of crested wheatgrass and bluegrass between 1979 and 2009. The combined relative plant frequency of these species decreased by about 50 percent between sample years. Total plant frequency decreased from 75 percent to 45 percent, while plant litter and moss increased two and eight-fold respectively.

Figure 272.2 — Sere plot in southwestern portion of pasture 1 revealing high level of utilization during October 2008. Dominant species were blue grama, western wheatgrass, and Canada bluegrass.

As evidenced by several ecoplots and field observations, the north half of pasture 2 consisted of broken land with crested wheatgrass dominance on low hills and Kentucky bluegrass dominance along broad shallow swales. These sites were at Planted Invaded or Invaded Grass States. A belt transect and Robel transect measured near one of the ecoplots indicated little change from dominance of crested wheatgrass, blue grama, and needle-and-thread. Field observations also

indicated bluegrass and/or crested wheatgrass dominance in large areas in the south half of the pasture.

About 61 percent of pasture 3 consisted of broken land. Dominant species recorded along a belt transect in broken land included crested wheatgrass, needle-and-thread, and blue grama, while a Robel transect about 450 feet distant on unbroken land recorded sedge, prairie sandreed, and Kentucky bluegrass.

Sharp-tailed Grouse – There is one known lek within the allotment and three leks occur within 1 mile of the allotment.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed 2 years later.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would now be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian condition of the unnamed spring in pasture 2 as described in the existing condition would continue and evolve toward the potential riparian community.

Woody Draws – Conditions of the two woody draws in pasture 2 would improve with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. Existing invasive grasses and potential increases of these species as a result of increasing litter with the removal of livestock grazing would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock and favorable climatic conditions, there would be an immediate appreciable increased opportunity for the development of High and Moderate herbaceous structure, and a decrease in the amount of Low herbaceous structure in the allotment.

Seral Stages – The removal of livestock grazing disturbances would have the potential to facilitate shifts towards late seral stages, but high amounts of existing invasive grasses would rapidly increase with accumulating plant litter and result in only short-term maintenance of any developing late seral native plant communities. The current extent of invasive grasses throughout most of the allotment would result in transitions to Invaded Grass States in less than 10 years where this has not already occurred. Crested wheatgrass would persist in areas of broken land, but gradually constitute

deceasing proportions of the plant composition with increases in bluegrass and smooth brome. The maintenance of native plant communities in unbroken land would be lost.

Sharp-tailed Grouse – The increase in potential High structure grasslands from the removal of livestock would enhance nesting and brooding habitat for sharp-tailed grouse. However, over time (perhaps greater than 10 to 15 years) the decrease in forb diversity could decrease foraging opportunities. Also, over time (perhaps >10 to 15 years), nesting and brooding quality and quantity would also decrease because of lower quality habitat associated with invasive grasses (e.g., Kentucky bluegrass) that would continue to invade the pastures.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by turn-in (common allotment) grazing association permits, and Authorized Use is 1473 federal AMs.
- Cow/calf pairs are run in a complementary system (spring pastures and seasonlong summer pasture).
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weed control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian condition of the unnamed spring in pasture 2 as described in the existing condition would continue.

Woody Draws – At Risk and Unhealthy conditions of the two woody draws in pasture 2 would persist or deteriorate under current management. The scarcity of woody draws in the pasture and levels of use that exceed initial estimated carrying capacity by 15 percent after adjusting for cow size ensures at least a moderate degree of livestock browsing and trampling disturbances. Grazing periods from early to mid-May through the end of June or early July have been sufficient to result in high woody draw disturbances and poor conditions.

Herbaceous Structure – Current management is projected to continue to perpetuate the existing herbaceous structure distribution with limited potential to promote an improvement. Retaining the current Authorized Use level, along with the season long use of pasture 1, is projected to continue to promote a lack of residual cover. Due to regrowth, the early season pastures should contribute to the High structure portion of the herbaceous structure distribution, but data in pasture 2 from 2004 would not support that conclusion.

Seral Stages – Invasive grasses would continue increasing under current management with additional transitions to Invaded Grass States. The intermixed and intermingled nature of invasive and native grasses throughout the three pastures complicates effective utilization of the invasive

grass component without premature grazing of the native component. Use of pastures 2 and 3 early in the season provides an opportunity for utilization of invasive grasses, but more consistent turn-in dates at the beginning of May and turn-off dates by mid June would have the potential to enhance native grass vigor by concentrating a greater portion of use on the invasive component. Palatability of invasive grasses decreases during the latter half of the grazing period in these pastures and increases the potential for selective and excessive use of the native component. Stands of crested wheatgrass and bluegrass at the north end of pasture 2 exhibited minimal utilization during 2010 and support the conclusion of low utilization of the invasive component, at least in areas distant from water. High stocking levels associated with Authorized Use that exceeds initial estimated carrying capacity by 15 percent have the potential to compound the effects of selective native grass utilization that may be assisting the spread of invasive grasses. Adverse premature use of native species has the potential to be compensated by relatively long recovery periods without grazing during years of adequate precipitation, but field observations indicate that Kentucky bluegrass is increasing in pastures 2 and 3.

Delaying turn-in until mid-June in pasture 1 provides additional time for native grass growth before grazing is initiated, but low palatability of the invasive grass component ensures selective use of the native component for most of the grazing season. Authorized Use that exceeds estimated carrying by 15 percent after adjusting for cow size compounds the effect of selective native grass utilization that can decrease plant vigor and assist the spread of invasive grasses. Similar to pasture 2, field observations indicated minimal use of crested wheatgrass stands and support the assumption of an underutilized invasive component (Figure 272.3). However, bluegrass was observed to have been utilized in one of the three sere plots.

Figure 272.3 — Crested wheatgrass stands along south end of pasture 1 during the spring of 2010. Large amounts of standing dead material are indicative of low utilization during 2009.

Sharp-tailed Grouse – Current management is projected to continue to limit the potential to enhance grouse nesting and brooding habitat. Retaining the current Authorized Use level, along with the season long use of pasture 1, is expected to continue to produce a lack of residual cover. Due to regrowth, the early season pastures should contribute to grouse habitat, but data from 2004 would not support that general conclusion.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 1,473 federal AMs.
- Fencing woody draw located in the southwest quarter of Section 30 with temporary electric fence.
- In pasture 1, constructing a rangeland water pipeline starting at the wellhead in Section 33, proceeding through Sections 28, 29, 30, and 33. Installing four livestock tanks, one in each section.
- After construction of the pipeline is complete, reclaiming the dugout located in the southeast quarter of Section 29 pasture 1 and the reservoir located in the northwest quarter of the southeast quarter of Section 30 pasture 2.
- Controlling livestock distribution through management of access to tanks and reservoirs.

ADAPTIVE OPTIONS:

- Fencing additional area in high-value woody draws.
- Adjusting Authorized Use.

Range

Initial Actions – Because the initial Authorized Use will remain the same as current management, the permittees would be allowed to harvest the same amount of forage.

Fencing the woody draw with a temporary electric fence would temporarily affect livestock grazing pressure within the woody draw because livestock would be excluded from accessing the woody draw. Overall livestock distribution within the pasture would not be affected by the temporary electric fence if kept to a small acreage.

Constructing a range water pipeline system, adding range stock tanks, and using the existing fenced reservoirs would provide managers the flexibility of implementing water management, which would manipulate the current grazing pattern within the pasture. This action would provide opportunity for initial growth and/or regrowth, especially within the summer pasture as livestock are pulled to different areas of the pasture throughout the growing season.

Reclaiming the reservoirs would not affect livestock distribution because reservoirs are being replaced by a range water pipeline in the initial action for this pasture. Due to the size of the reclamation sites Authorized Use would not be affected.

Adaptive Options – Fencing high-value woody draws would have little to no change in livestock distribution across the allotment. Forage within the exclosures would no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may occur on remaining forage. There will be a cost to install these fences and there will be the additional cost of maintenance of the fence to prevent livestock access to the woody draws.

Adjusting Authorized Use downward would result in fewer livestock numbers, fewer grazing days, or a combination of the two because of the turn in permit for this allotment. Adjusting Authorized

Use would not change the distribution of the livestock; however, the amount of forage harvested would be less than the existing forage harvested.

Riparian – There are no initial or adaptive actions proposed for riparian management.

Woody Draws

Initial Actions – Fencing the At Risk woody draw in pasture 2 would remove livestock browsing and trampling disturbances and facilitate the regeneration of desired trees and shrubs, including the advancement of heavily browsed saplings to larger size classes, whereupon the fence could be moved to another section of the woodland or the adjacent Unhealthy woodland. Increasing plant litter and invasive grass layers that would occur with the removal of livestock grazing could impair regeneration of woody species, and fencing of one woody draw or portion thereof would increase disturbances and decrease conditions within the adjacent woody draw.

Extending an existing water pipeline and constructing four water tanks would include a new a tank on the fenceline of pasture 2 and Allotment 221 pasture 3. This tank would contribute to decreased livestock disturbances and increased woody draw conditions because the tank would be located further from the draws than an existing reservoir that would be reclaimed. However, the scarcity of woody draws in the pasture, along with an undeveloped spring at the lower end of the Unhealthy draw, would ensure a level of continued woody draw disturbances.

Adaptive Options – Fencing additional portions of the At Risk woody draw or the Unhealthy draw or decreasing Authorized Use would result in the removal or decrease of livestock browsing and trampling disturbances that would facilitate the regeneration of desired woody species and increase woody draw conditions. Exclusion of livestock disturbances through fencing would provide the fastest and greatest degree of woody draw improvement, but increasing plant litter and invasive grass layers that would occur with the removal of livestock grazing would impede the regeneration of woody species. Decreasing Authorized Use would be less effective for woody draw improvement because only two draws were present in pasture 2 and would continue to experience relatively high degrees of use unless the reduction is disproportionally high relative to achieving other resource objectives.

Herbaceous Structure

Initial Actions – Assuming a cow size adjustment, Authorized Use exceeds the initial estimated carrying capacity by approximately 13 percent, which contributes to limiting the herbaceous structure distribution, notably High herbaceous structure, due to reduced residual cover. Adding four water tanks, one in pasture 2 and the other three in pasture 1, could promote a more even distribution under the Authorized Use level. Management flexibility, via tank management, could potentially be used to contribute to management of the herbaceous structure distribution. However, it is assumed, in the absence of a specific plan, that moderate use, or even use, will continue to be the management emphasis, contributing to the homogenous herbaceous structure distribution. The reclaimed reservoir in pasture 2 would be replaced by one of the four new tanks. The reclaimed dugout in pasture 1 would also be replaced by one of the new water tanks. The effects may be minor adjustments in distribution of livestock and perhaps seasonal use patterns since the reclaimed water sources may be seasonal in nature. Temporarily fencing the woody draw would have minor affects

to herbaceous structure due to minor changes, if any, to livestock distribution and timing, as well as the relatively small area expected to be fenced within the pasture.

Adaptive Options – Adjusting the Authorized Use would be the most effective tool available to begin to immediately adjust the herbaceous structure towards meeting project and Grassland Plan objectives. Adjusting Authorized Use would have positive affects for increasing residual cover levels. Fencing woody draws could have effects relative to the size and location of the exclosure but is not expected to be appreciable due to the relative small amount of woody draw habitats within the allotment.

Seral Stages

Initial Actions – Extending an existing water pipeline and constructing three new water tanks in pasture 1 and one tank in pasture 2 would provide a more reliable source of water compared to as many as seven variously functioning reservoirs, but would be not appreciably improve plant composition or seral stages across the allotment. Management of flow to the water tanks could control the level of utilization and facilitate the development of late seral stages and High structure, but it is more likely that tank management would increase the evenness of livestock distribution and utilization unless extended periods of non-use are specified around alternating water tanks. The main impediment to improving plant composition in the pasture involves the intermixture of native and invasive grasses. Invasive grass palatability is decreasing at the time of turn-in during early to mid June in pasture 1 and results in selective use of the native component during most of the grazing season. Authorized Use that exceeds initial estimated carrying capacity by 15 percent after adjusting for cow size, and seasonlong grazing in the pasture, would compound the effects of selective native grass utilization and assist the continued increase of invasive grasses. Disturbances associated with constructing more than 2 miles of pipeline for the water tanks would contribute to the establishment and spread of invasive grasses.

Adding a tank at the north end of pasture 2 would increase the utilization of crested wheatgrass and Kentucky bluegrass in this area, but decrease their use in the south half of the pasture, with the resulting increase in plant litter likely to facilitate increased invasive grass dominance or transitions to Invaded Grass States.

The precise tank locations have not been determined, but the potential would exist for placing some of the tanks within stands of crested wheatgrass or large bluegrass populations to avoid high grazing and trampling disturbance and shifts towards early seral stages within native plant communities. However, this would not alter the larger trend of increasing invasive grasses across the allotment.

Two reservoirs would be reclaimed in conjunction with the new tanks, but five additional reservoirs would have the potential of decreasing the effectiveness of water tank management to control livestock distribution, unless they are already fenced.

Adaptive Options – Neither decreases nor increases in Authorized Use would be effective in improving plant composition or facilitating a shift towards late seral stages without coordinating the grazing season with the palatability and production of invasive and native grasses in each pasture. Sufficient decreases in Authorized Use would increase the accumulation of plant litter that would

facilitate invasive grass spreading, while increases in use would compound adverse effects of native grass selection unless the grazing season is coordinated with high palatability of invasive grasses.

Sharp-tailed Grouse

Initial Actions – With four additional livestock tanks (two are replacement for reclaimed sources) and the proposed Authorized Use level (which exceeds the initial estimated carrying capacity by approximately 13 percent, after accounting for cow size) is not expected to alter the amounts of residual standing crop that would remain at the end of the grazing season. This would continue to homogenize residual cover. Management flexibility, via tank management, could potentially be manipulated to contribute to enhancing grouse herbaceous habitat. However, it is assumed, in the absence of a specific plan, that moderate use (or even use) will continue to be the management emphasis and would not enhance grouse habitat due to the continued homogenization of herbaceous structure. Reclaiming a reservoir and a dugout should have minor influences on residual cover since both are being replaced by new water tanks. The effects may be minor adjustments in distribution of livestock and perhaps seasonal use patterns since the reclaimed water sources may currently be seasonal in nature. Temporarily fencing the woody draw would have minor affects to herbaceous structure due to little changes, if any, to livestock distribution and timing, as well as the relatively small area expected to be fenced.

Adaptive Options – By adjusting the Authorized Use, a potential increase in the proportion of High herbaceous structure may be experienced with a commensurate enhancement in potential grouse nesting and brooding habitat. Fencing high-value woody draws is not expected to have appreciable positive or negative overall effects to herbaceous structure due to the relatively low quantity of woody draws in the allotment to be fenced.

Effects of Alternative 3A

The effects of Alternative 3A are the same as Alternative 3 with the following stated exceptions.

INITIAL ACTIONS:

- Developing a spring in pasture 2 in the northwest quarter of the southwest quarter of Section 30, T143N, R99W.
- Dropping the initial action of fencing the woody draw located in the southwest quarter of Section 30 with temporary electric fence.
- Dropping the initial action of after construction of the pipeline is completed reclaiming the dugout located in the southeast quarter of Section 29 in pasture 1 and the reservoir located in the northwest quarter of the southeast quarter of Section 30 in pasture 2.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 3A are the same as Alternative 3.

Range

Initial Actions – This action needs to be reviewed by an engineer and hydrologist to assure that the area has potential for a reliable spring development. A field visit was conducted by the Forest

Service hydrologist and range specialist on April 22, 2010 to assess the potential of a spring development (see Project Record, Specialist Reports and Notes, Watershed Report for details). If the site is a viable location for a spring development, an effect of this action would be that livestock would have an additional source of water in pasture 2. The livestock grazing distribution would increase on the western side of this pasture. Another effect of this action would be the cost of installation and maintenance of the spring development.

Dropping the other two actions would have no effect on Authorized Use of livestock distribution, as this would be no change from current management.

Riparian

Initial Actions – Developing the unnamed spring in pasture 2 would have the following effects. The amount of spring discharge was unable to be determined at the site visit. But if developed and a significant level of water is removed from the pooled area, the riparian habitat would diminish in area and function in relation to the loss of water.

Woody Draws

Initial Actions – Developing a spring in pasture 2 that is used as an early season pasture would result in further deterioration of the adjacent Unhealthy and At Risk woody draws as a result of increased livestock browsing and trampling disturbances. The general area of the spring is located near the photo in Figure 272.1b that revealed heavy livestock trampling disturbances and poor ecologic conditions along ephemeral pools receiving flow from the spring. The small size of the pasture, grazing periods that extend through June, and the occurrence of only two draws contribute to high levels of livestock disturbances. There is one existing water lot in the southeast corner of the pasture and a reservoir near the center of the pasture, neither of which would be reclaimed under this alternative. A new water tank proposed at the north end of the pasture would entirely negate the need and purpose for development of the spring or a fourth water source in the 369-acre pasture that would detract rather than contribute to achieving any resource goals.

Proposals to not fence any woody draws would ensure the persistence or deterioration of At Risk and Unhealthy conditions of the two existing sites. Other proposed actions and effects would be the same as discussed under Alternative 3, none of which would facilitate improved woody draw conditions.

Herbaceous Structure

Initial Actions – Developing a spring in pasture 2, in addition to adding one of the four tanks, would contribute to homogenizing the herbaceous structure distribution across the pasture. Dropping the initial action of fencing woody draws would not be a change from current management. This would have little to no effect on the herbaceous structure distribution within pasture 2 due to the small size of pasture and no change in distribution from current management. Not reclaiming the reservoir and dugout after the new tanks are placed would increase the water density throughout the allotment, particularly in pastures 1 and 2. This would homogenize herbaceous structure to continue to favor Low and Moderate herbaceous structure. It would also make it less effective to manage water sources because more water sources would not have controlled access within the pastures.

Seral Stages

Initial Actions – Increased livestock disturbances in herbaceous upland communities around the area of the proposed spring development would not appreciably affect existing plant composition or seral stages due to the existing abundance or dominance of invasive grasses in the pasture.

Sharp-tailed Grouse

Initial Actions – Developing a spring in pasture 2 in addition to adding one of the four tanks from the other initial actions would contribute to homogenizing potential grouse habitat across the pasture by increasing the water density. Dropping the initial action of fencing woody draws would not be a change from current management. This would have little to no effect on the herbaceous structure distribution within pasture 2 due to small size of the pasture and no changes in distribution from current management. Not reclaiming the reservoir and dugout after the new tanks are placed would also increase the water density throughout pastures 1 and 2. This would likely homogenize grouse herbaceous habitat and continue to favor Low and Moderate residual cover. It would also make it less effective to manage water sources because more water sources would not have controlled access within the pastures.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.
- Constructing 2.25 miles of rangeland water pipeline (also see Allot. 221), starting at the wellhead in Section 33 pasture 1, and installing a livestock tank in Section 29 and one in Section 30.

ADAPTIVE OPTIONS:

- Extending rangeland water pipeline and installing a livestock tank in Section 28 and Section 33.
- Fencing or removing dugouts and reservoirs, as necessary, to control animal distribution.

Range

Initial Actions – Authorized Use for this allotment would be 1,472 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 1,473 federal AMs converted to AUMs by adjusting for cow size is 1,694 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 13 percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment.

Constructing 2.25 miles of rangeland water pipeline (also see Allot. 221), starting at the wellhead in Section 33 pasture 1, and installing a livestock tank in Section 29 and one in Section 30 is similar to

the action proposed under Alternative 3, except only two stock tanks would be installed. Therefore, the effects are expected to be the same as those described under Alternative 3 for this action.

Adaptive Options – Extending the rangeland water pipeline and installing livestock tanks would add additional reliable water to the pastures because the existing developments are not reliable throughout the grazing season and create more flexibility in stock tank management.

Fencing or reclaiming the existing dugouts and reservoirs would prevent livestock access or totally remove access to the existing developments. Authorized Use would not be adjusted because of the size of area being removed from livestock access.

Riparian – There are no initial or adaptive actions proposed for riparian management.

Woody Draws

Initial Actions – Decreasing Authorized Use by 13 percent according to initial estimated carrying capacity and cow size would not appreciably improve woody draw conditions in pasture 2 because only two draws were present, which results in concentrated browsing and trampling disturbances. Grazing periods that extend through the end of June contribute to woody draw use as a result of increasing temperatures and insects pests and decreasing palatability of invasive grasses in the uplands.

The effects of fencing woody draws and adding a water tank at the north end of pasture 2 were discussed under Alternative 3 and would facilitate improved woody draw conditions by removing or decreasing browsing and trampling disturbances.

Adaptive Options – The effects of fencing additional woody draws or decreasing Authorized Use were discussed under Alternative 3.

Herbaceous Structure

Initial Actions – Adjusting the Authorized Use by reducing the AUMs by approximately 13 percent to approximate the initial estimated carrying capacity, accounting for cow size, should result in an improvement in the overall herbaceous structure distribution. However, adding two water tanks, one in pasture 2 and the other one in pasture 1, could promote a more even distribution because the tanks could be available for a longer period of time than the dugout or reservoir. This would not necessarily be a factor in pasture 2 because of the typically early use and small size of this pasture. In pasture 1, depending on the location of the tank, changes in distribution could occur. Also, longer seasonal use may be expected with a water tank rather than a dugout. This could contribute to more even use around the pasture. Whereas, if the dugout dried up, less use may be expected in the area resulting in less use and potentially more residual cover around the dugout. Adjusting Authorized Use to AUMs (initial estimated carrying capacity) and adding the new tanks, in combination with an unknown management strategy, is not expected to make an appreciable improvement in the herbaceous structure distribution.

Adaptive Options – Continuing to adjust the Authorized Use could have the most immediate effect on manipulating the herbaceous structure distribution towards addressing project objectives. Fencing or removing dugouts or reservoirs could provide management flexibility to facilitate improvement in the herbaceous structure distribution by the ability to manage water. However, it is

assumed, in the absence of a specific plan, that increasing livestock distribution would be the management emphasis, contributing to the homogenous herbaceous structure distribution.

Seral Stages

Initial Actions – Decreasing Authorized Use by 13 percent according to initial estimated carrying capacity and cow size would have the potential of facilitating shifts towards late seral stages, but would be impeded by the trend of increasing invasive grasses in all three pastures. The major impediment to maintaining native plant communities and achieving late seral communities involves the intermixed nature of invasive and native grasses, which results in underutilization of the invasive component and selective use of the native component and has a high potential to result in excessive utilization and assist the spread of invasive grasses.

Constructing two new water tanks to supplement an existing tank and managing the tank system to rotate livestock use would not have an appreciable effect on plant composition or trends of increasing invasive grasses. Palatability of invasive grasses is decreasing at the time of turn-in and results in selective use of the native component during most of the grazing season, with a high potential for excessive use that can facilitate continued increases of the invasive component. Disturbances associated with constructing more than 2 miles of pipeline for the water tanks would assist the establishment and spread of invasive grasses. Controlling access to several fenced reservoirs would increase the potential for rotating livestock through the pasture, but unfenced reservoirs may require fencing to increase the effectiveness of water access management.

Adaptive Options – Neither decreases nor increases in Authorized Use would be effective in improving plant composition or facilitating shifts towards later seral stages without coordinating the grazing season with the palatability and production of the invasive and native components in each pasture.

The effect of adding two additional tanks in pasture 1 were addressed under Alternative 3, and the reduction in Authorized Use under Alternative 4 would not appreciably change the effects.

Fencing or reclaiming reservoirs would increase the effectiveness of managing water access to control livestock distribution and utilization throughout the pasture, but would not alter the trend of increasing invasive grasses and decreasing native plant communities for reasons discussed above.

Fencing additional woody draws in pasture 2 would appreciably limit the amount of this habitat available to livestock and contribute to increased disturbances within upland herbaceous communities. This could have some benefit of reducing the accumulation of plant litter than can assist the spread of invasive grasses, but would not appreciably alter current trends in the pasture, as discussed under Alternative 3.

Sharp-tailed Grouse

Initial Actions – Adjusting the Authorized Use by reducing the AUMs by approximately 13 percent to approximate the initial estimated carrying capacity, accounting for cow size, should result in enhancement of grouse nesting habitat. However, adding two water tanks, one in pasture 2 and the other one in pasture 1 could promote a more even distribution because the tanks could be available for a longer period of time than the dugout or reservoir. This would not necessarily be a factor in pasture 2 due to the typically early use and small size in this pasture. In pasture 1,

depending on the location of the tank, changes in distribution could occur. Also, longer seasonal use could be expected around a water tank rather than a dugout. This could contribute to more even use within pasture 1. Whereas, if the dugout dried up, less use may be expected in the area resulting in less use and potentially more residual cover around the dugout. Adjusting Authorized Use to AUMs (initial estimated carrying capacity) and adding the new tanks, in combination with an unknown management strategy,is not expected to make an appreciable enhancement in overall grouse nesting habitat. The early season pastures may provide potential nesting habitat, particularly with the Authorized Use downward adjustment.

Adaptive Options – Continuing to adjust the Authorized Use could have the most immediate effect on manipulating grouse nesting habitat by altering the amount of residual cover. Fencing or removing dugouts or reservoirs could provide management flexibility to facilitate enhancement of grouse nesting habitat by the ability to manage water. However, it is assumed that in the absence of a specific plan, increasing livestock distribution would be the management emphasis and would contribute to homogenous grassland habitat favoring Low to Moderate grassland habitat.

ALLOTMENT 277

Table 277.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 277 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 3.65 – Rangelands With Diverse Natural-Appearing Landscapes	2071	75	
Management Area 6.1 – Rangeland With Broad Resource Emphasis	697	25	
Total allotment acres	4229	100	
NFS acres	2768	66	
State land acres	810	19	
Private land acres	651	15	
Current permitted livestock grazing (AMs) on NFS lands			1129
Initial estimated carrying capacity (AUMs) on NFS lands			1243
Number of pastures containing NFS lands			3

Table 277.2 — Allotment 277 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	The 1998/99 and 2006 surveys rated Magpie Creek at PFC; the 2006 survey rated North Creek and the upper reach of Scairt Woman Draw at PFC, the lower reach of Scairt Woman Draw was rated at NF. It is unclear why the lower reach of Scairt Woman Draw is NF. The NF reach is a half mile in length.	Determine why the lower reach of Scairt Woman Draw is Nonfunctional. Maintain PFC on Magpie and North Creeks.
Woody draws	50 percent of the sampled woody draws were Healthy, 42 percent were At Risk, and 8 percent were Unhealthy. For both At Risk and Unhealthy woody draws, low or no regeneration is main concern. Pasture 1 has the most impacted woody draws.	Establish tree regeneration and promote seedling/ sapling survival.
Herbaceous structure	Transect Results: Low – Meeting Objectives Moderate – Exceeding Objectives High – Below Objectives This allotment is close to meeting High structure objectives. 2004 Transects: 1.24; 1.73; 1.64; 1.75; 1.69; 2.24 2004 Stations percent: Low-44.17/Moderate-55.83/ High-0 2005 Transects: 1.49; 1.91; 2.16 2005 Stations percent: Low-35/Moderate-65/ High-0	Manage for additional High structure on biologically capable habitats.
Seral stages	Of eight sample sites across the allotment, five were at mid seral stages with moderate amounts of invasive grass. One sample was at a late seral stage without invasive grasses, but invasive grasses dominated two sample sites that were at Invaded Grass States.	Increase the maintenance and extent of native dominated communities and decrease or limit the extent of invasive grasses.
Sharp-tailed grouse	There are two known active leks within the allotment and another that is typically inactive or has very little activity associated with it (Knowles 2005 and personal observations). Another site occasionally contains dancing males but did not in 2010. In addition to these leks, two other leks are known to occur within 1 mile of the allotment, one very slightly. Therefore, overall, the projected area associated within the 1-mile proximity radius is approximately 2,000 to 2,400 acres.	Manage to enhance sharp-tailed grouse nesting and brooding habitat by increasing the quality and quantity of High vegetative structure on biologically capable sites.
Remarks	Approximately 23 acres of Canada thistle, burdock, and absinth wormwood scattered across allotment.	

Table 277.3 — Allotment 277 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 1,129 federal AMs. • Three-year average permitted use is 1,021 summer federal AMs.* • Permit type: Inventory (12 months). • Rotation: Modified twice-over rotation. • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 1,129. • Install stock tank in Section 24, which would be supplied from the existing pipeline located in pasture 1. • Fence dam in southeast quarter of the southwest quarter of Section 24 to control livestock access to water. • Maintain current twice over grazing system. • Continue to manage tanks to distribute livestock. **Adaptive Options** • Fence high-value woody draws. • Install new stock tank in pasture 2. • Adjust Authorized Use.	**Initial Actions** • Authorized federal AUMs: 1,243. • Install stock tank in Section 24, which would be supplied from the existing pipeline located in pasture 1. • Fence dam in southeast quarter of southwest quarter of Section 24 in pasture 1 to control livestock access to water. • Maintain current twice-over grazing system. • Continue to manage tanks to distribute livestock. • Continue to monitor Scairt Woman Draw to determine why lower reach is rated as nonfunctional. • Move hay lot in pasture 5 from present location to the southwest corner of the pasture. **Adaptive Options** • Fence high-value woody draws. • Adjust grazing system if structure and plant composition objectives are not met. • Adjust stocking level to account for underutilized invasive grass component and/or over utilized native grass component. • Adjust Authorized Use.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings annually for 3 years then reevaluate survey frequency. • Complete Properly Functioning Condition survey once every 3 years then once every 5 years if a positive trend has been established. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 277 — Existing Condition

Range – This allotment is approximately 4,229 acres in size and contains private, state, and NFS lands with 2,768 acres of NFS lands. Currently, this allotment is issued a private allocation inventory permit for 150 head for 8 months by the MGA. With this type of permit there is a potential of livestock being on NFS lands for the entire year, not just the typical May 1st to December 31st. Livestock are wintered on private and intermingled private and NFS lands during the winter months of January through April. Current AMs provided by NFS lands can be found in Table 277-1. This allotment is located in both the Badlands and the Rolling Prairie geographic areas. Water developments within this allotment include a livestock well and pipeline system with stock tanks, reservoirs, and a spring development. The current livestock grazing system is a modified twice over rotation.

Pasture 1 is the largest of the five pastures and is approximately 1,283 acres in size. This pasture is in good condition. Most of the mid and uplands have good litter cover and native species composition, however, there are areas with Kentucky bluegrass within the plant communities, and in the north and northeastern portion areas have been tilled and replanted to crested wheatgrass. The crested wheatgrass areas also have some native species expressing themselves, such as blue grama, western wheatgrass, needle-and-thread, and threadleaf sedge. Watering facilities nearby the woody draws showed signs of trailing through them. The reservoir in the northwest quarter of the southeast quarter of Section 23 has been reclaimed. Most of this pasture has been moderately grazed, and there were no serious issues within it.

Pasture 2 is approximately 1,025 acres in size, and it too had pretty moderate grazing throughout. The livestock appear to like hanging in the lowland areas, but there was still good species diversity and litter cover. The creek also had signs of beaver activity.

Pasture 5 is approximately 644 acres in size. The northeast and north central portion of this pasture is rough, so most of the grazing occurs in the south half of this pasture. The northeastern portion of this pasture has been grazed moderately. This area had a good diversity of native species and litter cover; however, the southeastern portion of the pasture is a little different. This pasture is normally used in the spring for calving so some winter feeding is taking place, and at the time had a few bulls in it. Livestock utilize both the creek and the spring found in the southeastern corner of this pasture.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there are approximately 23 acres of Canada thistle, burdock, and absinth wormwood. A fairly good size patch of Canada thistle was found along the North Creek bottom during an earlier visit. The Billings County weed board has been informed of these infestations and has made an attempt to control some of these infestations.

Oil and gas development on NFS lands in this allotment has removed a total of approximately 3.0 acres from livestock access. A total of approximately 2.7 acres of oil and gas pads and access roads have been reclaimed and are or will be available for livestock access. Associated forage from these acres is approximately 1.4 and 1.2 AUMs, respectively.

Riparian –

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
277-02	North Creek (2)	1.53					1.53
277-02	Scairt Woman Draw(2)					0.55	0.55
277-05	Magpie Creek (1a)	2.45					2.45

Three streams traverse Allotment 277. North Creek (reach 2) flows across pasture 2 and Magpie Creek (reach 1a) through pasture 5. The interdisciplinary team gave both reaches a functionality rating of PFC in 2006.

Scairt Woman Draw (reach 2) traverses pasture 2 (Figure 277.1). The IDT gave this reach a functionality rating of NF in 2006. Note that the reach farther upstream in pasture 3 of Allotment 289 has a rating of PFC (Figure 277.2). The NF condition of Scairt Woman Draw appears to be tied to the loss of a water table. In the upstream reach, beavers have created a series of ponds, which store water and nourish a robust riparian plant community. These ponds may correspond to a reach where springs discharge into the channel. Downstream of the beaver ponds, the channel appears to be ephemeral with no evidence of spring or bank discharge. The water table has dropped or been lost and the riparian community is missing. Livestock trailing is apparent along the channel.

Figure 277.1 — Middle reach of Scairt Woman Draw in Allotment 277 does not have any beavers. The reach has ephemeral stream flow, virtually no riparian vegetation, and a functionality rating of NF.

Figure 277.2 — Upper reach of Scairt Woman Draw in Allotment 289 is at PFC. Beavers have constructed a series of ponds that store water and nourish riparian vegetation.

Woody Draws – Of 12 woody draws sampled throughout the allotment, 50 percent were Healthy, 42 percent were At Risk, and 8 percent were Unhealthy. All sampled woody draws in pasture 2 were Healthy, while the majority of sampled sites in pastures 1 and 5 were At Risk. A greater proportion of woody draws in pastures 1 and 5 were situated along gentle terrain with increased livestock access compared to draws in pasture 2 that tended to occur along steep side slopes.

Herbaceous Structure – In 2004, six random VOR transects were surveyed in this allotment. One of the six averaged out in the Low structure class while the remaining five averaged in the Moderate class. None were measured in the High category. The consolidated station average showed approximately 44 percent in the Low class and 56 percent in the Moderate class. No High structure stations were recorded.

Three of these transects were resurveyed in 2005. One transect was surveyed in the Low structure class and the other two were measured in the Moderate structure class. The consolidated station average showed Low structure stations at 35 percent and Moderate stations took up the balance at 65 percent. No High structure stations were recorded.

Seral Stages – Of eight sample sites across the allotment, five were at mid seral stages with moderate amounts of invasive grass. One sample on a Thin Loamy ecological site was at a late seral stage without invasive grasses, but two samples on Loamy and Shallow Loamy sites were at Invaded Grass States.

Broken land comprised about 240 acres, 19 percent, of pasture 1, but larger areas of the pasture are at or approaching an Invaded Grass State dominated by bluegrass with intermingled and intermixed needle-and-thread and other native grasses. Pasture observations indicate the persistence of native dominated areas along low ridges and upper slopes, with invasive grasses dominating along shallow swales and drainages. An NDSU sample plot on a Loamy ecological site at the north end of the pasture was at a mid seral stage but approaching an Invaded Grass State with invasive grasses comprising 35 percent of the grass production. An ecoplot in broken land north of the NDSU site was dominated by crested wheatgrass and contained 20 percent relative cover of bluegrass in 1998. A sere plot in unbroken land in this general area of the pasture was at an Invaded Grass State with 43 percent relative grass basal cover of Kentucky bluegrass. A remeasured pace transect in this area indicated relative plant frequency of bluegrass increased from 3 percent to 52 percent between 1978 and 2009. Relative frequency of crested wheatgrass decreased from 33 percent to 16 percent, while needle-and-thread decreased from 33 percent to 2 percent. A sere plot at the south end of the pasture was at an Invaded Grass State with 45 percent relative grass canopy cover of bluegrass. Four Robel transects and two belt transects dispersed across the 880-acre pasture recorded dominant or high amounts of bluegrass intermixed with native grasses.

Pasture 2 was dominated by native grasses with no broken land. Invasive grass patches occurred along two-track edges and drainages, but these species also occurred lightly intermixed among native grasses. An NDSU sample on a Thin Loamy ecological site was at a mid-late seral stage with a low frequency of smooth brome that did not occur in the clipped plots. A sere plot on another Thin Loamy ecological site was at a late-mid seral stage with light amounts of Kentucky bluegrass.

Two Robel transects and one belt transect recorded native grasses as the dominant species and were suggestive of mid to late seral stages.

Only 10 percent of pasture 5 was identified as broken land, but crested wheatgrass and lesser amounts of smooth brome and bluegrass dominated more than a third of the pasture along the Magpie Creek corridor. It is possible that additional portions of the pasture consist of broken land, but hay storage and winter feeding adjacent to Magpie Creek is equally plausible to have contributed to the extent of invasive grasses. An NDSU sample on a Loamy ecological site was at an Invaded Grass State with 66 percent of the grass production comprised of crested wheatgrass, invasive bluegrass, and Japanese brome. Steep, barren land constituted about 15 percent of the pasture, and an NDSU sample on a Thin Loamy ecological site along a bluff above Magpie Creek was at a mid seral stage with light to moderate invasive grasses. A sere plot on a Thin Loamy ecological site at the south end of the pasture was at a mid seral stage with 45 percent crested wheatgrass frequency.

Sharp-tailed Grouse – There are two known active leks within the allotment and another that is typically inactive or has very little activity associated with it (Knowles 2005 and personal observations). Another site occasionally contains dancing males but did not in 2010. In addition to these leks, two others leks are known to occur within 1 mile of the allotment, one only very slightly. The overall, the projected area associated within the 1-mile proximity radius is approximately 2,000 to 2,400 acres.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed 2 years later.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would now be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian condition along North and Magpie Creeks, as described in the existing condition, would continue and evolve toward the potential riparian community. The riparian condition along Scairt Woman Draw would continue as described in the existing condition.

Woody Draws – Woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. Existing invasive grasses and potential increases of these species, as a result of increasing litter with the removal of livestock grazing, would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock, there would be an immediate, appreciable increased opportunity for the development of High and Moderate herbaceous structure and a decrease in the amount of Low herbaceous structure in the allotment.

Seral Stages – The removal of livestock grazing disturbances would facilitate shifts towards late seral stages in pasture 2, but this would be impeded in pastures 1 and 5, where further transitions to Invaded Grass States would occur over the next 10 years with accumulating plant litter.

Sharp-tailed Grouse – The increase in potential High structure grasslands from the removal of livestock would enhance nesting and brooding habitat for sharp-tailed grouse. However, over time, perhaps more than 10 to 15 years, the decrease in forb diversity could decrease foraging opportunities. Also, over time (>10 to 15 years), nesting and brooding quality and quantity would also decrease because of lower quality habitat associated with invasive grasses that could continue to invade the pastures.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by an inventory grazing association permit, and Authorized Use is 1,129 federal AMs.
- Cow/calf pairs are run in a modified twice-over rotation.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weed control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian conditions along North and Magpie Creeks and Scairt Woman Draw, as described in the existing condition, would continue.

Woody Draws – A high proportion of Healthy woody draw conditions would persist in pasture 2 under current management. Relatively short summer grazing seasons of 4to 6 weeks, cooler temperatures, and fewer insect pests during additional fall and early winter grazing periods, and steep slopes associated with many of the draws limit livestock disturbances. Three At Risk woody draws in pasture 1 have the potential to gradually improve as a result of a recently reclaimed reservoir near the confluence of the sites that should contribute to decreased browsing and trampling disturbances. A high proportion of woody draws in pasture 5 are likely to persist in an At Risk condition due to heavy winter use and gentle terrain that can contribute to high trampling disturbances when livestock seek thermal shelter. Frequent 1-month mid-summer rotations with increasing temperatures and insect pests and low invasive grass palatability contribute to additional woody draw disturbances in pasture 5.

Herbaceous Structure – Current management is projected to continue to perpetuate the existing herbaceous structure distribution with limited potential to promote an increase in the proportion of High herbaceous structure and the overall herbaceous structure distribution in general. Retaining the current Authorized Use level, the current grazing rotation, and the winter grazing is projected to continue to promote a lack of residual cover.

Seral Stages – Continuation of current management should result in the persistence of native plant communities in pasture 2 that appear to meet seral stage objectives. Trends of increasing invasive grasses, transitions to Invaded Grass States, and a loss of native species would continue in pastures 1 and 5. Palatability of invasive grasses is frequently low during summer rotations through these pastures and contributes to selective and excessive use of the native component that can facilitate the spread of invasive grasses. Hay feeding in pasture 5, and possibly to a lesser extent in pasture 1, contributes to the introduction and establishment of invasive grasses. Premature grazing of native grasses during relatively open winters (Figure 277.3) decreases plant vigor and increases the susceptibility to invasive grass establishment. Multiple pasture rotations following premature spring grazing can further contribute to decreased plant vigor.

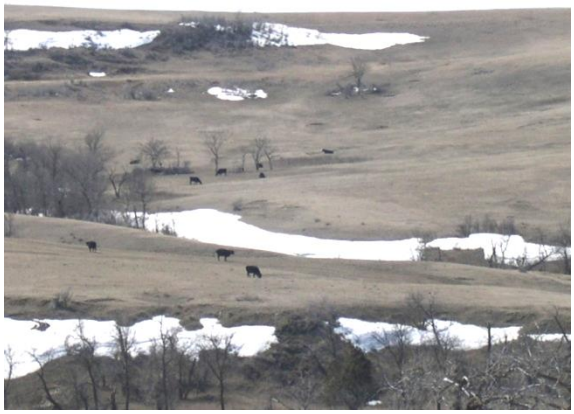


Figure 277.3 — Livestock grazing during April 2009 in hay feeding pasture of Allotment 277.

Sharp-tailed Grouse – Existing management actions would not enhance High structure grasslands due to the proposed Authorized Use level, the twice-over grazing rotation, and unaccounted winter grazing (pasture 5). Current management is projected to continue to facilitate a lack of residual cover, thus limiting the potential to enhance grouse nesting and brooding habitat.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 1,129 federal AMs.
- Installing a stock tank in Section 24, which would be supplied from the existing pipeline located in pasture 1.
- Fencing dam in southeast quarter of the southwest quarter of Section 24 to control livestock access to water.
- Maintaining a twice-over grazing system.

- Continuing to manage tanks to distribute livestock.

ADAPTIVE OPTIONS:

- Fencing high-value woody draws.
- Installing a new stock tank in pasture 2.
- Adjusting Authorized Use.

Range

Initial Actions – Because the initial Authorized Use would remain the same as current management, the permittee would be allowed to harvest the same amount of forage.

Distribution of livestock in Section 24 would change from the existing condition due to the installation of a stock tank and the fencing off of the reservoir in the southeast quarter of the southwest quarter of Section 24. These actions would draw livestock away from the woody draws in this area that have been identified to be At Risk or Unhealthy. Managing the existing pipeline and stock tanks as a tool to distribute livestock would control grazing pressure in areas of the pasture allowing for proper recovery and use of desirable native herbaceous species throughout their growth stages.

Adaptive Options – Fencing high-value woody draws would have little to no change in livestock distribution across the allotment. Forage within the exclosures would no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may occur on remaining forage. There will be a cost to install these fences, and as a result there will be additional cost of maintenance of the fence to prevent livestock access to the woody draws.

Installing a new stock tank in pasture 2 would increase the number of stock tanks to control livestock distribution within this pasture, possibly spreading the distribution throughout the pasture at different times of the grazing season.

Adjusting Authorized Use would require reducing the number of livestock, since this allotment carries an inventory permit. Adjusting Authorized Use would not change the distribution of the livestock; however, the amount of forage harvested would be less than the existing forage harvested.

Riparian

Initial Actions – Actions proposed include installing a stock tank in Section 24, fencing a dam in Section 24 to control livestock access to water, and maintaining the current twice-over grazing system. These actions would have no effect on the desired conditions being met along North and Magpie Creeks.

There are no actions proposed to restore desired riparian functionality to the lower reach of Scairt Woman Draw because the cause of nonfunctionality is unknown at present. The natural expansion of beaver along Scairt Woman Draw may improve riparian functionality. This reach would be monitored to determine the cause(s) of riparian dysfunction. Livestock trailing and forage consumption in the riparian area does not appear to be a problem along Scairt Woman Draw.

Adaptive Options – Fencing high-value woody draws should have no effect on riparian conditions along Scairt Woman Draw because there would be no expected change in livestock distribution and the distance of separation.

Developing rangeland water in pasture 2 would move livestock concentration away from the riparian stream corridor and improve riparian conditions. Riparian conditions would improve by minimizing trailing and trampling in the riparian area, allowing for herbaceous and woody riparian vegetation recovery.

The reach of Scairt Woman would be monitored to determine if the above options will have an effect on riparian condition.

Woody Draws

Initial Actions – Constructing a new water tank in the uplands of pasture 1 to replace an unreliable reservoir that would be fenced to control livestock access would have the potential for improving conditions in an adjacent small woody draw patch by decreasing livestock browsing and tramping disturbances. Recent management involving reclamation of a reservoir is likely to have a greater beneficial effect on three adjacent woody draws if browsing and trampling disturbances are sufficiently decreased. Management of water tanks to control livestock utilization across the pasture has not been effective in maintaining Healthy woody draws to date, and would not have an appreciable effect in the future compared to recent reclamation of the reservoir.

Management of water sources in pasture 2 would be less effective at controlling livestock distribution due to free water access in North Creek and intermittent access along Scairt Woman Draw. Magpie Creek is the primary water source in pasture 5 and is uncontrolled. Steep terrain that decreases the accessibility of some woody draws in pasture 2 would contribute to the persistence of Healthy woody draws. However, collateral herbicide impacts have occurred in some draws and would be expected to continue.

Potentially limiting the number of pasture rotations to two rather than three would not have an appreciable effect on woody draw conditions because the total length of time spent in individual pastures and the degree of woody draw use would not be consistently different from current management.

Adaptive Options – Depending on the location of a new water tank in pasture 2, adjacent woody draws would have the potential to decrease in condition as a result of increased browsing and trampling disturbances. Woody draw patches and riparian conditions along Scairt Woman Draw and North Creek might improve with a tank that would draw livestock away from the creeks, but they would remain fully accessible.

Fencing woody draws or decreasing Authorized Use would facilitate the regeneration of desired woody species and increase woody draw conditions by removing or decreasing livestock disturbances. Exclusion of livestock disturbances through fencing would provide the fastest and greatest degree of woody draw improvement, but increased litter and invasive grass layers that would occur with the removal of grazing could impede the regeneration of woody species. Fencing of one woody draw would have the potential of increasing livestock disturbances and decreasing conditions in adjacent woody draws.

Herbaceous Structure

Initial Actions – Assuming a cow size adjustment, Authorized Use would exceed the initial estimated carrying capacity by approximately 4 percent, which could be contributing to the existing herbaceous structure distribution. Adding one water tank could promote a more even distribution under the Authorized Use level. Fencing the dam in the southwest quarter of Section 24 could potentially provide some relief around adjacent uplands, but water density would remain at more than two sources per section, which could contribute to homogenous use patterns. Management flexibility, via water management, could potentially be used to contribute to management of the herbaceous structure distribution. However, in the absence of a specific plan to accomplish this objective, it is assumed that moderate use, or even use, will be the management emphasis, contributing to a homogenous herbaceous structure distribution. This is apparently demonstrated in the current management of the water system via the lack of diversity in the herbaceous structure distribution where the six VOR transect averages varied by only one inch. Maintenance of the twice-over grazing system could also be contributing to the current herbaceous structure distribution by not allowing sufficient regrowth to occur with the second pass and contributing to a homogenous use pattern. This alternative differs from the existing condition in adding an additional stock tank and fencing an existing water source. This could promote an even higher degree of a homogenous herbaceous structure distribution.

Adaptive Options – Adjusting the Authorized Use would be the most effective tool available to begin to immediately adjust the herbaceous structure towards meeting project objectives. Reducing Authorized Use would promote more residual cover. Fencing woody draws could have effects relative to the size and location of the exclosure but is not expected to be appreciable due to the relative small amount of woody draw habitat projected to be fenced. Adding a new tank in pasture 2 would likely contribute to increased homogenization of herbaceous structure due to the increased density of water developments in the pasture. Management flexibility could eventually be realized under rotating tanks in the context of utilizing timing and stocking rates, but no specific plan currently exists to accomplish this objective.

Seral Stages

Initial Actions – Construction of a new water tank in the uplands of pasture 1 would result in increased grazing and trampling disturbances and decreasing seral stages around the tank. Adverse effects to native plant communities could be decreased by placing the tank within an invasive grass dominated area, but could increase the potential for dispersal of invasive seed. Fencing the reservoir in the southeast quarter of the pasture and managing access along with water flow to the tanks would allow for control of livestock distribution and utilization across the pasture. However, the increasing trend of invasive grasses and frequently low palatability during the periods of grazing would continue to impede the potential development or maintenance of late seral stages and native plant communities. Management of water sources in pasture 2 would be less effective at controlling livestock distribution due to free water access in North Creek and intermittent access along Scairt Woman Draw. Magpie Creek is the primary water source in pasture 5 and is uncontrolled.

Multiple grazing rotations would have the potential to focus on early season grazing of invasive grasses in pastures 1 and 5 and later season grazing of native grasses in these pastures as well as

pasture 2, but this would require a concerted effort that is not specified in the proposed action. Poor coordination of the grazing seasons with high palatability of the invasive component would continue to contribute to high use of the native component and assist the spread of invasive grasses in pastures 1 and 5, as would hay feeding in pasture 5.

Adaptive Options – Decreasing Authorized Use would have the potential to facilitate shifts towards late seral stages in pasture 2, but neither decrease nor increases in stocking levels would improve plant composition in pastures 1 and 5 without coordinating the grazing periods with the palatability and production of the invasive and native grass components.

Sharp-tailed Grouse

Initial Actions – Assuming a cow size adjustment, Authorized Use would exceed the initial estimated carrying capacity by approximately 4 percent, which could be contributing to an under-representation of potential grouse nesting habitat by facilitating low levels of residual cover. Adding one water tank would promote a more even distribution under the Authorized Use level and also contribute to a lower level of residual cover for nesting grouse. Fencing the dam in the southwest quarter of Section 24 could potentially provide some relief around adjacent uplands, but water density would remain at more than two sources per section with the new water tank in place. Management flexibility, via water management, could potentially be used to contribute to management of the herbaceous structure distribution. However, in the absence of a specific plan to accomplish this objective, it is assumed that moderate use, or even use, will be the management emphasis, contributing to low levels of potential grouse nesting habitat. This is also demonstrated in the current management of the water system via the lack of diversity in the herbaceous structure distribution where the six VOR transect averages varied by only 1 inch. Maintenance of the twice-over grazing system could also be contributing to the current low levels of potential grouse nesting habitat by not allowing sufficient regrowth to occur with the second pass and contributing to a homogenous structure pattern. This alternative differs from the existing condition in adding an additional stock tank and fencing an existing water source. This could promote lower levels of potential cover for nesting grouse.

Adaptive Options – By adjusting the Authorized Use, a potential increase in the proportion of High herbaceous structure could be experienced with a commensurate enhancement in potential grouse nesting and brooding habitat. Fencing high-value woody draws is not expected to have appreciable positive or negative overall effects to herbaceous structure because of the relatively low quantity of woody draws projected to be fenced. Increased water density could homogenize herbaceous structure due to increased water density within pasture.

Effects of Alternative 3A

The actions, both initial and adaptive, are the same as Alternative 3; therefore Alternative 3A would have the same effects as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.
- Continuing to monitor Scairt Woman Draw to determine why lower reach is rated as nonfunctional.
- Moving hay lot in pasture 5 from present location to the southwest corner of the pasture.

ADAPTIVE OPTIONS:

- Adjusting grazing system if structure and plant composition objectives are not met.
- Adjusting stocking level to account for underutilized invasive grass component and/or overutilized native grass component.

Range

Initial Actions – Authorized Use for this allotment would be 1,243 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 1,129 federal AMs converted to AUMs by adjusting for cow size is 1,298 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 4 percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment.

Continuing to monitor Scairt Woman Draw to determine why the lower reach is rated as Nonfunctional would not have an affect on Authorized Use or livestock distribution.

Moving the existing hay lot in pasture 5 would have no effect on Authorized Use of livestock distribution because the hay lot is currently not affecting either of these.

Adaptive Options – Changing the grazing system would change the duration in which livestock graze each pasture. Livestock distribution would change in the larger pasture due to the season of use and forage quality of herbaceous species during the time they are grazed.

Adjusting stocking levels based on underutilized invasive grass component or over utilized native grass component would not be an option unless the permittee applied for a turn-in permit from the MGA. Because of the current inventory grazing association permit the total number of livestock on the allotment for the full 12 months cannot exceed the preference number. This number is based on the summer and winter needs of the livestock and what lands are listed on the permit for those needs. If a turn-in permit was applied for and approved, the permittee would no longer be able to winter on any NFS lands and would have to show additional lands for commensurability. The permittee would also have to find other pasture during the summer months, since the increased number of livestock would only be authorized for a shortened period of time on the allotment.

Riparian

Initial Actions – Moving the hay lot in pasture 5 from the present location to the southwest corner of the pasture should have no effect on the desired riparian conditions being met along Magpie Creek.

Adaptive Options – Adjusting the grazing system if structure and plant composition objectives are not met should have no effect on desired riparian conditions being met along Magpie and North Creeks.

The reach of Scairt Woman would be monitored to determine if the adaptive options will have an effect on riparian condition.

Woody Draws

Initial Actions – Reducing Authorized Use by 4 percent according to initial estimated carrying capacity and cow size would have minimal effect on woody draw conditions due to the low level of reduction.

Moving the hay lot from the terrace of Magpie Creek to the southwest corner of pasture 5 would have no effect on woody draws because multiple grazing rotations, winter use, summer use with low invasive grass palatability, and easy livestock access would continue to result in high woody draw disturbances.

Adaptive Options – Fencing woody draws or decreasing Authorized Use would facilitate increased woody draw regeneration by decreasing livestock browsing and trampling disturbances. Exclusion of livestock disturbances through fencing would provide the fastest and greatest degree of woody draw improvement, but regeneration of woody species could be impaired by increasing litter and invasive grass layers that would occur with the removal of grazing. Fencing of one woody draw would have the potential of increasing disturbances within adjacent woody draws.

Adjusting stocking levels and grazing systems according to the production and palatability of the native and invasive grass components would have the potential to decrease woody draw use and improve conditions by coordinating grazing seasons with upland grass palatability and production. Livestock would therefore be drawn to the uplands and be less attracted to the extended green periods within woody draws. However, livestock would continue to seek woody draws for shade and escape from insect pests.

Herbaceous Structure

Initial Actions – Adjusting the Authorized Use level to consider AUMs and cow size should begin to balance the herbaceous structure distribution. With less use it is projected that there would be more herbaceous structure left at the end of the grazing year. Moving the hay lot from its present location to the southwest corner in pasture 5 would have minimal impacts to the herbaceous structure distribution since pasture 5 is also used during the summer months in the twice-over rotation.

Adaptive Options – Assessing how adjusting the grazing system may impact structure is difficult without specifics. Stocking rate guidelines, in terms of herbaceous structure, are outlined in Appendix I of the Grasslands Plan.

Seral Stages

Initial Actions – Decreasing Authorized Use by 4 percent would probably not have an appreciable effect on seral stages due to the low level of reduced use compared to currently reported use. The proposed reduction would not alter trends of increasing invasive grasses in pastures 1 and 5. Poor or infrequent coordination of multiple grazing seasons with high palatability of the invasive component would continue to result in selective use of the native component and assist the spread of invasive grasses.

Moving the hay lot from the terrace of Magpie Creek to the southwest corner of the pasture would continue to assist the introduction and spread of invasive grasses in the pasture during hay feeding. Hay feeding has the potential to occur in pasture 1 when used in December and January.

Adaptive Options – Adjusting the grazing system or stocking levels according to the production and palatability and production of the invasive and native grass components would increase the potential for increasing the maintenance of native plant communities and decreasing the extent or rate of invasive grass spread. Consistent early season grazing in pastures 1 and 5 would increase the utilization of invasive grass forage, and later season stocking according to the production of native grasses would decrease the potential for excessive use of these species that can assist the spread of invasive grasses.

A large portion of the use in pasture 5 presently occurs during the winter and early May, but frequent mid-summer use also occurs and could be managed according to production of the native grasses, which primarily occur outside crested wheatgrass dominant areas.

Sharp-tailed Grouse

Initial Actions – Adjusting the Authorized Use level to consider AUMs and cow size should enhance grouse nesting habitat. With less use it is projected there would be more residual cover left at the end of the grazing year. Moving the hay lot from its present location to the southwest corner in pasture 5 would have minimal benefits to grouse nesting habitat over existing conditions since pasture 5 is also used during the summer months in the twice-over rotation. Potential decreased use could occur in the northeast corner from the move.

Adaptive Options – Assessing how adjusting the grazing system may impact grouse nesting habitat is difficult without specifics. Stocking rate guidelines, in terms of herbaceous structure (i.e., potential grouse nesting habitat), are outlined in Appendix I of the Grasslands Plan.

ALLOTMENT 278

Table 278.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 278 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 3.65 – Rangelands With Diverse Natural-Appearing Landscapes	472	100	
Total allotment acres	473	100	
NFS acres	472	100	
State land acres	0	0	
Private land acres	1	0	
Current permitted livestock grazing (AMs) on NFS lands			272
Initial estimated carrying capacity (AUMs) on NFS lands			230
Number of pastures containing NFS lands			3

Table 278.2 — Allotment 278 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	Whitetail Creek: 98-99 survey had this part of the reach at PFC. 2004 survey also had this part of the reach at PFC.	Maintain PFC.
Woody draws	Two sampled woody draws were rated, one was Unhealthy and one was At Risk due to lack of seedling/saplings and no shrub layer.	Increase seedling/sapling understory, and enhance shrubs.
Herbaceous structure	Transect results Low – Below Objectives Moderate – Exceeding Objectives High – Below Objectives 2004 Transects: 1.73; 2.45 2004 Stations percent: Low-45/Moderate-52.5/High-2.5	Manage for additional Low and High structure on biologically capable habitats.
Seral stages	Three pastures primarily composed of broken land dominated by crested wheatgrass and varying amounts of invasive bluegrass and native grasses. Two samples at early seral stages in pasture 1.	Decrease or limit the spread of invasive bluegrass and efficiently utilize crested wheatgrass while providing for community development.
Sharp-tailed grouse	There are no known grouse leks inside the allotment. There are two known leks within 1 mile of the allotment. The area of the allotment that overlaps this 1-mile radius encompasses approximately 344 acres (73 percent) of the allotment.	Manage to enhance sharp-tailed grouse nesting and brooding habitat by increasing the quality and quantity of High vegetative structure on biologically capable sites.
Remarks	Approximately 8 acres of Canada thistle and burdock. Weeds have been treated.	

Table 278.3 — Allotment 278 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action	Alternative 3A	Alternative 4
• Authorized Use is 272 federal AMs. • Three-year average permitted use is 254 federal AMs.* • Permit type: Turn-in. • Rotation: Early season use by two herds in three pastures. • Class(s) of livestock: Cow/calf pairs and/or yearlings. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 272. • Utilize pastures 1, 2, and 3 as crested wheatgrass pastures. • Reclaim reservoir in pasture 2. **Adaptive Options** • Fence high-value woody draws • Adjust Authorized Use.	**Initial Actions** • Authorized federal AMs: 272. • Utilize pastures 1, 2, and 3 as crested wheatgrass pastures. **Adaptive Options** • Fence high-value woody draws. • Adjust Authorized Use.	**Initial Actions** • Authorized federal AUMs: 230. • Utilize pastures 1, 2, and 3 as crested wheatgrass pastures. **Adaptive Options** • Fence high-value woody draws. • Rehabilitate or fence reservoir in pasture 2. • Adjust Authorized Use.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every 3 years. • Complete Properly Functioning Condition survey once every 5 years. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3.	**Monitoring** • Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 278 — Existing Condition

Range – This allotment is approximately 473 acres of solely NFS lands. Currently, this allotment is issued a private allocation turn-in permit for 272 AMs by the MGA. It is also the headquarters allotment associated with a common allotment, Allotment 301. This allotment has been divided into three pastures. The pastures range from 124 to 192 acres and are located in the Rolling Prairie geographic area. Water developments include a windmill well and stock tank, dugouts, and a reservoir. Current AMs provided by NFS lands can be found in Table 278.1.

Since 2004, the allotment has been grazed for approximately 30 to 35 days, depending on the year. Pastures 1 and 2 are currently grazed together with approximately 125 cow/calf pairs from the first week in May until the first week in June. Pasture 3 is currently grazed with 103 to 107 yearling heifers from the first week in May until the first week in June. Prior to 2004, this allotment was issued a private allocation inventory permit for 35 head for 8 months with an additional 77 head from January through April on the headquarters. The plant composition in these pastures is dominated by crested wheatgrass, with some native species intermixed within.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there are approximately 8 acres of Canada thistle and burdock. The Billings County Weed Board has been informed of these infestations and has made an attempt to control some of them.

Riparian – Pasture 1 of Allotment 278 contains a short segment (0.1 mile) of Whitetail Creek (Reach 1). This segment has a functionality rating of PFC (see table below). The headwaters of Betsy Creek cross pasture 2 of Allotment 278. The interdisciplinary team examined this reach and noted that it was heavily trampled by livestock (Figure 278.1). However, the reach lacked evidence of riparian habitat as the flow is ephemeral.

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
278-01	Whitetail Creek (1)	0.10					0.10

Figure 278.1 — Headwater drainage of Betsy Creek in Allotment 278 does not have riparian habitat. It is severely trampled by livestock. The area is treated as a woody draw; it suffers from a lack of seedlings and saplings and has no shrub layer.

Woody Draws – The only woody draw present in pasture 1 was Unhealthy, and an adjacent alkaline fen occurring along Whitetail Creek was in poor condition with a high degree of trampling associated

with livestock watering. A woody draw downstream of a dugout pond in pasture 2 was At Risk. No woody draws occurred in pasture 3.

Herbaceous Structure – In 2004, two randomly selected VOR transects were surveyed in the fall. Both transects were measured as Moderate. The station averages broke out as 45 percent in Low structure stations; 52.5 percent in Moderate structure; and 2.5 percent were High structure stations (≥5.5 inches). No transects were resurveyed in the fall of 2005.

Seral Stages – Broken land constituted 71 percent of pasture 1, and more than 90 percent of the pasture is identified as a mixture of crested wheatgrass and bluegrass, with lesser amounts of native grasses. Crested wheatgrass constituted 78 percent of the grass production in an NDSU sample plot at the north end of the pasture, while red three-awn (*Aristida purpurea* Nutt.) and sedge constituted 18 percent of the grass production. Kentucky bluegrass occurred at a frequency of 7 percent but was not present in the clipped plots. Clubmoss comprised 66 percent of the relative plant basal cover. A sere plot in the center of the pasture exhibited similar dominance of crested wheatgrass with light amounts Kentucky bluegrass and native grasses. Both of these sites were at an early seral stage for broken land.

About one-third of pasture 2 and all of pasture 3 consisted of broken land. Field observations, Robel transects, and belt transects indicated plant composition similar to pasture 1, but greater prominence of intermingled bluegrass as well as native grass patches were observed in portions of pasture 2.

Sharp-tailed Grouse – There are no known grouse leks known inside the allotment. There are two known leks within 1 mile of the allotment. The area of the allotment that overlaps the 1-mile radius encompasses approximately 344 acres (73 percent) of the allotment.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed after 2 years.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of the reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian condition along Whitetail Creek, as described in the existing condition, would continue and evolve toward the potential riparian community.

Woody Draws – Woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. Existing invasive grasses and potential increases of these species as a result of increasing

litter with the removal of livestock grazing would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock, there would be an immediate and appreciable increased opportunity for the development of High and Moderate herbaceous structure and a decrease in the amount of Low herbaceous structure in the allotment. This alternative would likely be quicker than the other alternatives in reaching, and potentially exceeding High structure objectives. But it, too, would be out of balance with overall herbaceous structure objectives with a subsequent loss of Low structure within the allotment.

Seral Stages – The removal of livestock grazing disturbances would result in the persistence of crested wheatgrass and gradual increases of native grasses and Kentucky bluegrass. The current light amount of native grasses would result in slow progression and would likely be impeded by faster increases of invasive bluegrass, as assisted by increasing plant litter with the removal of livestock grazing, thereby resulting in gradual transitions to Invaded Grass States.

Sharp-tailed Grouse – The increase in potential High structure grasslands from the removal of livestock would enhance nesting and brooding habitat for sharp-tailed grouse in the short term (<10 to 15 years). Over time (more than 10 to 15 years), a decrease in forb diversity would decrease foraging opportunities because of both crested wheatgrass and Kentucky bluegrass expansion. Regardless of the dynamics of Kentucky bluegrass and crested wheatgrass competition, potential nesting quality and quantity could be reduced, perhaps past the 10 to 15 year time frame.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by a turn-in grazing association permit, and Authorized Use is 272 federal AMs.
- Cow/calf pairs and/or yearlings are run early in the season with two herds in three pastures.
- See allotment map in Appendix B for current range developments.

Range – The existing federal AMs permitted to the grazing association would continue. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weed control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian conditions along Whitetail Creek, as described in the existing condition, would continue.

Woody Draws – Woody draw conditions in pastures 1 and 2 would not improve under current management. The general scarcity, easy accessibility, mid-summer grazing rotations, and location adjacent to water sources ensures continued disturbances that would impede improvement.

Herbaceous Structure – Management changed in 2004 from a May through December use to an early use allotment due to the crested component. Given the Authorized Use is appreciably higher than the initial estimated carrying capacity, Angell (1997) demonstrated negative effects to crested wheatgrass under high stocking rates. However, there is a long growing season for some recovery. It is projected that herbaceous structure could improve in the fall from previous measurements, but not appreciably, due to the high Authorized Use on these sites.

Seral Stages – Continued focus on early season use has the potential to facilitate native plant development, but apparent trends of increasing bluegrass among all three pastures have the potential to impede this result. The early grazing season is appropriately timed to the palatability of crested wheatgrass and bluegrass and is an improvement compared to previous management that extended later into the grazing season with decreasing palatability of invasive grasses. However, sporadic mid-summer grazing rotations in pastures 1 and 2 that have constituted half of the grazing season occur during low palatability of invasive grasses and contribute to selective use of the native component, particularly in view of the small proportion of these species measured in the NDSU plot and the sere plot. The occurrence of prominent clubmoss layers in portions of the allotment are likely contributing to low plant reproduction and forage production.

Sharp-tailed Grouse – Except for the high Authorized Use relative to the initial estimated carrying capacity on crested wheat (Angell 1997), existing management actions could enhance High structure grasslands, as measured in the fall due to the extended regrowth timeframe. However, due to the large number of livestock for the month of May, nesting sharp-tailed grouse may suffer trampling and loss of habitat from the livestock activities (Newell 1987).

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 272 federal AMs.
- Utilizing pastures 1, 2, and 3 as crested wheatgrass pastures.
- Reclaiming reservoir in pasture 2.

ADAPTIVE OPTIONS:

- Fencing high-value woody draws
- Adjusting Authorized Use.

Range

Initial Actions – Because the initial Authorized Use would remain the same as current management, the permittee would be allowed to harvest the same amount of forage. Utilizing all three pastures early as crested wheatgrass pastures would not affect Authorized Use or livestock distribution, as this type of management is occurring now.

Reclaiming the reservoir in pasture 2 would not have an effect on livestock distribution because the reservoir is breached and is more of a mud hole. Existing, reliable livestock water is nearby.

Adaptive Options – Fencing high-value woody draws would have little to no change in livestock distribution across the allotment. Forage within the exclosures would no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may occur on remaining forage. There will be a cost to install and maintain these fences.

Adjusting Authorized Use downward would result in fewer livestock numbers, fewer grazing days, or a combination of the two because of the turn in permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock. However, the amount of forage harvested would be less than the existing forage harvested.

Riparian

Initial Actions – It is expected that desired conditions along Whitetail Creek would continue with the initial actions proposed.

Utilizing all three pastures early as crested wheatgrass pastures would not affect livestock distribution and riparian condition along Whitetail Creek, as this type of management is occurring presently.

Reclaiming the reservoir in pasture 2 would not have an effect on riparian condition along Whitetail Creek due to separation in a different pasture.

Adaptive Options – It is expected that desired conditions along Whitetail Creek would continue with the adaptive options proposed.

Fencing high-value woody draws should have no effect on riparian condition along Whitetail Creek because there would be no expected change in livestock distribution and the distance of separation.

Reducing Authorized Use should help improve the upland vegetation, which reduces overland flow, further benefitting the riparian conditions along Whitetail Creek. A reduction in overland flow results in reduced stream velocities and allows for the establishment of riparian vegetation, which would build stream banks.

Woody Draws

Initial Actions – Use of all three pastures as early season crested wheatgrass pastures would not achieve Healthy woody draw conditions in pastures 1 and 2. Halting sporadic twice-over use could contribute to decreased woody draw disturbances and slightly improved conditions as a result of cooler temperatures and fewer insect pests. However, the general scarcity, easy accessibility, location adjacent to water sources, and high levels of use compared to initial estimated carrying capacity would ensure continued browsing and trampling disturbances that would impede increased regeneration of woody species.

Reclaiming the reservoir in pasture 2 would improve hydrologic flow and conditions in the downstream woody draw, but an adjacent well and water tank would ensure continued disturbance of the draw, which would impede woody species regeneration and improved conditions.

Adaptive Options – Fencing woody draws would facilitate the regeneration of desired woody species and improved conditions by removing livestock disturbances, but increasing litter and invasive grass layers that would occur with the removal of grazing could impede the regeneration of

woody species. Fencing of one woody draw may result in increased use of the remaining draw located about 0.6 miles distant.

Decreasing Authorized Use would have the potential of improving woody draw conditions by decreasing livestock browsing and trampling disturbances. However, the amount of reduction required to achieve successful reproduction of woody species would be high as a result of current levels of use that are appreciably less than Authorized Use, the scarcity and easy accessibility of draws, and their location adjacent to water sources.

Herbaceous Structure

Initial Actions – Management changed appreciably in 2004, and existing data could better reflect management previous to 2004, although structure can respond quite rapidly to changes in climate and management. However, the high Authorized Use relative to the initial estimated carrying capacity is initially proposed to be retained along with the early season use. It is projected that there could be some improvement in the fall over current data due to the long deferment period, but the high Authorized Use level could also negate meeting or moving herbaceous structure appreciably towards project objectives (Angell 1997). Reclaiming the reservoir in pasture 2 will have little impact to distribution of livestock due to the nearby presence of a stock tank at the windmill.

Adaptive Options – Adjusting the Authorized Use would be the most effective tool available to begin to adjust the herbaceous structure toward project objectives. Fencing specific woody draws could have effects relative to the size and location of the exclosure, but is not expected to be appreciable due to the relatively small amount of woody draw habitat projected to be fenced.

Seral Stages

Initial Actions – Utilizing the three pastures as early season crested wheatgrass pastures would assist the development of native grasses by removing selective grazing of these species, which occurs during mid-summer, when palatability of crested wheatgrass and Kentucky bluegrass decreases. However, clubmoss would continue to impede grass regeneration in large portions of the allotment. Although Authorized Use would remain 36 percent above initial estimated carrying capacity after adjusting for cow size, relatively high levels of early season use may be necessary to create a trend of decreasing bluegrass and increasing native grasses. Observations in pastures 1 and 2 suggest that current utilization is not highly excessive and the potential for premature grazing of native grasses would be reduced by high palatability of the invasive component and the removal of livestock by mid-June. Continued grazing after this date would result in increasing use of the native component.

Reclaiming the reservoir in pasture 2 would not have an appreciable effect on plant composition because an existing well and stock tank would ensure relatively high use in this area.

Adaptive Options – Decreasing Authorized Use would establish stocking levels closer to initial estimated carrying capacity and forage production measured in the NDSU plot, which would potentially increase plant vigor, community development, and production of both the invasive and native grass components. The potential degree of premature grazing of the native component would decrease, but increased plant litter would have the potential to facilitate the spread of invasive grasses. Clubmoss would persist as a major impediment to increasing production of either

component and would experience decreased trampling disturbances, which would maintain or decrease seedbed conditions.

Fencing woody draws would have no appreciable effect on plant composition due to the small size of the potential exclosures.

Sharp-tailed Grouse

Initial Actions – It is projected that a portion of the potential gains in herbaceous structure in the fall could be lost by the typical grouse nesting peak period in mid-May through livestock trampling and forage consumption. Plus, the presence of a large concentration of livestock could discourage sharp-tailed grouse hens reluctant from nesting (Newell 1987). Reclamation of the reservoir would have minimal effects because of the proximity of the windmill.

Adaptive Options – By adjusting the Authorized Use downward, a potential increase in the proportion of higher herbaceous structure readings could be experienced with commensurate potential enhancements in grouse nesting and brooding habitat. There would be a large number of livestock in the pasture during the peak grouse nesting period, as well as other ground nesting species, which could have negative impacts such as trampling of nest and loss of cover from other activities of livestock. Fencing high-value woody draws is not expected to have appreciable positive or negative overall effects to herbaceous structure due to the relatively low quantity of woody draws projected to be fenced.

Effects of Alternative 3A

The effects of Alternative 3A are the same as Alternative 3 with the following stated exceptions.

INITIAL ACTIONS:

- Dropping the initial action of reclaiming the reservoir in pasture 2.

ADAPTIVE OPTIONS:

- The adaptive options and effects in Alternative 3A are the same as Alternative 3.

Range

Initial Actions – Dropping the action of reclaiming the reservoir in pasture 2 would have no effect on Authorized Use or livestock distribution since there would be no change from current management.

Riparian

Initial Actions – This alternative is the same as Alternative 3 except that reservoir would not be reclaimed in pasture 2. The effects are the same as Alternative 3.

Woody Draws

Initial Actions – Dropping the action of reclaiming the reservoir in pasture 2 would have no effect on current conditions of the woody draw located adjacent to the reservoir because livestock disturbances would remain high as a result of an adjacent water tank. However, not reclaiming the reservoir would perpetuate poor hydrologic conditions of the downstream drainage in this and an

adjacent allotment, and the potential for including the draw within a temporary fence exclosure with the reclaimed reservoir would be lost.

Herbaceous Structure
Initial Actions – Dropping the action of reclaiming the reservoir in pasture 2 would have no appreciable effect on herbaceous structure since there would be no change from current management.

Seral Stages
Initial Actions – Dropping the action of reclaiming the reservoir in pasture 2 would have no affect on plant composition due to continued high use in the area associated with an adjacent stock tank.

Sharp-tailed Grouse
Initial Actions – Dropping the action of reclaiming the reservoir in pasture 2 would have no affect on sharp-tailed grouse habitat since there would be no change from current management.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exception of the following changes.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.

ADAPTIVE OPTIONS:

- Rehabilitating or fencing the reservoir in pasture 2.

Range
Initial Actions – Authorized Use for this allotment would be 230 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 272 federal AMs converted to AUMs by adjusting for cow size is 313 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 26 percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in cow size when calculating the number of head and the grazing season duration when planning the rotation for the allotment.

Adaptive Options – Rehabilitating the existing reservoir in pasture 2 would provide an additional livestock water source in pasture 2 and not affect livestock distribution because of the distance from the existing windmill and well system. Fencing the reservoir would not affect Authorized Use because of the size of area that would be excluded from livestock access.

Riparian
Initial Actions – The effects would be the same as described in Alternative 3.

Adaptive Options – The effects would be the same as described in Alternative 3.

Woody Draws

Initial Actions – Decreasing Authorized Use by 26 percent would establish levels of use 7 to 19 percent less than currently reported, thereby providing the potential for slowly improving woody draw conditions. Early season use of pastures 1 and 2 would further contribute to decreased disturbances within woody draws as a result of cooler temperatures and fewer insect pests, but the use of woody draws would remain relatively high due to their location adjacent to water sources, their scarcity, and their easy accessibility.

Adaptive Options – The effects of all Adaptive Options were discussed under Alternative 3.

Herbaceous Structure

Initial Actions – The grazing system has changed appreciably since the VOR data was collected in 2004. The early season use is proposed to continue under this alternative. Under this alternative, Authorized Use would be changed to reflect AUMs under an initial estimated carrying capacity. A projected, more moderate Authorized Use level, in combination with the longer growing season over pre-2004 management, could aid in achieving an increased proportion of High herbaceous structure as measured in the fall. This should occur in a shorter timeframe than in Alternative 3. Angell (1997) found that highly stocked crested wheat treatments (i.e., Alt. 3) had significantly less standing crop than a moderately stocked system (i.e. Alt. 4).

Adaptive Options – Rehabilitating or fencing the reservoir in pasture 2 should result in minimal changes in herbaceous structure because of the proximity of the windmill site.

Seral Stages

Initial Actions – The general effects of decreasing Authorized Use while managing for crested wheatgrass pastures was discussed under Alternative 3. The proposed 26 percent reduction in Authorized Use under Alternative 4 would increase plant vigor and production and decrease the potential degree of premature native grass use. However, increasing plant litter could assist the spread of Kentucky bluegrass, which would impede development of the native component.

Adaptive Options – The effects of all Adaptive Options were discussed under Alternative 3.

Sharp-tailed Grouse

Initial Actions – It is projected that a portion of the projected gains in herbaceous structure in the fall (from the reduction in Authorized Use to initial estimated carrying capacity) could be lost during the typical peak grouse nesting period of mid-May through livestock trampling and forage consumption plus the presence of large herbivores (Newell 1987). With a reduction of approximately 26 percent, the effects would be less than the other alternatives.

Adaptive Options – Rehabilitating or fencing the reservoir in pasture 2 should have the same general effects as the other alternatives, except that this alternative would impart a reduced amount of impact due to the projected reduction in number of livestock.

ALLOTMENT 281

Table 281.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 281 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 6.1 – Rangeland With Broad Resource Emphasis	555	100	
Total allotment acres	681	100	
NFS acres	555	81	
State land acres	0	0	
Private land acres	126	19	
Current permitted livestock grazing (AMs) on NFS lands			295
Initial estimated carrying capacity (AUMs) on NFS lands			270
Number of pastures containing NFS lands			4

Table 281.2 — Allotment 281 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	There are no perennial or intermittent stream reaches in this allotment.	None.
Woody draws	Of the sampled woody draws 20 percent were Healthy, 60 percent were At Risk, and 20 percent were Unhealthy. At Risk and Unhealthy stands are due to low regeneration and livestock trampling.	Increase successful recruitment of woody species.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Below Objectives High – Below Objectives 2004 Transects: 1.0; 1.25 2004 Stations percent: Low-92.5/Moderate-7.5/ High-0.	Manage for additional Moderate and High structure on biologically capable habitats.
Seral stages	High proportion of broken land in three of four pastures and evidence of increasing invasive grasses in all pastures. One sample site in broken land was at a mid seral stage.	Increase community development in broken land pastures. Increase native plant dominance and decrease or limit the expansion of invasive grasses in unbroken land.
Sharp-tailed grouse	There are no known leks within the allotment boundary and there are no known leks within one mile of the allotment. There is one lek just outside the one mile boundary.	Manage to enhance sharp-tailed grouse nesting and brooding habitat by increasing the quality and quantity of High vegetative structure on biologically capable sites.
Remarks	Approximately 13 acres of Canada thistle, leafy spurge, and burdock.	

Table 281.3 — Allotment 281 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 295 federal AMs • Three-year average permitted use is 268 federal AMs.* • Permit type: Inventory (Managed as turn-in). • Rotation: Modified complementary deferred rotation. • Class(s) of livestock: Cow/calf pairs and/or yearlings. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 295 • Develop water source in pasture 1 to pull livestock away from woody draws. • Annually change season of use in the grazing rotation. **Adaptive Options** • Construct reservoir in southwestern portion of pasture 1. • Fence high-value woody draws. • Mechanically treat portion of pasture 6, to reduce clubmoss, then interseed, and possibly fertilize. • Adjust Authorized Use.	**Initial Actions** • Authorized federal AUMs: 270 • Develop water source in northeast corner of pasture 1 to pull livestock away from woody draws. • Annually change season of use in the grazing rotation. **Adaptive Options** • Fence high-value woody draws. • Adjust Authorized Use.
Monitoring • Review annual planned management identified in Allotment Worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every 3 years. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 281 — Existing Condition

Range – This allotment is approximately 681 acres in size and contains both private and NFS lands with 555 acres of NFS lands. Currently, this allotment is issued an inventory permit for 351 AMs by the MGA. It should be noted that although this allotment is permitted with an inventory permit, which typically means that livestock are somewhere on the allotment for a full 12 months, it is

actually managed like a turn-in permit. The permittee brings in livestock to graze sometime in the summer months, but brings them home to a separate 'off permit' location to winter the livestock. It is also the headquarters allotment associated with a common allotment, Lower Cherry Hollow. This allotment has been subdivided into four pastures which all contain some amount of NFS lands. These pastures range in size from 83 to 322 acres. Current AMs provided by NFS lands can be found in Table 281.1. This allotment is located in the Rolling Prairie geographic area. Water developments within this allotment include a well and livestock tank. Pasture 1 has no developed water, and livestock rely on a beaver dam that exists in a tributary of Whitetail Creek.

The grazing management on this allotment in recent years has been highly variable, but the following is what can be summarized from recent allotment worksheet grazing plans. Depending upon the climatic conditions for the given year either cow/calf pairs or yearlings are stocked in the pastures. Pastures 5 and 6 are usually grazed earlier in the season around the first week in June, and depending on the conditions for the year, some grazing may occur later in the fall. Livestock are usually turned into pastures 2 and 1 around the end of June to the middle of July respectively. Pasture 2 usually has livestock come back into the pasture before leaving the allotment altogether for the year. Plant composition is primarily crested wheatgrass with some intermixed native species on the uplands with the draws containing a mix of Kentucky bluegrass and native species.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there is approximately thirteen acres of Canada thistle, leafy spurge, and burdock.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – Of five sampled woody draws in the allotment, 20 percent were Healthy, 60 percent were At Risk, and 20 percent were Unhealthy. Two relatively large woody draws in pasture 1 were At Risk and Unhealthy. Browsing and trailing disturbances were evident in both draws but particularly along the largest draw with several beaver ponds that serve as the primary source of water (Figure 281.1).

Figure 281.1 — Pasture 1, a) Heavily trampled beaver pond at lower end of woody draw, and b) current use of upstream beaver ponds by livestock.

Half of the woody draws in pasture 2 were Healthy, while half occurring along drainages at the bottom of the slopes were At Risk and contain high amounts of burdock (Figure 281.2). The single woody draw in pasture 5 was At Risk, and a small woody draw in pasture 6 is likely to be in a similar condition because it is also the only draw present. Ephemeral pools along the drainage in pasture 5 contribute to woody draw disturbances.

Figure 281.2 — Healthy woody draw on the left and At Risk on the right in pasture 2.

Herbaceous Structure – In 2004, two randomly placed VOR transects were surveyed in the fall. Both transects measured in the Low class. The overall station average found that approximately 93 percent of the stations were in the Low category with the remaining stations in the Moderate class. None were measured in the High structure class. There were no transects resurveyed in 2005.

Seral Stages – Broken land constituted 14 percent of pasture 1. Native grasses tended to dominate unbroken land with high invasive grass frequency that constituted low to moderate portions of the plant composition. Sweet clover can be high during some years. A belt transect near the center of the pasture recorded western wheatgrass as the dominant species but noted poor plant composition.

Fewer than 70 acres of NFS land occurred in pasture 2 and primarily involved terraces of Whitetail Creek that are at Invaded Grass States with smooth brome and crested wheatgrass dominance.

Most of pasture 5 and all of pasture 6 were composed of broken land with intermixed invasive and native grasses. A sere plot in pasture 6 was at a mid seral stage for a broken land with intermixed crested wheatgrass, needle-and-thread, and Junegrass. Relative plant frequency of Kentucky bluegrass increased from 0 percent to 21 percent between 1980 and 2009 along a repeated pace transect at the south end of the pasture. Frequency of clubmoss increased from 3 percent to 30 percent. Two Robel transects recorded crested wheatgrass dominance with a mix of native grasses.

Sharp-tailed Grouse – There are no known leks within the allotment boundary and there are no known leks within 1 mile of the allotment. There is one lek just outside the 1-mile boundary with the next closest lek a little more than 2 miles away.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed 2 years later.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would now be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – Woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. Existing invasive grasses and potential increases of these species as a result of increasing litter with the removal of livestock grazing would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock there would be an immediate appreciable increased opportunity for the development of High and Moderate herbaceous structure, and a commensurate decrease in the amount of Low herbaceous structure in the allotment. Over time, the herbaceous structure distribution would likely change to the point where the imbalance in herbaceous structure would be reversed from what the current data indicates (low amounts of High structure) to where there is a low amount of Low structure.

Seral Stages – The removal of livestock grazing disturbances would increase the potential for shifts towards late seral stages among broken and unbroken land, but would be impeded by increasing invasive grasses facilitated by increased plant litter. Large areas of the allotment would transition to Invaded Grass States within ten years with decreasing maintenance of native plant species.

Sharp-tailed Grouse – The increase in potential High structure grasslands from the removal of livestock would enhance nesting and brooding habitat for sharp-tailed grouse. However, over time (perhaps greater than 10 to 15 years) the decrease in forb diversity could decrease foraging opportunities. Also, over time (>10 to 15 years), nesting and brooding quality and quantity would also decrease because of lower quality habitat associated with invasive grasses that would continue to invade the pastures.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by an inventory grazing association permit, and Authorized Use is 295 federal AMs.
- Cow/calf pairs and/or yearlings are run in a modified complementary deferred rotation.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – The low proportion of Healthy woody draws across the allotment would persist under current management. Authorized Use that exceeds initial estimated carrying capacity by 26 percent after adjusting for cow size, the scarcity of draws within individual pastures, easy accessibility, close proximity to water sources, and multiple pasture rotations contribute to high woody draw disturbances.

Relatively light use reported for pasture 2 should sustain Healthy conditions of half the woody draws occurring on steep slopes, but At Risk sites occurring along the toeslopes would persist due to flat terrain and high livestock disturbances (Figure 281.2 above). Collateral impacts to woody species from herbicide treatments for burdock would contribute to decreasing conditions in these

draws. The woody draw in pasture 5 exhibited a moderately high potential for improvement but it was the only draw present in the pasture and would therefore continue to experience a high level of disturbance.

Herbaceous Structure – Current management is projected to continue to perpetuate the existing herbaceous structure distribution, at least in pastures 5 and 6, with limited potential to improve the overall herbaceous structure distribution. An Authorized Use level that exceeds the initial estimated carrying capacity, after accounting for cow size, by approximately 20 percent is expected to maintain these conditions.

Seral Stages – The apparent trend of increasing invasive grasses would continue with transitions to Invaded Grass States and decreasing maintenance of native species under current management. Seral development would be impeded by stocking at the level of Authorized Use that exceeds initial estimated carrying capacity by 26 percent after adjusting for cow size, inconsistent coordination of the grazing season with invasive grass palatability, and potentially excessive use of the native component during mid and late summer grazing seasons. Multiple rotations through pastures 5 and 6 have a high potential to result in selective and potentially excessive use of the native component during the second rotation, thereby impeding native grass establishment and assisting invasive grasses. Premature and/or seasonlong grazing in pasture 1 during some years may have contributed to the current abundance of invasive grasses. Smooth brome is likely to be utilized in pasture 4 during various grazing seasons because it remains more palatable than other invasive grasses, but it would remain dominant along the creek terraces without concentrated efforts to increase native communities.

Sharp-tailed Grouse – Existing management actions would not enhance High structure grasslands, thus limiting the potential to enhance grouse nesting and brooding habitat. The existing Authorized Use level is expected to maintain the habitat conditions.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 295 federal AMs.
- Developing a water source in pasture 1 to pull livestock away from woody draws.
- Annually changing season of use in the grazing rotation.

ADAPTIVE OPTIONS:

- Constructing a reservoir in southwestern portion of pasture 1.
- Fencing high-value woody draws.
- Mechanically treating a portion of pasture 6, to reduce clubmoss, then interseeding, and possibly fertilizing.
- Adjusting Authorized Use.

Range

Initial Actions – Because the initial Authorized Use would remain the same as current

management, the permittee would be allowed to harvest the same amount of forage. Annually changing the season of use within the grazing rotation would not affect Authorized Use or livestock distribution as this type of management is occurring presently on the pasture treated as native.

Developing a water source would provide reliable livestock water in pasture 1 compared to the existing condition. Livestock grazing use would change in the area of the water source and would assist in pulling livestock away from the woody draw. However, livestock would still have access to the woody draw and beaver dam in the western portion of the pasture because there would be nothing restricting them. Due to the size of the pasture overall livestock distribution changes would be minimal.

Adaptive Options – Constructing a reservoir in the southwestern portion of pasture 1 would add an additional water source to the allotment. This would not affect the Authorized Use or livestock distribution because of the size of the pasture, topography, and the existing water source.

Fencing high-value woody draws would have little to no change in livestock distribution across the allotment. Forage within the exclosures would no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may occur on remaining forage. There will be a cost to install these fences and as a result there will be additional cost of maintenance of the fence to prevent livestock access to the woody draws.

Mechanically treating portions of pasture 6 to reduce clubmoss, then interseeding, and possibly fertilizing would affect Authorized Use on a temporary basis because depending on the actions taken some amount of rest may be required to allow establishment of target species in the pasture. Livestock distribution may be more focused in the areas that are fertilized, but due to the small size of the pasture overall the livestock distribution would not change. There would be an initial cost for the various treatments.

Adjusting Authorized Use downward would result in fewer livestock numbers, fewer grazing days, or a combination of the two. Adjusting Authorized Use would not change the distribution of the livestock; however, the amount of forage harvested would be less than the existing forage harvested.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws

Initial Actions – Developing a water source in pasture 1 would facilitate improved woody draw conditions by pulling livestock away from the woody draw where livestock obtain water from a series of beaver ponds. However, Authorized Use that exceeds initial estimated carrying capacity by 26 percent after adjusting for cow size, the scarcity of draws in the pasture, and continued access to the beaver ponds would contribute to continued livestock disturbances within woody draws. Warm temperatures and insect pests, and low palatability of the invasive grass component that would occur on a frequent annual basis with the proposed deferred rotation would also contribute to woody draw disturbances.

The easy accessibility and scarcity of woody draws in the other three pastures would maintain current woody draw disturbances. The proposed deferred rotation would have the potential to

increase woody draw disturbances across the three pastures as a result of more frequent mid and late summer grazing periods with increased temperatures and insect pests and extended green periods relative to invasive grass uplands with low palatability.

Adaptive Options – Constructing a reservoir in the southwest corner of pasture 1 would add to several beaver ponds as a water source and perpetuate Unhealthy conditions of the associated woody draw.

Fencing woody draws and/or decreasing Authorized Use would facilitate increased woody draw regeneration by decreasing livestock browsing and trampling disturbances. Exclusion of livestock disturbances through fencing would provide the fastest and greatest degree of woody draw improvement, but regeneration of woody species could be impaired by increasing litter and invasive grass layers that would occur with the removal of grazing. Fencing of the primary woody draw in pasture 1would increase the proportion of Healthy sites to 40 percent, but would likely result in increasing disturbances and decreasing conditions within the adjacent At Risk woody draw. Increased disturbance of adjacent draws would not occur with potential fencing of the lone draws in pastures 5 and 6, other than portions of the draw not included within the fence. Decreasing Authorized Use would be less effective than fencing for improving woody draw conditions due to their scarcity within individual pastures and the close proximity of water in pasture 1.

Mechanically treating clubmoss, interseeding, and fertilizing portions of pasture 6 could increase plant production and palatability that could facilitate decreased woody draw disturbances by drawing livestock to the upland herbaceous communities. However, the single woody draw in the pasture would continue to be sought for shade and escape from insect pests, thereby decreasing the potential for improvement.

Herbaceous Structure

Initial Actions – Accounting for the cow size adjustment, Authorized Use exceeds the initial estimated carrying capacity by approximately 20 percent which would be contributing to the existing herbaceous structure distribution, notably the apparent lack of a High herbaceous structure class from low levels of residual cover. Adding one water tank in pasture 1 could facilitate a more even distribution, especially under the Authorized Use level but permit rotational flexibility. Implementing a four pasture deferred rotation may have benefits for herbaceous structure distribution in the earliest pasture. However, the Authorized Use level would limit the regrowth potential.

Adaptive Options – Adjusting the Authorized Use would be the most effective tool available to begin to immediately adjust the herbaceous structure towards meeting project objectives due to increased levels of residual cover. Fencing woody draws, or portions of draws, could have effects relative to the size and location of the exclosure but is not expected to be appreciable due to the relative small amount of woody draw habitat expected to be fenced. Constructing the reservoir in pasture 1, in combination with the initial action of a new water source in the initial actions, would increase the density of water sources in the pasture creating the potential to increase the homogenization of the herbaceous structure within the pasture. Management flexibility, via water management, could potentially be used to contribute to the management of the herbaceous structure

distribution. However, it is assumed, in the absence of a plan, that moderate use, or even use, will be the management emphasis, contributing to the homogenous herbaceous structure distribution. Also, fencing of the reservoir would be necessary to improve the effectiveness of any potential strategy. Mechanically treating clubmoss, then interseeding, could potentially decrease club moss and increase grass cover. This may have beneficial effects for residual cover levels.

Seral Stages

Initial Actions – Developing a water source in the uplands of pasture 1 would result in a zone of increased grazing and trampling disturbances and shifts towards early seral stages and annual weeds around the tank. Adverse impacts to native plant communities could be decreased by placing the tank in an area dominated by invasive grasses, but this would have the potential for spreading invasive seed to other portions of the pasture.

Implementing a deferred rotation among the four pastures would continue or increase poor coordination of the grazing season with palatability of the invasive grass component, thereby increasing the potential for selective and excessive use of the native component and facilitating the spread of invasive grasses. This effect would be most pronounced in pastures 2, 5, and 6, and would be compounded by Authorized Use that exceeds initial estimated carrying capacity by 26 percent after adjusting for cow size.

Adaptive Options – Constructing a reservoir along the drainage in the southwestern portion of pasture 1would perpetuate livestock distribution along the woody draw drainage and away from the uplands, particularly during summer grazing rotations that would occur on a frequent annual basis. However, invasive grasses would impede the potential development or maintenance of late seral stages in the uplands.

Fencing high-value woody draws or portions thereof such as that occurring along the above drainage, or the singular draws occurring in pastures 5 and 6, would help shift livestock distribution to the uplands. Although potentially impeding the development of late seral stages, this may assist litter management and decrease the spread of invasive grasses. However, a portion of the livestock distribution in pasture 1 would shift towards the second woody draw and contribute to decreasing conditions.

Mechanically treating clubmoss, interseeding crested wheatgrass, and fertilizing portions of pasture 6 could increase plant production that could decrease the difference between Authorized Use and initial estimated carrying capacity. However, the deferred rotation would perpetuate poor coordination of the grazing season with crested wheatgrass palatability in the pasture. The proportion of native grasses would be reduced through seeding of crested wheatgrass, and fertilizing would increase the competitive advantage for invasive grasses because they exhibit greater responses than native grasses to increased nitrogen levels (Belsky and Gelbard 2000, Sedivec and Manske 1990, USNA 2006). Sedivec and Manske (1990) recommended against fertilizing pastures with high amounts of native grasses because of adverse effects of nitrogen and phosphorous on mycorrhizal fungi to which many native grasses have symbiotic relationships. Interruptions of this relationship can lead to decreased native plant vigor and production after growth effects of the fertilizer have decreased.

Neither decreasing nor increasing Authorized Use would alter the trend of increasing invasive grasses without coordinating the season of use and stocking levels with the proportional contribution and palatability of the invasive and native grass components.

Sharp-tailed Grouse

Initial Actions – Accounting for the cow size adjustment, Authorized Use exceeds the initial estimated carrying capacity by approximately 20 percent, which would be contributing to the existing herbaceous structure distribution, notably the apparent low levels of high residual cover. Adding one water tank in pasture 1 could facilitate a more even distribution, especially under the Authorized Use level but permit rotational flexibility. Implementing a four pasture deferred rotation may have benefits for herbaceous structure distribution in the earliest pasture. However, the Authorized Use level would limit the potential.

Adaptive Options – Adjusting the Authorized Use would be the most effective tool available to begin to immediately enhance grouse nesting habitat due to increasing levels of residual cover. Fencing woody draws, or portions of draws, could have effects relative to the size and location of the exclosure but is not expected to be appreciable because of the relative small amount of woody draw habitat expected to be fenced. Constructing the reservoir in pasture 1, in combination with the initial action of the new water source, would increase the density of water sources in the pasture increasing the homogenization of residual cover within the pasture, thus decreasing the quantity and quality of potential nesting sites. Mechanically treating club moss then interseeding could potentially decrease club moss and increase grass cover. This may have beneficial effects for residual cover levels.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3; therefore, Alternative 3A would have the same effects as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 4 are the same as Alternative 3.

Range

Initial Actions – Authorized Use for this allotment would be 270 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 295 federal AMs converted to AUMs by adjusting for cow size is 339 federal AUMs. The effect of setting

Authorized Use at the initial estimated carrying capacity equates to a 20 percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws

Initial Actions – Decreasing Authorized Use by 20 percent according to initial estimated carrying capacity and adjustments for cow size would facilitate improved woody draw conditions by decreasing livestock browsing and trampling disturbances. However, the scarcity of woody draws among pastures, the close proximity of water sources in pasture1, and to a lesser extent in pasture 5, and frequent seasons of use during the warmest portion of the year would continue to result in high levels of browsing and trampling disturbances that would slow or impede woody draw improvement.

Herbaceous Structure

Initial Actions – Adjusting the Authorized Use level by approximately 20 percent to consider AUMs and account for cow size should begin to balance the herbaceous structure distribution – with less use it is projected there would be more residual cover left at the end of the grazing year.

Seral Stages

Initial Actions – Decreasing Authorized Use by 20 percent according to initial estimated carrying capacity and adjustments for cow size would have the potential to facilitate shifts towards late seral stages. However, the grazing seasons would remain poorly coordinated with the proportional contribution and palatability of the invasive and native grass components and would continue to assist the spread of invasive grasses.

Sharp-tailed Grouse

Initial Actions – Within the context of an adjusted Authorized Use level based on an AUM and accounting for cow size, there should be an enhancement of grouse nesting habitat through higher retention levels of residual cover.

ALLOTMENT 282

Table 282-1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 282 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 1.31 – Backcountry Recreation Non-motorized	746	7	
Management Area 2.2 – Research Natural Areas	30	0	
Management Area 3.51a – Bighorn Sheep Habitat With Non-Federal Mineral Ownership	2929	27	
Management Area 3.51b – Bighorn Sheep Habitat With Non-Federal Mineral Ownership	1601	15	
Management Area 3.65 – Rangelands With Diverse Natural-Appearing Landscapes	4768	44	
Management Area 4.22 – River And Travel Corridors	733	7	
Total allotment acres	12394	100	
NFS acres	10807	87	
State land acres	248	2	
Private land acres	1339	11	
Current permitted livestock grazing (AMs) on NFS lands			2123
Initial estimated carrying capacity (AUMs) on NFS lands			2859
Number of pastures containing NFS lands			6

Table 282.2 — Allotment 282 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	1998/99 Survey – Fantail Creek at PFC 2004 Survey – Fantail at FAR-U. Fantail Creek is recovering from the Fantail Fire. 1998/99 Survey – Magpie Creek at PFC, 2004 Survey – Magpie Creek at NF. 2004 & 2006 Survey rated Whitetail Creek at PFC and NF. The Little Missouri River borders this allotment. A field review by the district hydrologist indicated no riparian concerns.	Fantail is still being affected by a natural event. At this point no action is necessary. Need to start Whitetail and Magpie Creeks on an upward trend toward PFC.
Woody draws	Approximately 81 percent of the woody draws sampled were Healthy and about 19 percent were At Risk. Low sapling numbers, impacted shrub layer, low or no regeneration, and browsing typify the At Risk woody draws. Heavy leafy spurge infestations in woody draws are adversely affecting woody draws.	Maintain current woody draw conditions.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Below Objectives High – Below Objectives 2004 Herbaceous Transects: 1.45; 1.58; 1.61; 1.7; 1.51; 1.31; 1.33; 1.01; 1.05; 2.85 2004 Herbaceous Stations percent: Low-68/ Moderate-28/High-2 2004 Shrub dominated Transects: 3.65; 2.54; 1.63; 5.34; 2.83; 1.60. 2004 Shrub dominated Stations percent: Low-35/Moderate-51/High-14 2005 Herbaceous Transects: 1.66; 1.0 2005 Herbaceous Stations percent: Low-60/ Moderate-40/High-0 2005 Shrub dominated Transects: 3.44; 5.70; 3.89 2005 Shrub dominated Stations percent: Low-10/ Moderate-63.3/High-26.7	**Manage allotment to maintain meeting structure objectives.
Seral stages	Of 12 sample sites, the proportion of early, mid, and late seral stages was 8, 58, and 25 percent. One or 8 percent of the sites was at an Invaded State.	Maintain native grass communities and the mosaic of seral stages and limit the expansion of invasive grasses.
Sharp-tailed grouse	There are two known leks within the allotment and there is one within 1 mile of the allotment.	Manage for increased High vegetative structure on biologically capable sites to enhance nesting and brooding habitat
Remarks	• Approximately 230 acres of noxious weeds including leafy spurge, Canada thistle, black henbane, and burdock. Weeds are scattered across landscape, they are being treated. • Control leafy spurge infestations in woody with biological agents as preferred control method. Herbicides, if biological is unsuccessful	

**** Based on a review of field notes and observations, the IDT determined that this allotment was meeting structure objectives.**

Table 282.3 — Allotment 282 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 2,123 federal AMs • Three-year average permitted use is 1,959 federal AMs.* • Permit type: Inventory (12 months). • Rotation: Modified deferred rotation. • Class(s) of livestock: Horses, cow/calf pairs and yearlings. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 2,123 • Move pasture 5 boundary fence to ridge top in the southeast portion of pasture 5. • Continue modified deferred rotation system changing season of use within the rotation. • Manage water tanks to better distribute use along Magpie Creek. • Reduce sagebrush encroachment on terrace along east side of pasture 6. • Move fence from northeast corner of pasture 5 to the west. • Continue to monitor Fantail Creek. **Adaptive Options** • Fence high-value woody draws. • Create a riparian pasture through construction of a fence south of Magpie Creek in Sections 4, 5, 6. • If created, the riparian pasture would require an additional water source. • Adjust Authorized Use.	**Initial Actions** • Authorized federal AUMs: 2,123 • Move pasture 5 boundary fence to ridge top in the southeast portion of pasture 5. • Continue modified deferred rotation system changing season of use within the rotation. • Manage water tanks to better distribute use along Magpie Creek. • Reduce sagebrush encroachment on terrace along east side of pasture 6. • Move fence from northeast corner of pasture 5 to the west. • In pasture 6, on Lower Magpie Creek, construct a 167-acre riparian exclosure with no grazing for first 3 years. **Adaptive Options** • Fence high-value woody draws. • Create a riparian pasture through construction of a fence south of Magpie Creek in Sections 4, 5, 6. • If created, the riparian pasture would require an additional water source. • If riparian vegetation has been established on 80 percent of stream banks and active stream cutting has ceased occurring then initiate late or dormant season prescribed grazing. Prescribed grazing would be identified in AOI/AW. • Construct a 92- and 178-acre riparian exclosures on Magpie Creek in pasture 6. 92-acre

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
		exclosure is located in sections 4,5,9 (Reach 5). The 178-acre exclosure is located in Sections 6 and 1. (Reach 8) • Adjust Authorized Use.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every 3 years. • Complete Properly Functioning Condition survey once every 3 years then once every 5 years if a positive trend has been established. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 282 — Existing Condition

Range – This allotment is approximately 12,394 acres including 10,807 acres of NFS lands. The remainder is private and state lands. Currently, this allotment is issued a private allocation inventory permit for 278 head for 8 months by the MGA. Livestock are on NFS lands the entire year, not just the typical May 1st to December 31st. Livestock are wintered on private and intermingled private and NFS lands during January through April. This allotment has been subdivided into six pastures, which all contain some NFS lands. The pastures range from 739 to 4,301 acres. Current AMs provided by NFS lands can be found in Table 282.1. This allotment is located in the Badlands geographic area. Water developments within this allotment include artesian wells with stock tanks, livestock wells with windmills and stock tanks, dugouts, and reservoirs.

The allotment is managed as a two-pasture, deferred rotation in pastures 5 and 6 with cow/calf pairs from May 1st to October 15th. The cow/calf herd is then rotated to pasture 3 and grazes until December 31st. Occasionally, the permittee takes some cattle back to pasture 6 in November to finish out the season. At the end of December, the cow/calf herd is then rotated into pasture 4 to graze through approximately the middle of February. This herd is then brought across the river to pasture 2 and stays until the end of May for feeding and calving. The number of cow/calf pairs varies depending upon the number of yearlings the permittee plans on running in a given year. The

yearlings usually are kept in pasture 1 during the summer grazing season with the number varying depending on the year. The yearlings are then brought across the river to pasture 4 for winter grazing along with the cows. The permittee also runs horses which are divided up into three groups of fifteen brood mares. The horses normally utilize pastures 1, 3, and 6. Later in the season, September and October, all brood mares are rotated into pasture 5 after the colts have been weaned. The horses are not rotated into this pasture earlier because of recreation activity on the Maah Daah Hey Trail; the permittee does not feel comfortable having his studs in this pasture during the prime recreation season for safety reasons.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there is approximately 230 acres of leafy spurge, Canada thistle, black henbane and burdock. The Billings County Weed Board has been informed of these infestations and has made an attempt to control them. Biological control agents have been used to control leafy spurge; but due to its location along the Little Missouri River, the success has been poor. Herbicides are the main means of controlling these weed species.

Oil and gas development on NFS lands in this allotment has removed approximately 101.7 acres from livestock access. Approximately 77.8 acres of oil and gas pads and access roads have been reclaimed and are, or will be, available for livestock access. Associated forage from these acres is approximately 24.5 and 18.7 AUMs, respectively.

Riparian –

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
282-03	Fantail Creek (1)		0.40				0.40
282-04	Whitetail Creek (11)					0.67	0.67
282-04	Whitetail Creek (12)	0.22					0.22
282-05	Fantail Creek (1)		2.11				2.11
282-06	Magpie Creek (6)					0.47	0.47
282-06	Magpie Creek (7)					3.84	3.84

Parts of three streams flow through Allotment 282. Fantail Creek (Reach 1) flows through pastures 3 and 5. This reach has undergone dramatic geomorphic changes following a wildfire in 1988. The DPG hydrologist visited Fantail Creek in 2003, 2004, 2005, and 2007. He observed that riparian vegetation is increasing, sedimentation rates are decreasing, sediment loads are decreasing. Consequently, he gave the creek a functionality rating of FAR-U, although this determination was not part of a formal riparian survey.

Lower Magpie Creek (Reaches 6 and 7) passes through pasture 6. It has a functionality rating of NF along its entire length in this pasture (Figure 282.1). The channel is incised, has little riparian vegetation, high sediment loads, high erosion rates, and little regeneration of riparian trees or willows. Cottonwood and willow seedlings are present, but they are repeatedly browsed until they die. The riparian vegetation is heavily grazed and trampled; consequently there is little vegetation left to stabilize banks and reduce sediment loads.

Lower Whitetail Creek (Reach 11 & 12) crosses pasture 4. About 0.7 miles of this reach has a functionality rating of NF (Figure 282.2); whereas the lower 0.2 miles of the reach has a rating of PFC. Problems with this reach include:

- Adverse effects from uplands related to poor road design and poor composition of plant species, particularly the loss of perennial, cool-season native grasses.
- Lack of riparian plant species and inadequate plant cover in riparian zone.
- Lack of regeneration, especially of riparian cottonwood trees.
- High sediment loads and high rates of channel erosion.
- Lack of vegetation on point bars.
- Historical and recent channel incision.

Figure 282.1 — Reach 7 of Magpie Creek in Allotment 282 has a functionality rating of NF. Notice the absence of water in the channel, the high width-depth ratio, the lack of riparian vegetation, and livestock trails in the stream channel.

Figure 282.2 — Reach 11 of Whitetail Creek in Allotment 282 has a functionality rating of NF. Notice the lack of riparian vegetation on point bars, the active erosion on the cut bank, the amount of sedimentation on the point bar.

Woody Draws – Of 16 woody draw samples, 81 percent were Healthy and 19 percent were At Risk. Rocky Mountain juniper is extensive on steep north aspect slopes in large portions of the allotment. A 6-mile segment of the Little Missouri River (LMR) and several major tributaries occur in the allotment, and except for the occurrence of noxious weeds and invasive grasses, cottonwood woodlands along the LMR corridor were moderately Healthy with successful regeneration on active

gravel bars. Although these communities are more appropriately treated as riparian woodlands and do not meet the definition of woody draw communities of this analysis, several sites sampled during 1998 for a previous analysis were included among the sample set for completeness.

Herbaceous Structure – This allotment is considered to be meeting structure objectives (via IDT decision) partly due to the Authorized Use being less than the initial estimated carrying capacity. The results of the randomly selected VOR transects demonstrated that approximately 12.5 percent (2 out of 16 transects) were in the High structure class and approximately 56 percent were Moderate structure transects, meeting the proposed drought guidelines for structure. However, the High structure transects were recorded in shrub communities.

Seral Stages – Upland vegetation was largely composed of native plant communities with little or no broken land throughout the allotment, but invasive grasses gained dominance along extensive sagebrush terraces, terraces of the LMR and major tributaries, road corridors, several oil and gas related disturbances, and hay feeding and watering sites (Figure 282.3). The Big Top Research Natural Area (RNA) occurs in the southeastern corner of pasture 6, but natural topography and a section of drift fence exclude livestock access.

Figure 282.3 — Watering site on sagebrush terrace along Magpie Creek in pasture 6 with annual brome indicated by brown patches.

Pasture 1 straddles the LMR, with a large portion of NFS lands occurring on steep slopes and escarpments dissected by rugged drainages supporting Rocky Mountain juniper. Private land, that comprises about 26 percent of the allotment, involved a broad river terrace. An NDSU plot sampled on a fragment of NFS land on the terrace was almost entirely comprised of planted crested wheatgrass that was not identified in the broken lands layer.

NFS land in pasture 2 consisted of broader, but no less rugged, uplands above the LMR. Private land comprised terraces of the LMR that likely receive the majority of hay feeding use during the winter months, but NFS land likely experiences increased use during early spring following snowmelt. An NDSU sample plot on a Thin Claypan ecological site (ES) along a narrow ridgeline was generally at a late seral stage with no invasive grasses recorded. A Robel transect along a broad plateau recorded blue grama, western wheatgrass, and needle-and-thread as the dominant species, suggesting mid seral stages.

Pasture 3 occurred on the eastern side of the LMR. An NDSU sample on a Clayey ES along the outer perimeter of the river terrace was approaching an Invaded Grass State with Kentucky bluegrass dominance and western wheatgrass co-dominance beneath dense silver sagebrush. A Loamy ecological site sampled by NDSU along Buckhorn Creek was at a mid seral Native Invaded Grass State, while a second site on a Thin Loamy ES was at an Invaded Grass State. A belt transect

near the sites reported similar plant composition with Kentucky bluegrass as the second species of dominance. Several ecoplots were present in the pasture but occurred in woodland or shrubland communities.

Pasture 4 also occurred on the eastern side of the LMR and contained terraces of Whitetail Creek below steep upland slopes. An NDSU plot midway between the creek and the base of the slopes contained intermingled patches of native and invasive grasses, with the latter occurring at relatively low frequencies along the transects but dominating the biomass from the clipped plots. Thus, plant composition appeared to vary from late seral Native Invaded Grass States to Invaded Grass States. A Robel transect measured 750 feet to the west recorded native grasses and shrubs without invasive grasses.

Pasture 5 comprised 4,300 acres, and several data points indicated a predominance of native plant communities with generally light invasive grasses. Five NDSU sample sites collected in the eastern half of the pasture are summarized below.

- Center of pasture on Sandy ES - late seral Native Invaded Grass State with 14 percent and 7 percent frequency of Kentucky bluegrass and smooth brome respectively, but no invasive grasses in the clipped plots.
- Three samples in the southeastern corner of the pasture - Thin Loamy and Claypan ES at mid seral Native Invaded Grass States with light amounts of annual brome and Kentucky bluegrass. Loamy ES at a mid-early Native Invaded State with silver sagebrush and western wheatgrass but 62 percent bare ground.
- Clayey ES in the northeast corner of the pasture was at a mid seral stage for a planted site with blue grama and crested wheatgrass and trace amounts of smooth brome.

Relative plant frequency of Kentucky and Canada bluegrass, crested wheatgrass, and annual brome increased from 0 to 24 percent along a repeated pace transect between 1979 and 2009, but the site was located adjacent to a developed road. Five Robel transects across the center of the pasture recorded native species dominance but were suggestive of mid to early seral stages. Of three ecoplots sampled in herbaceous communities during 1998, two were at mid seral stages and one on a needle-and-thread/threadleaf sedge habitat type was at a late stage.

Pasture 6 comprised 3,534 acres, and measurements also indicated a predominance of native plant communities with generally light but frequent invasive grasses. Six NDSU sample sites dispersed in the northwest half of the pasture are summarized below.

- Two Thin Claypan ES in the north-central area of the pasture were at late-mid and mid seral Native Invaded Grass States with light amounts of Kentucky bluegrass and annual brome.
- A Thin Sandy ES near the center of the pasture was at a mid seral Native Invaded Grass State with portions of the site approaching an Invaded Grass State of Kentucky bluegrass and lesser amounts of annual brome.
- Loamy and Claypan ES near the center of the pasture were at mid seral Native Invaded States, with the Loamy ES exhibiting 30 percent frequency of Kentucky bluegrass.

- A Loamy ES in the northeast corner of the pasture was at a mid seral Native Invaded State with light amounts of Canada bluegrass.

A remeasured ecoplot on a Thin Loamy ES in the northwestern corner of the pasture shifted from a mid to a late to mid seral stage between 1996 and 2007 with a moderate decrease in blue grama and increase of green needlegrass. Light amounts of smooth brome, annual brome, and Kentucky bluegrass were present in 2007 but not 1996. A sere plot on a Loamy ES near the center of the pasture was at a mid seral stage with light amounts of Kentucky bluegrass and annual brome. A repeated pace transect on the eastern edge of the pasture indicated minimal change in plant species frequency between 1979 and 2009, but bare ground decreased from 15 percent to 3 percent while litter increased by a similar amount. Of seven additional ecoplots sampled in the late 1990s from western wheatgrass/green needlegrass habitat types, one was at a late seral stage, four were at mid seral stages, and two were at Invaded Grass States with more than 70 percent of the relative grass canopy cover comprised of Kentucky bluegrass. Of nine ecoplots on silver sagebrush/western wheatgrass habitat types, one was at a late seral stage, five were mid seral, and three were early seral. Several of these sites exhibited exceptionally dense stands of sagebrush and low herbaceous cover that included light amounts of invasive grasses on three sites. One of two ecoplots from needle-and-thread/sedge habitat types was at a late seral stage while the other was at an early stage. Dominant species recorded among seven Robel transects dispersed throughout the pasture were suggestive of mid seral stages, with two of the sites listing Kentucky bluegrass as the third dominant grass.

Sharp-tailed Grouse – Two grouse leks exist in the allotment with significant overlap of NFS lands. One additional lek overlaps the allotment in the western portion.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed after 2 years.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment. Removal or maintenance of existing range infrastructure would be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian condition along Fantail, Whitetail, and Magpie Creeks as described in Existing Condition would improve and evolve toward desired riparian conditions over time. Improvement would result from the establishment of riparian vegetation which would capture sediment and build stream banks.

Woody Draws – Woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. Existing invasive grasses, and potential increases of these species as a result of increasing litter with the removal of livestock grazing, would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock, there would be an immediate and appreciable increased opportunity for the development of High and Moderate herbaceous structure, and a decrease in the amount of Low herbaceous structure in the allotment. This alternative would likely be quicker than the other alternatives in reaching, and potentially exceeding, High structure objectives with the eventual result of being out of balance with overall herbaceous structure objectives with the subsequent loss of Low structure.

Seral Stages – The removal of livestock grazing disturbances would facilitate shifts towards late seral stages with a loss of early and mid seral stage communities across large areas of the allotment dominated by native plant communities. Shifts to late seral stages would occur within 5 years among many communities, but could require longer periods among early seral communities that contain only remnants of late seral species. Areas with moderate amounts of invasive grasses would impede the development or maintenance of late seral stages, and transitions to Invaded Grass States would be assisted by increasing litter with the removal of livestock. These transitions would occur over 5 to 15 years depending on the current amount of invasive grasses, but even low occurrences of these species would have a high potential to increase in dominance and extent. This would occur from the west to the east side of the allotment according to the current extent and amount of invasive grasses across the allotment.

Sharp-tailed Grouse – The increase in potential High structure herbaceous grasslands with the removal of livestock would appreciably enhance nesting and brooding habitat for sharp-tailed grouse. However, unlike some allotments where invasive grasses are a more serious concern, it is projected that foraging opportunities and nesting quality will not decrease appreciably in quality and quantity within the planning timeframe.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by an inventory grazing association permit, and Authorized Use is 2,123 federal AMs.
- Cow/calf pairs, yearlings, and horses are run in a modified deferred rotation.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing

association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian conditions along Fantail, Whitetail, and Magpie Creeks as described in Existing Condition would continue.

Woody Draws – Continuation of current management is likely to sustain existing woody draw conditions that satisfy objectives of the Grasslands Plan. Winter use and hay feeding on the western side of the allotment would have the potential to result in decreasing conditions because of trampling disturbances associated with high livestock concentrations and the spread of invasive grasses that can impede the regeneration of woody species.

Herbaceous Structure – Current management is projected to continue the existing herbaceous structure distribution. There would be limited potential to promote an increase in the proportion of High herbaceous structure and improve the overall herbaceous structure. Shrub areas (primarily silver sage terraces) would be expected to continue to carry the High structure burden.

Figure 282-4. Hay feeding site in pasture 3.

Seral Stages – Native grass dominated communities with a predominance of mid seral stages, but occurrences of late stages, would persist for an extended period across large portions the allotment under current management. No early seral communities were identified from the plant composition measurements, but Invaded Grass States were present in pastures on the western side of the allotment. Additional transitions would continue to be assisted by effects of hay feeding and premature spring grazing (Figure 282.4). Frequent, but relatively light occurrences of invasive grasses in other areas of the allotment would have the inherent potential to increase with eventual transitions to Native Invaded and Invaded Grass States. Premature spring grazing that occurs in all pastures on a consistent, frequent, or annual basis, as well as seasonlong grazing in pastures 1 and 6, can contribute to low plant vigor and increase the susceptibility to invasive grass establishment. Although levels of reported use are less to slightly greater than initial estimated carrying capacity depending on whether winter use is included in the totals, rugged topography, dense juniper slopes, low herbaceous production within some shrub communities, and long distances to water would decrease the actual level of initial estimated carrying capacity and potentially contribute to greater utilization than expected.

Sharp-tailed Grouse – Existing management actions would not enhance High structure herbaceous grasslands, thus limiting the potential to enhance grouse nesting and brooding habitat. Considering shrub habitat transects together with the herbaceous transects, the distribution did address project

objectives during a drought year with Low – 31.25 percent; Moderate – 56.25 percent; and High – 12.5 percent; but that is based on the presence of VOR readings in a shrub community. Potential nesting habitat for grouse appears to be limited primarily to the shrub community at this time, principally the silver sage community. At this time, the upland herbaceous community does not display vegetative structure sufficient to provide suitable habitat for nesting and brooding grouse.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 2,123 federal AMs.
- Moving pasture 5 boundary fence to ridge top in the southeast portion of pasture 5.
- Continuing deferred rotation system changing season of use within the rotation.
- Managing water tanks to better distribute use along Magpie Creek.
- Reducing sagebrush encroachment on terrace along east side of pasture 6.
- Moving fence from northeast corner of pasture 5 to the west.
- Continuing to monitor Fantail Creek.

ADAPTIVE OPTIONS:

- Fencing high-value woody draws.
- Creating a riparian pasture through construction of a fence south of Magpie Creek in Sections 4, 5, 6.
- If created, the riparian pasture would require an additional water source.
- Adjusting Authorized Use.

Range

Initial Actions – Because the initial Authorized Use would remain the same as current management, the permittee would be allowed to harvest the same amount of forage. Continuing a deferred rotation system, changing the season of use within the rotation would not affect Authorized Use or livestock distribution as this type of management is occurring presently on the allotment.

Moving the interior fence between pastures 5 and 6 to the ridge top in the southeast portion of pasture 5 would reduce the trailing along the foot slope of the butte. However, there would be little to no change in livestock distribution.

Managing water tanks to better distribute livestock use along Magpie Creek would shift livestock distribution, and can be designed to develop a rotation within a pasture without fences. Due to the topography and location of livestock water developments along Magpie Creek, additional permittee management would need to be in place to react quickly to alleviate potential resource concerns along the riparian areas due to livestock grazing pressure.

Reducing sagebrush encroachment on the terrace along the east side of pasture 6 would promote more herbaceous forage growth and would improve native graminoid diversity due to less competition. Depending on how the sagebrush would be treated, livestock would have to be excluded from the treatment area for a period of time, which would require the installation of a

temporary fence. Depending on the size of the treated area available AMs would need to be adjusted until vegetation is re-established.

Moving the fence from the northeastern corner of pasture 5 to the west would change livestock distribution in pasture 6 but not in pasture 5. Because of the topography on the eastern side of pasture 5, livestock do not readily use this area without being herded by the. Because of the topography on the western side of pasture 6, livestock could easily access this area. Minor adjustments in the amount of available AMs in each pasture would be necessary due to the topography and size of the pastures after moving the fence.

Continuing to monitor Fantail Creek would not have an effect on Authorized Use or livestock distribution.

Adaptive Options – Fencing high-value woody draws would have little to no change in livestock distribution across the allotment. Forage within the exclosures would no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may occur on remaining forage. There will be a cost to install and maintain these fences.

Creating a riparian pasture through construction of a fence south of Magpie Creek in Sections 4, 5, and 6, would change livestock distribution due to the change in the size and timing of grazing in both pastures. This action would allow more control of grazing pressure along Magpie Creek because livestock would no longer have free access to the riparian areas when grazing the south pasture. Due to the location of the existing livestock water developments, an additional development would be required since livestock would no longer have access to the artesian well in Section 6 and the windmill/well in Section 5. Livestock grazing pressure would increase within the area of the new water development.

Adjusting Authorized Use downward would result in fewer livestock numbers because of the inventory permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock but the amount of forage harvested would be less than currently harvested.

Riparian

Initial Actions – Moving pasture 5 boundary fence to the ridge top in pasture 5 should better distribute livestock and would have no effect on riparian conditions along Whitetail Creek.

Continuing the deferred rotation system and changing season of use within the rotation would benefit riparian conditions if the time livestock were on the creeks was reduced. If livestock use on the riparian corridor was reduced, conditions would improve by minimizing trailing and trampling allowing for riparian vegetation recovery.

Proposed stock tank management would have no or minimal effect on riparian conditions along Whitetail and Magpie Creeks. All of the water developments in pasture 6 (two wells and a stock pond) are within 1/4-mile of Magpie Creek, so livestock would likely continue to hang along the creek and negative riparian impacts are likely to continue regardless of tank-management strategies.

Reducing sagebrush encroachment on the terrace on the east side of pasture 6 would benefit riparian conditions if an herbaceous plant community was established. Herbaceous plants are more effective in reducing overland flow which would benefit riparian conditions along Magpie Creek.

Moving the fence from the northeastern corner of pasture 5 to the west should better distribute livestock and would have no effect on riparian conditions along Whitetail Creek.

Repeated inspections of Fantail Creek indicate that its riparian functionality is on an upward trend following the 1988 wildfire there. Consequently, there is no proposed action to remediate Fantail Creek at this time.

It is expected that desired conditions on Fantail Creek would be achieved in 5 to 10 years. It is expected that desired conditions on Whitetail and Magpie Creeks would be achieved in several decades.

Adaptive Options – Fencing high-value woody draws should have no effect on riparian conditions along Magpie and Whitetail Creeks because there would be no expected change in livestock distribution and the distance of separation.

The creation of a riparian pasture to limit livestock access to the stream in pasture 6 should improve riparian conditions along Magpie Creek. The use of riparian pastures and exclosures has proven to be effective in the Little Missouri Badlands (e.g., note the riparian response within the exclosures along Ash Coulee) in reestablishing desired riparian vegetation and controlling sediment loads. The new water source developed in the riparian pasture to pull livestock away from the corridor would benefit riparian conditions by minimizing bank sloughing, trailing, trampling, and loafing in the area and allow for herbaceous and woody vegetation recovery.

Reducing Authorized Use should help improve the uplands vegetation, which in turn reduces overland flow further benefitting the riparian conditions along Fantail, Whitetail, and Magpie Creeks. A reduction in overland flow delivered to the creeks would reduce stream velocities and allow for the establishment of riparian vegetation to build stream banks.

It is expected that desired conditions on Fantail Creek would be achieved in 5 to 10 years. It is expected that desired conditions on Whitetail and Magpie Creeks would be achieved in 10 to 15 years.

Woody Draws

Initial Actions – Management of water tanks to control livestock distributions along Magpie Creek would have potential for maintaining woody draw conditions adjacent to the creek corridor, but could be limited by free water access along the creek during large portions of the year.

Infrastructure maintenance involving relocations of pasture fencelines would decrease excessive trailing related impacts in localized areas, but could contribute to increased woody draw disturbances along the north boundary of pastures 5 and 6 due to increased access from pasture 6.

Reducing sagebrush encroachment on creek terraces would pull livestock to these areas due to the increased forage and potentially assisting slight decreases in woody draw use.

Continuing the current seasons of pasture use should maintain Healthy woody draw conditions among 81 percent of the sampled sites, but winter use and hay feeding has the potential to contribute to At Risk conditions.

Maintaining the level of Authorized Use that is 15 percent less than initial estimated carrying capacity after adjusting for cow size creates the potential for increased levels of use compared to reported use during 2003 through 2008, and this would have the potential to decrease woody draw conditions.

Adaptive Options – Fencing woody draws and/or decreasing Authorized Use would facilitate the maintenance of, or increase, woody draw conditions by decreasing livestock browsing and trampling disturbances. Exclusion of livestock disturbances through fencing would provide the fastest and greatest degree of woody draw improvement, but increasing litter and invasive grass layers that would occur with the removal of grazing could impede the regeneration of woody species. Fencing of a woody draw would have a high potential to result in increased disturbances and decreased conditions within adjacent woody draws.

Creating a riparian pasture along Magpie Creek would facilitate the establishment of riparian species as well as woody draw patches along the riparian margins by decreasing the level of livestock browsing and trampling disturbances that would be required to maintain or achieve PFC ratings. However, the potential would occur for increasing disturbances and decreasing conditions within unfenced sections of the corridor and adjacent woody draws. Development of an additional water source in the pasture would probably not decrease the potential for increased woody draw conditions, depending on where the water is located.

Herbaceous Structure

Initial Actions – Annually adjusting the season of use within the established deferred rotation and within the context of the current Authorized Use level, is projected to maintain the herbaceous structure distribution. Since the Authorized Use is unchanged, there is not expected to be any change in the amount of residual herbaceous structure remaining in the fall. Managing water tanks is not expected to be effective since available water can be found in Magpie Creek plus other amenities that the creek offers for livestock. Reducing sagebrush would directly reduce the amount of High structure because of the reduction in shrubs but should increase the initial estimated carrying capacity for livestock. It is possible that use may shift to the treatment area, reducing the livestock pressure on the herbaceous communities, providing some regrowth opportunity and promote more heterogeneity in use patterns. Moving the pasture boundary fences is a minor impact and would not appreciably affect herbaceous structure.

Adaptive Options – Adjusting the Authorized Use would be the most effective tool to begin to manipulate the herbaceous structure towards meeting project objectives since more residual herbaceous structure would remain in the fall. Fencing specific woody draws would have negative effects for grouse habitat relative to the size and location of the exclosure but should not be appreciable due to the relative small amount of woody draw habitat to be fenced. Creation of a riparian pasture could be expected to improve structure conditions within the riparian pasture. The additional water source in the riparian pasture could contribute to homogenizing the herbaceous structure.

Seral Stages

Initial Actions – Continuation of present pasture rotations limits the ability of herbaceous plant

species to complete critical growth periods in primary use areas because there is a low degree of pasture deferment and/or seasonlong or nearly seasonlong grazing. Premature grazing occurs in several pastures and is compounded by winter hay feeding periods that can result in grazing during relatively open winters. These practices contribute to low plant vigor and production and increase the susceptibility to invasive grass establishment. Although premature spring grazing would be limited to one of 3 years in most pastures, winter/early spring use of pastures 2 and 4 would continue.

Potentially increased stocking to the level of Authorized Use compared to currently reported levels of use would facilitate shifts towards early seral stages.

Management of water tanks to control livestock distributions along Magpie Creek would assist the management of forage utilization and seral stages along the creek terraces, but could be limited by free water access along the creek during large portions of the year.

Decreasing silver sagebrush densities along terraces of Magpie Creek in pasture 6 through fire, mowing, herbicide, or a combination of treatments, would increase herbaceous production and seral development by decreasing the competitive influence of sagebrush and snowberry that are excessively dense in some areas. However, a high potential exists for expansion of invasive grasses that are present in portions of these communities following shrub control. Invasive grass treatments are not conducted on the LMNG and such treatments are not included in the proposed actions.

Infrastructure maintenance involving slight relocations of pasture fencelines would contribute to increased grazing disturbances in a localized area along the north boundary of pastures 5 and 6, but would not have an appreciable effect on seral stages across the effected pastures.

Adaptive Options – Fencing woody draws would not have an appreciable effect on seral stages outside the fence due to the small size of these exclosures. Invasive grasses would have high potential to increase within the exclosure but are already dominant within the understory of most woody draws.

Creating a riparian pasture with Magpie Creek would involve almost half of pasture 6 and have a high potential to facilitate shifts towards late seral stages among upland habitats as a result of decreased grazing and trampling disturbances associated with the achievement or maintenance of PFC condition along the creek. The potential would exist for invasive grasses to increase with decreased grazing and increases in plant litter.

Adding a water source within the riparian pasture would result in increased grazing and trampling disturbances around the water source with shifts towards early seral stages and potential increases of invasive grass establishment.

Decreasing Authorized Use would facilitate shifts towards late seral stages as a result of decreased grazing and trampling disturbances, while increasing Authorized Use would have the opposite effect.

Sharp-tailed Grouse

Initial Actions – Since the proposed initial actions listed are projected not to improve the herbaceous structure distribution, the Initial Actions would not enhance grouse nesting and

brooding habitat. The silver shrub habitat, which carries the High structure in this allotment, would be directly affected by reducing the silver sagebrush in the eastern portion of pasture 6. Kobriger (1980) indicates that hens nest in brushy lowland draws when the quality and quantity of the surrounding grasslands was low. Given the low "quality" of nesting habitat in the grasslands, as demonstrated by the VOR data, reducing the sagebrush would reduce potential nesting habitat for sharp-tailed grouse hens. It is not expected that the resultant vegetative community would respond immediately with a later seral, High structure state: replacing the shrub community in neither structure nor favorable composition. The proposed rotation change is not projected to affect structure due to lack of a change in Authorized Use under this alternative.

Adaptive Options – By adjusting the Authorized Use, a potential increase in the proportion of High herbaceous grasslands could be experienced with a commensurate enhancement in grouse nesting and brooding habitat. Fencing high-value woody draws is not expected to have appreciable overall effects to herbaceous grasslands due to the amount of woody draws projected to be fenced relative to the size of the allotment. Creation of a riparian pasture could be expected to improve nesting and fall-winter habitat conditions, depending on the size and configuration.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes.

INITIAL ACTIONS:

- Authorized Use in AUMs is set at the level of Alternatives 2, 3, and 3A but adjusted for cow size.
- In pasture 6 on Lower Magpie Creek, constructing a 167-acre riparian exclosure. No grazing of exclosure for first 3 years.

ADAPTIVE OPTIONS:

- If riparian vegetation has been established on 80 percent of stream banks and active stream cutting has stopped occurring, then initiate late or dormant season prescribed grazing. Prescribed grazing would be identified in AOI.
- Constructing 92- and 178-acre riparian exclosures on Magpie Creek in pasture 6. The 92-acre exclosure would be located in Sections 4, 5, and 9 (Reach 5). The 178-acre exclosure would be located in Sections 6 and 1. (Reach 8).

Range

Initial Actions – Authorized Use for this allotment would be 2,123 federal AUMs. The initial estimated carrying capacity is 2,598 AUMs. There are resource issues on the allotment that need to be addressed. Therefore, the initial action would be to authorize the same numbers as Alternatives

2, 3, and 3A, but as AUMs. The existing Authorized Use of 2,123 federal AMs converted to AUMs by adjusting for cow size is 2,441 federal AUMs. The effect of this authorization equates to a 13 percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in cow size when calculating the number of head and the grazing season duration when planning the rotation for the allotment.

Constructing a 167-acre riparian exclosure in pasture 6 on Lower Magpie Creek would remove approximately 85 to 87 federal AUMs which are currently available to livestock grazing. Since livestock grazing would not be allowed within the exclosure for the first 3 years an adjustment in Authorized Use would be necessary for those grazing seasons. Due to the size of the exclosure there would be minimal changes in livestock distribution within pasture 6 because of its overall size.

Adaptive Options – Prescribed grazing identified in the AOI within the riparian exclosures would increase the intensity of livestock grazing because of the livestock density within the small area. The duration of dormant season grazing would vary yearly because of the variation of growing conditions and would need to be closely managed by the Forest Service and permittee.

Constructing 92- and 178-acre exclosures on Magpie Creek would remove livestock grazing within the exclosures. Because of the size of the exclosures and their associated available federal AUMs, an adjustment in Authorized Use would be necessary. Because of the overall size of pasture 6 and location of existing livestock water developments, there would be minimal changes in livestock distribution; however, intensity of grazing around the exclosures would increase.

Riparian

Initial Actions – The 167-acre riparian exclosure proposed would provide the best opportunity for riparian vegetation to reestablish itself in the least amount of time, stabilizing and building stream banks along Magpie Creek. The use of riparian exclosures has proven to be effective in the Little Missouri Badlands (e.g., note the riparian response within the exclosures along Ash Coulee) in reestablishing desired riparian vegetation and controlling sediment loads. No grazing would be allowed in the exclosure for 3 years.

It is expected that desired conditions on Fantail and Magpie Creeks would be achieved in 5 to 10 years. Whitetail Creek timing is the same as Alternative 3.

Adaptive Options – The 92- and 178-acre riparian exclosures proposed would provide the best opportunity for riparian vegetation to reestablish itself in the least amount of time, stabilizing and building stream banks along Magpie Creek. The use of riparian exclosures has proven to be effective in the Little Missouri Badlands (e.g., note the riparian response within the exclosures along Ash Coulee) in reestablishing desired riparian vegetation and controlling sediment loads. No grazing would be allowed in the exclosure for 3 years.

It is expected that desired conditions on Fantail Creek would be achieved in 5 to 10 years. It is expected that desired conditions on Magpie Creek would be achieved in 2 to 5 years. Whitetail Creek timing is the same as Alternative 3.

Woody Draws

Initial Actions – Reducing Authorized Use by 13 percent after adjusting for cow size would

maintain potential levels of summer use 8 to 26 percent greater than currently reported use, or 13 percent greater to 4 percent less than total annual use that includes winter use. Therefore, there would be minimal improvement in woody draw conditions by the proposed reduction in Authorized Use.

Constructing a riparian exclosure along Magpie Creek in pasture 6 would facilitate the establishment of riparian species, and depending on the site location, create the potential for the improvement or increase in extent of woody draw communities along the perimeter of the exclosure as a result of decreased browsing and trampling disturbances. However, the potential would occur for increased disturbances and decreasing conditions within unfenced sections of the corridor and adjacent woody draws.

Adaptive Options – Constructing two riparian exclosures, in addition to the one identified as an Initial Action and the one identified as an Adaptive Option under Alternative 3, would have similar potential of improving woody draw communities that occur within the exclosure. Potential grazing in any of these sites would likely maintain increased woody draw conditions because of relatively light grazing levels that would be required for PFC. However, additional fencing of the riparian corridor would increase the potential for more disturbances and decreasing conditions within unfenced sections of the corridor and adjacent woody draws.

Herbaceous Structure

Initial Actions – Assuming the permittee is operating at the Authorized Use level, adjusting the Authorized Use to account for cow size could begin to move the herbaceous structure distribution towards project objectives, particularly if the sage brush reduction is implemented. Moving pasture fences would have minimal effect on the overall herbaceous structure objective since it is in the same allotment and the adjustments are minor. Managing the water sources along Magpie Creek could be of limited effectiveness due to the availability of water in the creek. Reducing silver sage would appreciably alter the existing vegetative structure condition. Currently, the silver sagebrush communities carry the High structure burden within the allotment while the herbaceous communities tend to have VORs of less than 2.0 inches. In light of the adjusted Authorized Use to account for cow size, continuing the grazing system while changing the season of use could potentially aid in advancing seral conditions, therefore improving potential for a wider diversity of herbaceous structure. Creation of a 167-acre riparian exclosure would not appreciably affect the quantity herbaceous structure, depending on the size and configuration of the exclosure. The effects may be mixed with much of the exclosure, likely composed of woody habitats, which are not considered biologically capable. Depending on the configuration, the exclosure may create an ecological trap for grouse.

Adaptive Options – Constructing an additional two riparian exclosures would have similar effects as the riparian exclosure created in the initial action.

Seral Stages

Initial Actions – Reducing Authorized Use by 13 percent after adjusting for cow size would maintain potential levels of summer use 8 to 26 percent greater than currently reported use, or 13

percent greater to 4 percent less than total annual use that includes winter use. Therefore, there would be minimal effect on seral stages resulting from the proposed reduction in Authorized Use.

Creating a riparian exclosure along Magpie Creek would not have an appreciable effect on upland seral stages because the fence would be confined to the creek corridor. Although the potential would exist for the development of late seral stages along the perimeter of the exclosure, likely increases of invasive grasses would impede this outcome. Implementing prescribed grazing within the exclosure, after improved riparian conditions are attained, would have some potential for controlling litter accumulation and the increase in invasive grasses.

Adaptive Options – Constructing as many as three additional riparian exclosures would increase the potential for increased use of the adjacent uplands depending on the extent of the riparian corridor that is fenced. Although the potential would exist for the development of late seral stages around the perimeter of the exclosure, likely increases of invasive grasses would impede this outcome, but with some potential for prescribed grazing within the exclosure to control the accumulation of litter and increase of invasive grasses.

Sharp-tailed Grouse

Initial Actions – Assuming the permittee is operating at the Authorized Use level, adjusting the Authorized Use to account for cow size could begin to correct the imbalance of the herbaceous structure distribution by potentially increasing the amount of residual cover. Potential grouse nesting habitat would be directly affected by reducing the sagebrush in the eastern portion of pasture 6, and the resultant herbaceous community may not make up for the lost shrub habitat. However, there could be improved herbaceous structure distribution in the uplands. The reduction in Authorized Use would contribute to the proposed rotation change and potentially advance seral condition, thereby improving the herbaceous structure distribution. Implementing a riparian pasture (167 acre) could improve structure conditions within portions of the exclosure but it could also create an ecological trap for grouse.

Adaptive Options – Constructing an additional two riparian exclosures would have similar effects for grouse as the riparian exclosure created in the initial action.

ALLOTMENT 283

Table 283.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 283 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 3.65 – Rangelands With Diverse Natural-Appearing Landscapes	1,027	98	
Management Area 6.1 – Rangeland With Broad Resource Emphasis	21	2	
Total allotment acres	2,791	100	
NFS acres	1,048	38	
State land acres	0	0	
Private land acres	1,743	62	
Current permitted livestock grazing (AMs) on NFS lands			300
Initial estimated carrying capacity (AUMs) on NFS lands			340
Number of pastures containing NFS lands			3

Table 283.2 — Allotment 283 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	Whitetail Creek flows through a portion of the allotment. The 1998 survey rated it at PFC.	Maintain PFC
Woody draws	Of the sampled woody draws 100 percent were Healthy.	Maintain current woody draw conditions.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Meeting Objectives High – Below Objectives 2004 Transects: 1.41; 1.51 2004 Station percent: Low-55/Moderate-45/ High-0	Manage for additional High structure on biologically capable habitats.
Seral stages	Two mid and one early seral stage were measured in broken land. Potential exists for late stages in unbroken land among secondary range.	Maintain native grass communities and potential mosaic of seral stages in unbroken land and limit the spread of invasive grasses.
Sharp-tailed grouse	There are two known leks within one mile of the allotment encompassing less than 160 acres within that overlap. The eastern portion of pasture 4 could potentially contribute habitat to the lek in the adjacent section to the east.	Manage to enhance sharp-tailed grouse nesting and brooding habitat by increasing the quality and quantity of High vegetative structure on biologically capable sites.
Remarks	Approximately 40 acres of Canada thistle and burdock.	

Table 283.3 — Allotment 283 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 300 federal AMs • Three-year average permitted use is 186 summer federal AMs.* • Permit type: Inventory (12 months). • Rotation: Winter grazing/feeding for herd coming from common, Allotment 301. • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 300 • Continue current management system and monitor. • Develop rangeland well which may be located in this allotment or Allotment 300. Construct a water pipeline to supply two stock tanks. A stock tank would be located in each allotment. **Adaptive Options** • Adjust Authorized Use.	**Initial Actions** • Authorized federal AUMs: 340. • Continue current management system and monitor. • Develop rangeland well which may be located in this allotment or Allotment 300. Construct a water pipeline to supply two stock tanks. A stock tank would be located in each allotment. **Adaptive Options** • Adjust Authorized Use.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every 3 years. • Complete Properly Functioning Condition survey once every 5 years. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 283 — Existing Condition

Range – This allotment is approximately 2,791 acres including 1,048 acres of NFS lands. Currently, this allotment is issued an inventory permit for 43 head for 8 months by the MGA. With this type of permit, livestock are on NFS lands the entire year. Livestock are wintered on private and intermingled private and NFS lands during January through April. It is also the headquarters allotment associated with a common allotment, Allotment 301. This allotment has been subdivided into five pastures, of which three contain some amount of NFS lands. Current AMs provided by NFS lands can be found in Table 283.1. This allotment is located in both the Badlands and Rolling

Prairie geographic areas. Water developments include a dugout and spring. It should be noted that the primary use is as a "home" place for livestock when they come off of the common allotment.

Pasture 4 is the largest of the five pastures and is approximately 1,083 acres, and currently used for wintering and calving. The eastern portion of this pasture was tilled and planted with crested wheatgrass at some point. Litter cover in this area is moderate to light. South of the Magpie Road and the western portion of the pasture are relatively rough. Most of the use occurs in the eastern portion.

Pasture 1 is approximately 699 acres and is mostly deeded land, but the western-most edge of this pasture contains NFS land. The portion of NFS land had very little livestock use in 2004. The litter cover was extensive in this area of the pasture.

The last pasture that contains approximately 40 acres of NFS lands is located on the headquarters. Due to the small amount of NFS lands and having to go through the private headquarters no tour of this parcel was completed.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there is approximately 40 acres of Canada thistle. The Billings County Weed Board was been informed and has made an attempt to control some of these infestations. Biological control agents for Canada thistle were released but the control was poor.

Riparian –
A short segment, of Whitetail Creek (reach 5a), crosses NFS lands in Allotment 283. This short segment was rated as PFC in 1998 and was not reevaluated in 2006.

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
283-01	Whitetail Creek (5a)	0.35					0.35

Woody Draws – The northwestern quarter of pasture 4 contained a series of steep ridges and moderately deep intervening drainages with woody draws occurring along the upper reaches (Table 283.2). The main portions of three sampled woody draws in this area were Healthy. Short tributaries with greater livestock access that lead to the main draws tended to be At Risk. Woody draws in pasture 1 and the headquarters pasture that are composed of less than 20 percent NFS land were not sampled. However, a high proportion of sites on NFS land are likely to be in a Healthy condition due to relatively high woody draw densities and/or occurrences along steep slopes or the margins of the pasture.

Herbaceous Structure – The two randomly selected VOR transects in 2004 had VOR transect averages of 1.41 (Low structure) and 1.51 (Moderate structure). The station frequency of these transects is 55 percent Low, 45 percent Moderate, and 0 percent High. Neither transects was re-surveyed in 2005.

Seral Stages – Plant composition data is lacking for pasture 1 and the headquarters pasture, but most NFS land in pasture 1 occurred in rugged uplands that are reported to receive light use (Project Record, Specialist Reports and Notes, Range Report). A portion of Whitetail Creek extending through pasture 1 was rated at PFC, suggesting moderate or conservative use of the pasture. The headquarters pasture involved 40 acres of NFS land along Whitetail Creek that is used with 230 acres of private land.

Broken land constituted about 6 percent of NFS land along a broad plateau on the northeastern boundary of pasture 4 with crested wheatgrass, bluegrass, annual brome, and needle-and-thread. This area receives much of the use concentrated during late fall through early spring. Two NDSU plots on Claypan ecological sites at the north end of this area, as well as a sere plot on the west-central boundary, are overwhelmingly dominated by crested wheatgrass, with western wheatgrass or blue grama alternating as the next most dominant species. However, native grasses constituted less than 16 percent of the grass production from the two NDSU plots and the sites that were at early and mid seral stages for planted crested wheatgrass. The sere plot was at a mid seral stage. Two Robel transects at the north and south ends of the broken land area, as well as two belt transects, recorded similar plant dominance.

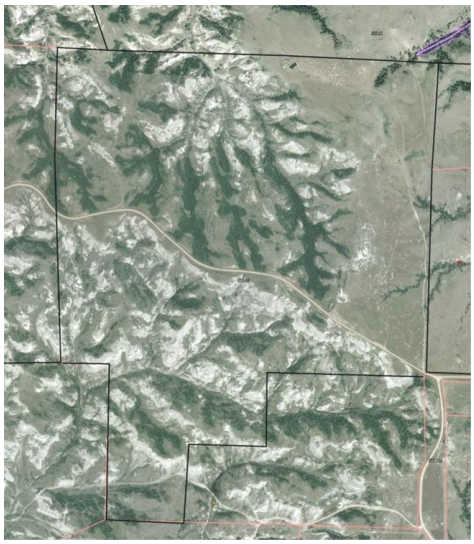


Figure 283.1 — Pasture 4 with woody draws concentrated along upper drainages in the northwestern portion of the pasture. The plateau in the northeastern portion of the pasture receives the greatest level of livestock use, while rugged topography in the northwest and south of FSR 722 receives light use.

One belt transect along a drainage bench at the north-central end of pasture 4 recorded dominance of needle-and-thread, blue grama, and sedge, suggestive of mid seral stages for the habitat. No additional upland plant composition data is available from the western side of the pasture. Although Kentucky bluegrass dominated the understory of a NDSU sampled woody draw on the western side of the pasture, a high density of tree saplings suggests light to moderate use in the surrounding area.

Figure 283.2 — Looking southeast over pasture 4 from VOR transect 7-283-1 starting point. (photo taken Oct 26, 2004).

Observations along benches and lower ridge slopes between the woody draw sample sites have indicated the presence of invasive grasses, but as the primary area of livestock use involves the plateau in the northeast portion of the pasture, the potential exists for late seral native communities in rugged secondary range on the west and south sides of the pasture (Figure 283.1).

Sharp-tailed Grouse – There are two leks within one mile of the allotment, encompassing less than 160 total acres of overlap. The eastern portion of pasture 4 has potential to contribute an appreciable amount of grouse nesting and brooding habitat.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed after 2 years.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment so no contribution towards CP funds would be made. Removal or maintenance of existing range infrastructure would be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian condition along Whitetail Creek as described in the Existing Condition would continue and evolve toward the potential riparian community.

Woody Draws – Healthy woody draw conditions would persist or improve with the removal of livestock browsing and trampling disturbances. Although all sampled sites were Healthy, the potential for increased woody species regeneration would occur, and side drainages of the main draws that experience greater levels of disturbance and tend to be in an At Risk condition would shift towards Healthy. The high density of tree saplings from the sampled woody draw mentioned above indicates a low effect of invasive grass dominance in the understory in regards to impeding woody species regeneration. Potential increases of invasive grasses with the removal of livestock

grazing should therefore not have an appreciable effect on the maintenance or improvement of existing conditions.

Herbaceous Structure – With the removal of livestock activities there would be an immediate and appreciable increased opportunity for the development of High and Moderate herbaceous structure, and a decrease in the amount of Low herbaceous structure in the allotment.

Seral Stages – The removal of livestock grazing disturbances would facilitate a shift, or contribute to the persistence, of late seral stages across large areas of the three pastures. Potential native plant development on the plateau of pasture 4 would be impeded by increasing bluegrass that would expand with increasing plant litter. Gradual coalescing of bluegrass patches would have a high potential to result in transitions to Invaded Grass States on the plateau of pasture 4 over the next 10 years. Smaller patches of bluegrass observed in other portions of the pasture would have a similar potential to increase but potential transitions to Invaded Grass States would likely take 20 years. Similar effects would occur in pasture 1 and the headquarters pasture according to the range of conditions associated with hay feeding/primary use areas and secondary range.

Sharp-tailed Grouse – The increase in Moderate and/or High structure herbaceous grasslands due to the removal of livestock would enhance nesting and brooding habitat for sharp-tailed grouse. Over time, however, a decrease in forb diversity would decrease foraging opportunities and the increasing dominance of invasive grasses would negatively impact nesting and brooding quality.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by an inventory grazing association permit, and Authorized Use is 300 federal AMs.
- Cow/calf pairs are wintered here from Allotment 301 after the summer grazing season, even though no summer AMs are associated with this it. However, the 43 head associated with the summer grazing have been grazed on private the majority of the time.
- See allotment map in Appendix B for current range developments.

Range – Existing federal AMs permitted to the grazing association would continue. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian condition along Whitetail Creek was rated as PFC in 1998 and was not reevaluated in 2006.

Woody Draws – Although livestock use occurs in woody draws in pasture 4, particularly adjacent to the plateau in the northeastern portion of the pasture, browsing and trampling disturbances were

relatively light or concentrated along small shallow side drainages with greater accessibility and less snow accumulation. Deep snow drifts during most winters, lack of water, and increasing distance from hay feeding areas on the eastern side of the pasture contribute to low browsing and trampling disturbances within the main woody draws. Steep slopes that limit the extent of livestock access during summer grazing periods also contribute to low disturbances. Therefore, Healthy woody draws would persist under current management. Similar conditions are likely to occur in pasture 1 and the headquarters pasture.

Herbaceous Structure – Current management is projected to continue to promote the existing herbaceous structure distribution, particularly in pasture 4, with limited potential to promote an increase in the proportion of High herbaceous structure and improve the overall herbaceous structure distribution within the allotment.

Seral Stages – Existing plant composition that has a high potential to be at late seral stages as a result of low livestock disturbances on the western and southern portions of pasture 4 would persist. Hay feeding and high livestock concentrations along the plateau on the northeastern portion of the pasture would continue to impede the development of native plant diversity within the stand of crested wheatgrass. Hay feeding would also assist the spread of invasive grasses through direct seed introductions, disturbed soil conditions, and premature grazing of native grasses around the periphery of the plateau (Figure 283.3). The potential exists for invasive grasses to spread from the east to the west side of the pasture and may be assisted by lower utilization on the west that facilitates increased litter. Conditions in pasture 1 and the headquarters pasture have the potential to be similar to the western side of pastures 4 as a result of light summer stocking levels, but adverse effects associated with hay feeding and premature grazing may occur in portions of these pastures.

a) b)

c)

Figure 283.3 — Effects of hay feeding in pasture 4. Photos a and b show soil disturbances that assist the establishment of invasive grass seed. Photo c shows high levels of native grass utilization that increase the susceptibility to invasive grass establishment.

Sharp-tailed Grouse – Existing management actions would not enhance High structure herbaceous grasslands, thus limiting the potential to enhance grouse nesting and brooding habitat largely because of unaccounted winter use.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 300 federal AMs.
- Continuing current management system and monitor.
- Developing a rangeland well which may be located in this allotment or Allotment 300. Constructing a water pipeline to supply two stock tanks. A stock tank would be located in each allotment.

ADAPTIVE OPTIONS:

- Adjusting Authorized Use.

Range

Initial Actions – Because the initial Authorized Use would remain the same as current

management, the permittee would be allowed to harvest the same amount of forage. Continuing the current management system and monitoring would not affect Authorized Use or livestock distribution at this time. Deferring turnout until June 1st on native pastures, with the exception of inventory permits where early turnout would be allowed one out of 3 years, would have an effect on this allotment since it carries an inventory permit through the MGA and there are no pastures within the allotment that are designated as crested wheatgrass pastures. Wintered on this allotment are 175 head of livestock and the effects of this proposed Design Criteria would be that 175 AMs two out of the 3 years would have to remain on feed or the permittee would have to find another pasture to graze for the month of May.

Developing a well and tank would alter the livestock grazing pressure in areas but the effects should be minimal.

Adaptive Options – Adjusting Authorized Use downward would result in fewer livestock numbers because of the inventory permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock but the amount of forage harvested would be less than current amounts.

Riparian

Initial Actions – It is expected that desired conditions along Whitetail Creek would continue with the initial actions proposed.

Developing a rangeland well and adding a stock tank would have no effect on the riparian condition along Whitetail Creek in pasture 1 because the stock tank would most likely be located in pasture 4.

Adaptive Options – It is expected that desired conditions along Whitetail Creek would continue with the adaptive options proposed.

Reducing Authorized Use should help improve the uplands vegetation, reducing overland flow and further benefitting the riparian conditions. A reduction in overland flow delivered to the creek would result in reduced stream velocities allowing for the establishment of riparian vegetation to build stream banks.

Woody Draws

Initial Actions – Continuation of current management focusing on winter use would perpetuate Healthy woody draw conditions measured in pasture 4, and likely to occur in the headquarters pasture and pasture 1. However, the potential exists for appreciably increased summer use compared to reported use that would contribute to decreasing woody draw conditions.

Constructing a water well and adding a stock tank on the plateau of pasture 4 to augment a shallow reservoir in the northeast corner of the pasture would not have an appreciable effect on woody draw conditions due to livestock concentrations and impeded access to woody draws as a result of topography and snow drifts. A water tank could decrease browsing and trampling disturbances when a lack of snow cover allows livestock access to the draws when they utilize small pools or seeps along the drainages.

Adaptive Options – Decreasing Authorized Use would not have an appreciable effect on woody draw condition unless the reduction was relatively high due to the large majority of use that occurs during the winter and is not credited towards Authorized Use. With sufficient reductions in total

annual use, increased woody draw conditions would occur among Healthy sites as well as smaller and more accessible At Risk sites along short tributaries of the main sites. Increasing Authorized Use would increase woody draw disturbances during years or periods of low snow cover that would contribute to decreasing conditions.

Herbaceous Structure

Initial Actions – Adding a water source, retaining the management system, and the Authorized Use level, would continue to promote the existing herbaceous structure distribution. Depending on the location of the new tank, the effects to herbaceous structure would vary. If the tank is placed near the existing water source(s) on the northern end, changes in distribution of livestock from the existing condition would be minimal due to the established distribution around the existing water sources. If placed near the road on the southern end, or somewhere in the western portions of the allotment, the effect would be to further homogenize the distribution and herbaceous structure. The management system of the allotment typically entails use during the winter months which would result in the loss of residual cover as measured the previous fall. The Authorized Use is approximately 13 percent greater than initial estimated carrying capacity. However, it appears that winter use is not proportionally distributed across the allotment, nor is it fully accounted for. It seems that pasture 4 receives much of the winter use.

Adaptive Options – It doesn't appear that adjusting the Authorized Use would affect the herbaceous structure, at least initially. Given that a recent 3-year average is nearly 100 AMs less than the Authorized Use and the initial estimated carrying capacity. It is assumed that heavy unaccounted for winter use, especially in pasture 4, may be affecting herbaceous structure.

Seral Stages

Initial Actions – Continuation of current management focused on winter use would perpetuate existing conditions described under Alternative 2. Adding a stock tank on the plateau of pasture 4 would result in a concentrated zone of increased trampling disturbances that would be compounded by wet soil conditions during spring thaw. Decreased plant cover around the tank would promote weedy forbs and invasive annual brome, while disturbances associated with the construction of pipelines would increase opportunities for the establishment of more aggressive bluegrass with an increased potential for spreading to other portions of the pasture.

Adaptive Options – Decreasing Authorized Use would probably not have an appreciable effect on plant composition in pasture 4, largely because winter use is not credited towards the level of Authorized Use. Reductions in total annual use sufficient to promote increased development of native plant species on the plateau would be necessarily large due to concentrated use in this area. Other portions of the pasture appear to experience light degrees of grazing disturbance with a high potential for the occurrence of late seral stages. The situation is likely to be similar in the headquarters pasture and pasture 1. Increasing Authorized Use would primarily increase disturbances associated with hay feeding and premature use of native grasses that would facilitate shifts towards early seral stages and the spread of invasive grasses.

Sharp-tailed Grouse

Initial Actions – The Authorized Use applies primarily to summer use and does not seem to fully

account for the winter use which could have direct and negative impacts to grouse nesting habitat. The high levels of winter use/feeding, especially in pasture 4, results in trampled and grazed vegetation, and reduces residual cover. The location of the water tank would not appreciably affect grouse habitat given the high levels of current winter use, especially in pasture 4.

Adaptive Options – In this allotment, adjusting Authorized Use would not move the allotment towards herbaceous structure objectives since the allotment is only lightly used during the summer grazing season. Accounting for winter use needs to occur. Potential grouse nesting cover is impacted by trampling and grazing during the winter months by livestock in pasture 4.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 4 are the same as Alternative 3.

Range

Initial Actions – Authorized Use for this allotment would be 340 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 300 federal AMs converted to AUMs by adjusting for cow size is 345 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a one percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration when planning the rotation for the allotment.

Riparian

Initial Actions – The effects would be the same as described previously in Alternative 3.

Woody Draws

Initial Actions – Reducing Authorized use by one percent would not have an effect on current woody draw conditions. Continuation of current management focused on winter use would perpetuate Healthy woody draw conditions measured in pasture 4, and likely to occur in the headquarters pasture and pasture 1. However, the potential exists for appreciably increased summer use compared to reported use that would contribute to decreasing woody draw conditions.

Herbaceous Structure

Initial Actions – The proposed Authorized Use would approximate the initial estimated carrying capacity but would not appreciably affect conditions because livestock use is focused on unaccounted for winter use.

Seral Stages

Initial Actions – Decreasing Authorized Use by 1 percent according to adjustments for cow size and initial estimated carrying capacity would have no effect on current plant composition or trends. Livestock concentrations associated with hay feeding would remain high among the primary use areas and maintain adverse impacts of premature spring grazing and invasive grass introductions. Low grazing disturbances outside of hay feeding areas in pasture 4 would facilitate the maintenance of existing seral stages.

Sharp-tailed Grouse

Initial Actions – The Authorized Use appears to apply primarily to summer use and does not appear to fully account for the winter use. The high levels of winter use grazing and feeding, especially in pasture 4, results in trampled and grazed vegetation which could appreciably reduce potential spring grouse nesting cover.

ALLOTMENT 286

Table 286.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 286 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 6.1 – Rangeland With Broad Resource Emphasis	465	100	
Total allotment acres	465	100	
NFS acres	465	100	
State land acres	0	0	
Private land acres	0	0	
Current permitted livestock grazing (AMs) on NFS lands			278
Initial estimated carrying capacity (AUMs) on NFS lands			236
Number of pastures containing NFS lands			3

Table 286.2 — Allotment 286 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	The 2004 surveys rated Betsy Creek's two reaches as NF and FAR-NA.	Start on upward trend.
Woody draws	Sampled woody draw was Unhealthy due to lack of regeneration and no shrub layer.	Increase successful recruitment of woody species.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Below Objectives High – Below Objectives 2004 Transects: 1.06 2004 Station percent: Low-95/Moderate-5/ High-0 2005 Transects: 1.06 2005 Station percent: Low-90/Moderate-10/ High-0	Manage for additional Moderate and High structure on biologically capable habitats.
Seral stages	Of three sample sites, two were at mid seral stages and one was at an early stage. Most of the three pastures consist of broken land with intermixed native and invasive grasses.	Increase the proportion of late seral stages and limit the spread of invasive bluegrass.
Sharp-tailed grouse	There are no leks within the allotment. There are no known leks within 1 mile of the allotment.	Manage for increased High vegetative structure on biologically capable sites to enhance nesting and brooding habitat
Remarks	2 acres of absinth wormwood in lowlands, trace of burdock.	

Table 286.3 — Allotment 286 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 278 federal AMs • Three-year average permitted use is 161 federal AMs.* • Permit type: Inventory (managed as turn-in). • Rotation: Modified deferred rotation according to allotment worksheets, but truly seasonlong until fences are functional. • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 278 • Implement three-pasture deferred rotation. • Construct water lot between pastures 2 and 3. **Adaptive Options** • Fence high-value woody draw. • Adjust Authorized Use. • Construct water lot between pastures 1 and 3.	**Initial Actions** • Authorized federal AUMs: 236 • Implement three-pasture deferred rotation. • Construct water lot between pastures 2 and 3. **Adaptive Options** • Fence high-value woody draw. • Construct water lot between pastures 1 and 3. • Adjust Authorized Use. • Treat clubmoss.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every 3 years. • Complete Properly Functioning Condition survey once every 3 years then once every 5 years if a positive trend has been established. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 286 — Existing Condition

Range – This allotment is approximately 465 acres and contains solely NFS lands. Currently, this allotment is issued an inventory permit for 10 head for 8 months and 44 head for 4-1/2 months by the MGA. It should be noted that although this allotment is permitted with an inventory permit, which typically means that livestock are somewhere on the allotment for a full 12 months, it is actually managed like a turn-in permit. The permittee brings in livestock to graze sometime in the summer months, but brings them home to a separate 'off permit' location to winter the livestock. It

is also the headquarters allotment associated with a common allotment, Blacktail Common, but because the permittee has not turned into the common for many years, they have relinquished these common units back to MGA. Current AMs provided by NFS lands can be found in Table 268.1. This allotment is located in the Rolling Prairie geographic area. Water developments within this allotment include three reservoirs.

This allotment has been subdivided into three pastures ranging from 139 to 176 acres. Because there is no water source in pasture 3, the gates are left open between pastures 1 and 3 and are managed as one pasture. Although a review of the allotment worksheets indicate a rotation always starting in pasture 1 and moving to pasture 2 and in some years coming back to one or both pastures, this in reality is not the case. A field tour showed that the fenceline separating pastures 2 and 3 was not functional with barbed wire down at the intersection of all three pastures. Therefore, a more accurate description of the management on this allotment is a seasonlong grazing system from May 15th through August 31st. All pastures show some kind of indication of prior cultivation, therefore the dominant vegetation is crested wheatgrass intermixed with minor components of native species, especially blue grama. In some areas, the stand has a fair density of plants, but in other areas it thins out and provides openings for fragile cactus and club moss. There is fair to poor litter cover, except in the far northeast portion of pasture 3, throughout the allotment.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there is approximately two acres of absinth wormwood and burdock. The Billings County Weed Board has been informed and has made an attempt to control some of these infestations.

Riparian –

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
286-01	Betsy Creek (1)					0.43	0.43
286-01	Betsy Creek (2)			0.13			0.13
286-03	Betsy Creek (2)			0.59			0.59

Betsy Creek (Reaches 1 and 2) crosses pastures 1 and 3 of Allotment 286. In pasture 1, the interdisciplinary team assigned a functionality rating of FAR-NA and NF; and in pasture 3, FAR-NA. Problems with Betsy Creek include:

- Loss of water table and short hydro period leading to a paucity of desired riparian plants in the riparian zone.
- Lack of regeneration of sedges and riparian shrubs and trees.
- Invasion of mesic upland plants into the riparian zone.
- Repeated patches of bare ground and sparse plant cover along meander bends.

Woody Draws – The single woody draw community in the allotment extends through pastures 1 and 3 and is Unhealthy (Figure 286.1). The scarcity of woody draws, easy livestock access, summer grazing rotations, and a water reservoir located along the boundary of pastures 1 and 3 contribute to high browsing and trampling disturbances.

Figure 286.1 — Unhealthy woody draw conditions in pasture 1 exhibiting no shrub layer or recent tree regeneration and heavy grazing of the understory.

Herbaceous Structure – There was one randomly selected VOR transect in 2004. The VOR transect average was 1.06 (Low structure class). The station frequency of this transect was 95 percent Low, with 5 percent in Moderate, and no reported High.

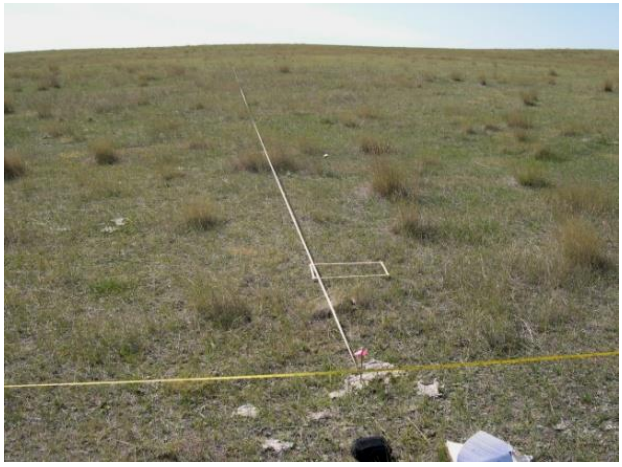
This transect was re-surveyed in 2005 and had the same VOR reading of 1.06. Station averages remained approximately the same as 2004 with 90 percent in Low structure and the remaining 10 percent in Moderate structure stations.

Seral Stages – Broken land constituted almost 70 percent of pastures 1 and 3, and vegetation was consistently comprised of intermixed crested wheatgrass, bluegrass, and native grasses, generally at mid to early seral conditions or Invaded Grass States. Cover of clubmoss was often high. A sere plot in pasture 1 was at an early-mid seral stage for broken land with low development of native grasses and high clubmoss cover. Kentucky bluegrass comprised six percent of the relative grass basal cover. A belt transect in pasture 1, located on a previous ecoplot from 1998, indicated recent establishment and current dominance of bluegrass. Remeasurement of an ecoplot in pasture 3 indicated that blue grama had sharply increased at the expense of all other prominent grasses, with a resulting decrease in seral stage from late-mid to mid-early. Relative cover of invasive bluegrass remained less than 3 percent. Observations of several other ecoplot sites in this area suggested similar shifts in plant composition with areas of increased bluegrass.

Broken land constituted most of the 160 acres of pasture 2, where a sere plot was at a mid-early seral stage with a moderate mixture of grass species but more than 40 percent clubmoss cover (Figure 286.2). Canada bluegrass comprised about 10 percent of the relative grass canopy cover. A

repeated pace transect along the slope of a low ridgeline dominated by native grasses indicated minimal change in plant frequency other than a decrease of blue grama and an increase of sedge. Total plant and clubmoss frequency doubled while litter decreased. A Robel transect on the eastern edge of the pasture recorded blue grama, western wheatgrass, and bluegrass as the dominant species.

Figure 286.2 — Sere plot in broken land of pasture 2 at a mid-early seral stage with high utilization suggested by the lack of residual cover after livestock turn-off.



Sharp-tailed Grouse – There are no known leks within the allotment. The nearest lek is less than 1.02 miles from the allotment. However, the allotment is near enough to the lek that it could contribute to providing nesting habitat for grouse.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed after 2 years.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment, so there be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian condition along Betsy Creek as described in the Existing Condition would improve and evolve toward desired riparian conditions over time. Improvement would result from the establishment of riparian vegetation which would capture sediment and build stream banks.

Woody Draws – Woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. Existing invasive grasses within woody draws, and potential increases of these species as a

result of increasing litter with the removal of livestock grazing, would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock there would be an increased opportunity for the development of High and Moderate herbaceous structure, and a decrease in the quantity of Low herbaceous structure in the allotment.

Seral Stages – The removal of livestock grazing would facilitate increased litter accumulation that would assist increases of bluegrass and transitions to Invaded Grass States with decreased maintenance of native plant communities during the next 10 years.

Sharp-tailed Grouse – The increase in potential High herbaceous grasslands from the removal of livestock would appreciably enhance nesting and brooding habitat for sharp-tailed grouse. However, the long-term projection (>10 to 15 years) is the site would experience declining forb diversity resulting in decreasing foraging opportunities and the increasing dominance of invasive grasses, particularly Kentucky bluegrass, which would negatively impact nesting and brooding quality.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by an inventory grazing association permit, and Authorized Use is 278 federal AMs. It should be noted that although this allotment is permitted with an inventory permit, it is actually managed like a turn-in permit.
- Cow/calf pairs are run in a three-pasture modified deferred rotation according to allotment worksheets, but seasonlong grazing will be taking place until the fences are deemed functional.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian conditions along Betsy Creek as described in the Existing Condition would continue.

Woody Draws – The woody draw extending through pastures 1 and 3 would continue to deteriorate under current management as it is the only draw present and experiences concentrated livestock disturbances that have contributed to the lack of significant tree and shrub reproduction. Stocking at levels of Authorized Use that exceed initial estimated carrying capacity by 36 percent after adjusting for cow size, and that greatly exceed currently reported use, would increase the degree of woody draw disturbances and decrease present conditions.

Herbaceous Structure – Current management is projected to promote the existing herbaceous structure distribution and provide limited opportunities to increase the proportion of High

herbaceous structure and improve the overall herbaceous structure distribution. Potential reasons include an Authorized Use level that is 26 percent higher than the initial estimated carrying capacity, although recent AOI/AW information indicates use is appreciably less than the initial estimated carrying capacity estimation. The seasonlong use could also be contributing to the existing herbaceous structure conditions because no regrowth period is promoted in any of the pastures.

Seral Stages – Continuation of current management would result in the persistence of mid to early seral stages and a high potential for increased spreading of invasive grasses. Mid May turn-in onto pastures 1 and 3 creates the potential for invasive grass utilization at the beginning of the season, with gradual shifts towards native grasses before rotating to pasture 2 during mid-June. Decreased invasive grass palatability during the second rotation through pastures 1 and 3 during mid-July through mid-August contributes to selective use of the native component that can assist the spread of invasive grasses. Low invasive grass palatability in pasture 2 during the mid-June through mid-July grazing season would contribute to selective use of the native component on a consistent annual basis. Conversely, ineffective fencelines would potentially result in invasive grass utilization in all three pastures until mid-June, followed by utilization of the native component as invasive grass palatability decreases. However, low livestock density and the intermixed nature of invasive and native grasses under this situation would decrease selective utilization of invasive grasses across the combined pastures.

Plant composition measurements suggest forage production is less than assumptions used to estimate carrying capacity, and potentially increased stocking to the level of Authorized Use that exceeds initial estimated carrying capacity by 36 percent, and exceeds currently reported use by a greater amount, would result in shifts towards early seral stages and contribute to the spread of invasive grasses.

Sharp-tailed Grouse – Existing management would not enhance High structure herbaceous grasslands, thus limiting the potential to enhance grouse nesting and brooding habitat. As noted above, the high Authorized Use (26 percent higher than initial estimated carrying capacity) could be a primary reason.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 278 federal AMs.
- Implementing a three-pasture deferred rotation.
- Constructing a water lot between pastures 2 and 3.
- Adaptive Options:
- Fencing high-value woody draw.
- Adjusting Authorized Use.
- Constructing a water lot between pastures 1 and 3.

ADAPTIVE OPTIONS

- Fencing high-value woody draw.
- Adjusting Authorized Use.
- Constructing a water lot between pastures 1 and 3.

Range

Initial Actions – Because the initial Authorized Use would remain the same as current management, the permittee would be allowed to harvest the same amount of forage. Implementing a three-pasture deferred rotation would change the season of use for each pasture and provide opportunities for initial growth and/or regrowth of herbaceous species. Because of the size of the pastures, livestock distribution may not change much from the existing conditions.

Constructing a water lot between pastures 2 and 3 would allow for a three-pasture deferred rotation there is not dependable water in pasture 3 currently. There would be an initial cost for fencing, and annual maintenance thereafter.

Adaptive Options – Fencing high-value woody draws would have little to no change in livestock distribution across the allotment. Forage within the exclosures would no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may happen on remaining forage. There will be a cost to install these fences and annual maintenance thereafter.

Adjusting Authorized Use downward would result in fewer livestock numbers, less grazing days, or a combination of the two because of the turn-in permit. Adjusting Authorized Use would not change the distribution of the livestock and the amount of forage harvested would be less than the existing amount.

Constructing a water lot between pastures 1 and 3 would provide an alternative water source in pasture 3 to pull livestock away from Betsy Creek. There would be an initial cost for fencing, and annual maintenance thereafter.

Riparian

Initial Actions – The actions proposed to address riparian condition along Betsy Creek are as follows:

- Implement a three-pasture deferred rotation.
- Construct a water lot between pastures 2 and 3.

These proposed actions are not sufficient for short-term improvement in the condition of riparian areas along Betsy Creek. With forage in short supply, adding a water lot in the uplands would do little to decrease pressure on the riparian area. The riparian area is unlikely to improve under the proposed Authorized Use level.

It is expected that desired conditions on Betsy Creek would be achieved over a long period of time (several decades).

Adaptive Options – Fencing high-value woody draws should benefit riparian conditions along Betsy Creek because there would be no livestock disturbances.

Reducing Authorized Use should help improve the uplands vegetation which in turn reduces overland flow further benefitting riparian conditions along Betsy Creek. A reduction in overland flow delivered to the creek would result in reduced stream velocities allowing for the establishment of riparian vegetation and building stream banks.

Constructing a water lot between pastures 1 and 3 should have minimal effect on riparian conditions because the amount of overall livestock use should remain.

It is expected that desired conditions on Betsy Creek would be achieved in 10 to 15 years.

Woody Draws

Initial Actions – Implementing a three-pasture deferred rotation after constructing a water lot fence to make a reservoir accessible to both pastures 2 and 3 would increase the potential for improved woody draw conditions by decreasing the period of access to the draw. However, as only one draw extends through these pastures, the relative amount of use would remain high and would decrease the potential degree of woody draw improvement. Stocking at levels of Authorized Use that exceed initial estimated carrying capacity by 36 percent after adjusting for cow size would result in increased woody draw disturbances relative to levels of currently reported use that are appreciably less than initial estimated carrying capacity.

Adaptive Options – Fencing woody draws and/or decreasing Authorized Use would increase the potential for improved woody draw conditions by removing or decreasing livestock browsing and trampling disturbances that would facilitate the regeneration of desired woody species. Exclusion of livestock impacts through fencing would provide the fastest and greatest degree of woody draw improvement, but regeneration of woody species could be impaired by increasing litter and invasive grass layers. Fencing of a portion of the draw would contribute to increased disturbance within adjacent unfenced portions of the draw. Decreasing Authorized Use would require reductions of more than 50 percent to effect a change in woody draw conditions because recently reported use has been about half of Authorized Use and there is no indication of woody species regeneration.

Constructing a water lot between pastures 1 and 3 would facilitate implementation of the deferred rotation and would decrease the period of access to the north and south halves of the woody draw extending through the two pastures. However, increased livestock density in each pasture and the single available draw would maintain relatively high levels of disturbance with minimal potential for improved conditions.

Herbaceous Structure

Initial Actions – Implementing a three-pasture deferred rotation, in conjunction with construction of a water lot between pastures 2 and 3, could decrease the amount of Low structure through timing of grazing and potential regrowth in early pasture, but permitting use at the Authorized Use level would limit residual cover. However, recent AOI/AW data seems to indicate that the permittee is operating below the initial estimated carrying capacity, therefore permitting an Authorized Use at 278 AMs would be 26 percent over the initial estimated carrying capacity and above the recent

operating level, and thus it would be counter-productive to improving the herbaceous structure (particularly High) distribution.

Adaptive Options – Adjusting the Authorized Use could be the most effective tool available to begin to adjust the herbaceous structure towards meeting project objectives. However, since reported use is appreciably lower than initial estimated carrying capacity, which is lower than Authorized Use (15 percent), use of the tool may not be effective until well after the 10 to 15 year timeframe to achieve a balance between the initial estimated carrying capacity and the Authorized Use level. Fencing specific woody draws could have effects to the herbaceous structure distribution by displacement of cattle to the surrounding uplands. These effects are not expected to be appreciable due to the small amount of woody draw habitat projected to be fenced. Constructing a water lot between pastures 1 and 3 would encourage more even distribution of livestock within these small pastures because of increased numbers with decreased time, especially in combination with the initial Authorized Use level, inhibiting achievement of the herbaceous structure distribution (particularly High) objectives, within the 10-15 year time frame.

Seral Stages

Initial Actions – Implementing a three-pasture deferred rotation would not contribute to positive trends in plant composition due to the intermixed occurrence of invasive and native grasses in the three pastures. Although there would be an increased potential for native grasses in pastures 1 and 3 to complete critical growth periods, low palatability of invasive grasses occurring during frequent grazing seasons in individual pastures would contribute to selective use of native grasses. Relatively low levels of currently reported use might result in appropriate utilization of the native component, but low utilization of invasive grasses would contribute to a competitive advantage that assists their increase. Stocking at the level of Authorized Use that exceeds initial estimated carrying capacity by 36 percent after adjusting for cow size would increase the potential for excessive use of the native component, with the resulting decrease in plant vigor assisting the spread of invasive grasses.

Constructing a water lot between pastures 2 and 3 would assist implementation of the deferred rotation but would not increase the maintenance of native grass communities for reasons stated above.

Adaptive Options – Constructing a water lot between pastures 1 and 3 would also assist the deferred rotation but would not increase the maintenance of native grass communities for reasons stated above.

Fencing portions of the woody draw would not have an appreciable influence on upland plant composition due to the small size of the exclosure. Existing invasive grasses in the understory of the draw would have a high potential to increase within the exclosure as a result of increasing litter.

Decreasing Authorized Use would have the potential of facilitating shifts towards late seral stages by decreasing the level of grazing disturbances, but reductions would have to exceed 50 percent to affect a decrease in recently reported levels of use. Reductions in current levels of use could assist the accumulation of plant litter that can facilitate the spread of invasive grasses. Neither decreases nor increases in use would halt the spread of invasive grasses and increase the maintenance of

native plant communities without coordinating the grazing season with the respective palatability and production of the invasive and native grass components.

Sharp-tailed Grouse

Initial Actions – Implementing a three-pasture deferred rotation, in conjunction with construction of a water lot between pastures 2 and 3, could increase even use with the smaller pastures, and permitting use at the Authorized Use level could limit grouse nesting cover. However, recent AOI/AW data seems to indicate that the permittee is operating below the initial estimated carrying capacity, therefore permitting an Authorized Use at 278 AMs would be 26 percent over the initial estimated carrying capacity and appreciably above the recent operating level, and thus it would be counter-productive to enhancing grouse nesting habitat.

Adaptive Options – Adjusting the Authorized Use could be the most effective tool available to begin to manage for grouse nesting habitat. However, since reported use is appreciably lower than initial estimated carrying capacity, and lower than Authorized Use, use of the tool may not be fully implemented until after the 10 to 15 year timeframe to achieve a balance between the initial estimated carrying capacity and the Authorized Use level. Fencing specific woody draws could have effects to grouse nesting habitat due to displacement of cattle to the surrounding uplands. These effects are not expected to be appreciable due to the small amount of woody draw habitat projected to be fenced. Constructing a water lot between pastures 1 and 3 would encourage more even distribution of livestock within the allotment because of increased numbers with decreased time, especially in combination with the initial Authorized Use level, thus inhibiting grouse nesting habitat within the 10- to 15-year time frame.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes:

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.

ADAPTIVE OPTIONS:

- Treat club moss.

Range

Initial Actions – Authorized Use for this allotment would be 236 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 278 federal AMs converted to AUMs by adjusting for cow size is 320 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 26 percent reduction from

existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration when planning the rotation for the allotment.

Adaptive Options – Treating clubmoss would affect Authorized Use on a temporary basis because, depending on the actions taken, some amount of rest may be required to allow establishment of target species in the pasture. Livestock distribution may be more focused in these areas, but due to the small size of the pastures overall the livestock distribution would not change. There would be an initial cost for the treatment.

Riparian

Initial Actions – Alternative 4 is identical to Alternative 3 except the Authorized Use would be adjusted from 278 AMs to 236 AUMs. These proposed actions are not sufficient to see improvement in the condition of riparian areas along Betsy Creek in the short term. See Alternative 3 for discussion.

It is expected that desired conditions on Betsy Creek would be achieved over a long period of time (several decades).

Adaptive Options – Treating clubmoss is proposed. If conversion to an herbaceous plant community is achieved then overland flow should be reduced. A reduction in overland flow delivered to the creek would result in reduced stream velocities allowing for the establishment of riparian vegetation which would build stream banks.

It is expected that desired conditions on Betsy Creek would be achieved in 10 to 15 years.

Woody Draws

Initial Actions – Decreasing Authorized Use by 26 percent according to initial estimated carrying capacity and adjustments for cow size would not contribute to improved woody draw conditions because potential levels of use would remain 15 to 67 percent greater than typically reported use.

Adaptive Options – The effects of fencing woody draws, constructing a water lot between pastures 1 and 3, and adjusting Authorized Use were discussed under Alternative 3. However, further decreases in Authorized Use would begin to result in reduced levels of actual use compared to currently reported use, and would have an increased potential to facilitate improved woody draw conditions.

Treating clubmoss could increase plant vigor and forage production, and attract livestock to the uplands, thereby decreasing the level of browsing and trampling disturbances within the woody draw. However, livestock would continue to be attracted to the woody draw and impede the development of Healthy conditions.

Herbaceous Structure

Initial Actions – Even though the initial estimated carrying capacity is less than the preference number, allowing for an Authorized Use at 236 AUMs could still be limiting to improving residual cover since it exceeds the recent reported average of approximately 185 AUMs after adjusting for cow size, thus limiting improvement in the herbaceous structure distribution.

Adaptive Options – Treating clubmoss would have the potential to increase the amount of production and, therefore, improve herbaceous structure.

Seral Stages

Initial Actions – Decreasing Authorized Use by 26 percent according to initial estimated carrying capacity and adjustments for cow size would have no affect on trends in plant composition because potential levels of use would remain 15 to 67 percent greater than typically reported use.

Adaptive Options – Treating clubmoss would have the potential of increasing plant vigor and forage production, thereby decreasing the level of utilization at current levels of use and facilitating shifts towards late seral stages. However, invasive grasses would increase similar to native grasses, and grazing seasons that are poorly coordinated with palatability of the invasive component would impede the development of late seral stages and maintain the potential for transitions to Invaded Grass States.

The effects of woody draw fencing, constructing a water lot between pastures 1 and 3, and adjusting Authorized Use were discussed under Alternative 3. Further decreases in Authorized Use would begin to result in reduced levels of use compared to currently reported use, and would have an increased potential to facilitate shifts towards late seral stages. However, sufficiently reduced levels of use would contribute to increased plant litter that would facilitate the increase of invasive grasses.

Sharp-tailed Grouse

Initial Actions – Even though the initial estimated carrying capacity is less than the preference number, allowing for an Authorized Use at 236 AUMs could still be limiting to improving grouse nesting cover since the Authorized Use of this alternative still exceeds the recent reported average of approximately 185 AUMs after adjusting for cow size, thus limiting the enhancement of groused nesting habitat.

Adaptive Options – Treating clubmoss would have the potential to increase the amount of production and, therefore, enhance the potential for grouse nesting habitat.

ALLOTMENT 287

Table 287.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 287 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 2.2 – Research Natural Areas	115	7	
Management Area 3.65 – Rangelands With Diverse Natural-Appearing Landscapes	1505	86	
Newly acquired NFS lands with unassigned Management Area	125	7	
Total allotment acres	2626	100	
NFS acres	1744	66	
State land acres	290	11	
Private land acres	592	23	
Current permitted livestock grazing (AMs) on NFS lands			579
Initial estimated carrying capacity (AUMs) on NFS lands			577
Number of pastures containing NFS lands			3

Table 287.2 — Allotment 287 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	PFC surveys conducted in 2004 rated the unnamed tributary of Blacktail Creek as NF.	Start stream back toward PFC.
Woody draws	33 percent of sampled woody draws were Healthy, 50 percent were At Risk and 17 percent were Unhealthy. At Risk and Unhealthy woody draws are affected by low regeneration, no shrub layer, deep headcuts, and locations next to water.	Promote survival of seedling/saplings and shrubs.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Below Objectives High – Below Objectives 2004 Transects: 2.34; 1.16 2004 Stations percent: Low-61.67/Moderate-38.33/High-0	**Manage allotment to maintain meeting structure objectives.
Seral stages	Native dominated communities with frequent invasive grass occurrences and about 10 percent broken land across the allotment. One measured sere plot was at a mid seral stage.	Maintain native plant communities with a mosaic of seral stages and limit the expansion of invasive grasses.
Sharp-tailed grouse	There is one known lek within the allotment. There are no known leks within one mile of the allotment. Overall, the projected area associated within the one mile proximity radius is approximately 1,309 acres.	Manage to enhance sharp-tailed grouse nesting and brooding habitat by increasing the quality and quantity of High vegetative structure on biologically capable sites.
Remarks	4 acres of Canada thistle, and burdock on private, none on federal.	

**** Based on a review of field notes and observations, the IDT determined that this allotment was meeting structure objectives.**

Table 287.3 — Allotment 287 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action	Alternative 3A	Alternative 4
• Authorized Use is 579 federal AMs • Three-year average permitted use is 575 federal AMs.* • Permit type: Turn-in. • Rotation: Seasonlong. • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 579 • Manage stock tanks to pull livestock away from woody draws and to control distribution. • Maintain current grazing system but change season of use within rotation. **Adaptive Options** • Fence high-value woody draws. • Improve upon natural barrier between pasture 2 and 3 to control livestock access. • Add livestock tank in north half of Section 26 pasture 3 and adjust tank management accordingly. • Adjust Authorized Use. • Fence reservoir in pasture 3.	**Initial Actions** • Authorized federal AMs: 579 • Manage stock tanks to pull livestock away from woody draws and to control distribution. • Maintain current grazing system but change season of use within rotation. • Construct an extension to the existing range water pipeline in pasture 3 into the northwest quarter of Section 26, T143N, R101W. **Adaptive Options** • Fence high-value woody draws. • Improve upon natural barrier between pasture 2 and 3 to control livestock access. • Adjust Authorized Use. • Fence reservoir in pasture 3.	**Initial Actions** • Authorized federal AUMs: 577 • Manage stock tanks to pull livestock away from woody draws and to control distribution. • Maintain current grazing system but change season of use within rotation. **Adaptive Options** • Fence high-value woody draws. • Improve upon natural barrier between pasture 2 and 3 to control livestock access. • Add livestock tank in north half of Section 26 in pasture 3, and manage stock tanks accordingly. • Adjust Authorized Use. • Fence reservoir in pasture 3.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every 3 years. • Complete Properly Functioning Condition survey once every 3 years then once every 5 years if a positive trend has been established. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3.	**Monitoring** • Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 287 — Existing Condition

Range – This allotment is approximately 2,626 acres with 1,744 acres of NFS lands, the rest being state and private. Currently, this allotment is issued a private allocation turn-in permit for 100 head for eight months by the MGA. This allotment has been subdivided into five pastures and of these five pastures three contain NFS lands. The current NFS pastures range from 153 to 608 acres.

Current AMs provided by NFS lands can be found in Table 287.1. This allotment is located in the Badlands geographic area. This allotment contains a spring development, a reservoir, and a pipeline/stock tank system for water facilities.

In the last 5 years, the current permittee has managed the allotment with increased livestock numbers for a shortened season (numbers vary from 200 to 115 head for 3 to 5 months) in pastures 2 and 3. Due to the condition of the natural barrier between pastures 2 and 3, livestock normally are turned into pasture 2 around mid-June to the mid-July from either pasture 1 or 4, livestock have been seen in pasture 4 once in 5 years, and then drift into pasture 3.

Overall, this allotment has fairly good native species diversity, litter cover, with potential areas for High structure. Due to past and present oil activity, there are areas along the road and around oil pads that contain crested wheatgrass intermixed with native plant communities. A good example of this would be in the east side of Section 26. Salt and mineral placement has been along the road relatively close to the water facilities in 2004; however, the permittees have made efforts to move supplements away from the road and water facilities since then.

Pasture 2 is approximately 625 acres. Water facilities include a spring development and pipeline with a stock tank. The topography in this allotment is relatively rough compared to the other three pastures. Utilization around the water facilities was around 45 to 50 percent for the 2004 grazing season.

Pasture 3 is approximately 1,223 acres. The water facilities include a reservoir (was breached until November 2004) and a pipeline system with two stock tanks. Reviewing the distribution map shows that most of the heaviest use is centered near the water facilities, road, and the gentle rolling topography. To the east and north of the water facilities show a more moderate use level. In the moderate use areas, winter fat (*Ceratoides lanata* (Pursh) Howell) was thriving although grazed, but the use was light and it was difficult to distinguish if it was from cattle or wildlife. There were isolated areas of red threeawn, but are not much of an issue. Trailing to the watering facilities is evident. The trailing going down to the reservoir in Section 26 should be monitored for erosion.

The eastern side of pasture 4 is mostly crested wheatgrass and smooth brome; however, the northwestern portion does have native species. It’s evident that this pasture in the past was cultivated and seeded back into a grass pasture/hay field.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there is approximately 4/10 acre of Canada thistle and burdock. The Billings County Weed Board has been informed of these and has made an attempt to control some of these infestations.

Oil and gas development on NFS lands has removed a total of approximately 6.1 acres from livestock access. No acres have been reclaimed and are or will be available for livestock access. Associated forage from these acres is approximately 1.8 and 0.0 AUMs, respectively.

Riparian –

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
287-03	Unnamed tributary to Blacktail Creek (9)					0.65	0.65

An unnamed tributary of Blacktail Creek (Reach 9) forms the boundary between pasture 3 of Allotment 287 and pasture 2 of Allotment 256. A portion of this reach totaling 0.45 miles is in Allotment 256. See Allotment 256 for a review of the existing conditions for this tributary reach.

Woody Draws – Five woody draw samples from pasture 1 and one sample from pasture 2 resulted in ratings of 33 percent Healthy, 50 percent At Risk, and 17 percent Unhealthy (Figure 287.1). Woodland communities in pasture 4 are dominated by Rocky Mountain juniper with lesser amounts of green ash on north aspect slopes. These sites were not sampled but livestock use is relatively light as a result of infrequent use of the pasture and steep north aspect slopes.

Figure 287.1 — Healthy (a) and At Risk (b) woody draws in pastures 2 and 3, respectively. Note dominance of Kentucky bluegrass understory and lack of recent tree regeneration and shrub layers in the At Risk draw that is located below a water tank.

Herbaceous Structure – This allotment was determined to be meeting structure objectives (via IDT decision with personal knowledge and field notes through the use mapping exercise). Two random VOR herbaceous dominated transects were surveyed in 2004. One showed Low structure and the other was Moderate. The overall station averages demonstrated that approximately 62 percent were Low structure and 38 percent were Moderate structure. There were no High structure transects or stations recorded. Neither of the two transects were resurveyed in 2005.

Seral Stages – Native grass communities with frequent invasive grass patches tended to dominate throughout the three NFS pastures of this allotment. Several patches of broken land occur in pastures 2 and 3 and other invasive grass dominated areas occur along Forest System Road 702A on the west side of pasture 3, reclaimed or existing oil developments, and around developed water sources. Rough topography, barren landforms, and long distances to water contribute to low livestock use in portions of the allotment.

Broken land constituted about 11 percent of NFS land in pasture 2 along a plateau where a repeated pace transect indicated an increase in sedge and decrease in needlegrass. Invasive bluegrass was present in trace amounts during both measurement dates. Utilization of crested wheatgrass was low in 2009 (Figure 287.2). A Robel transect on the edge of broken land recorded dominance of sedge, needle-and-thread, and western wheatgrass with high amounts of bare ground.

Figure 287.2 — Crested wheatgrass in pasture 2 during the spring of 2010. Large amount of standing dead material is indicative of low utilization during 2009 grazing season.

Six parcels of broken land constituted about 10 percent of pasture 3. A sere plot on a Thin Loamy ecological site in unbroken land was at a mid-late seral stage with about 15 percent relative basal cover of invasive grasses. A nearby belt transect recorded bluegrass as the second species of dominance, while another belt transect about 0.7 miles to the south recorded Junegrass, western wheatgrass, and needle-and-thread with fringed sage and silky wormwood (*Artemisia dracunculus* L.). Three Robel transects in pasture 3 supported the dominance of native grasses. Pasture observations indicated relatively low use but frequent invasive grass patches in the northeast quarter of the pasture.

A small portion of the Mikes Creek RNA comprised most of the NFS land in pasture 4 that is much smaller than pastures 2 and 3. There are no records for use in the pasture but it may be infrequently used as a winter pasture with private land and hay feeding. Most use likely occurs along a ridgetop consisting of broken land and crested wheatgrass that breaks to steep native dominated slopes with Rocky Mountain juniper.

Sharp-tailed Grouse – There is one known lek within the allotment on NFS lands. The area associated within the 1-mile proximity radius is approximately 1,309 acres.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed after 2 years.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment, so there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian condition along the unnamed tributary to Blacktail Creek as described in the Existing Condition would improve and evolve toward desired riparian conditions over time. Improvement would result from the establishment of riparian vegetation which would capture sediment and build stream banks.

Woody Draws – The proportion of Healthy woody draws would increase with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. Existing invasive grasses within woody draws and potential increases of these species as a result of increasing litter with the removal of livestock grazing would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock, there would be an increased opportunity for the development of High and Moderate herbaceous structure, and a decrease in the quantity of Low herbaceous structure in the allotment.

Seral Stages – The removal of livestock grazing disturbances would facilitate shifts towards late seral stages with a decrease and eventual loss of the desired proportion of early and mid seral stages. However, increased litter accumulation with the removal of livestock grazing would assist increases of existing bluegrass and transitions to Invaded Grass States with decreased maintenance of native plant communities. Transitions could occur on a localized scale in 5 to 10 years, but could require more than ten years in portions of the allotment with relatively low invasive grasses.

Sharp-tailed Grouse – The potential increase in High structure herbaceous grasslands from the removal of livestock would appreciably enhance nesting and brooding habitat for sharp-tailed grouse. The long-term projection (>10 to 15 years) the allotment would eventually experience declining forb diversity resulting in decreasing foraging opportunities plus the increasing dominance of invasive grasses would negatively impact nesting and brooding quality.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by a turn in grazing association permit, and Authorized Use is 579 federal AMs.
- Cow/calf pairs are run in seasonlong grazing system.
- See allotment map in Appendix B for current range developments.

Range – Existing federal AMs permitted to the grazing association would continue. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian conditions along the unnamed tributary to Blacktail Creek as described in the Existing Condition would continue.

Woody Draws – The high proportion of At Risk woody draw communities would persist under current management in which existing conditions developed. Current levels of reported use, topographic constraints, the close proximity of water sources to several woody draws, and nearly seasonlong grazing would continue to result in high browsing and trampling disturbances. Potentially increased stocking at the level of Authorized Use that has exceeded typically reported use by 17 to 25 percent would contribute to decreasing conditions.

Herbaceous Structure – Current management is projected to continue the existing herbaceous structure distribution and providing limited opportunities to ensure its maintenance or ensure the projected proportion of High herbaceous structure. One reason for concern includes an Authorized Use level that is 15 percent higher than the initial estimated carrying capacity, accounting for cow size.

Seral Stages – Native-dominated communities would persist for an extended period under current management with a moderate potential for increasing invasive grasses. Mid June to early July turn-in dates provide additional time for native plants to complete critical early season growth periods, thereby helping to maintain plant vigor and production. However, the late turn-in dates result in low palatability of crested wheatgrass that comprises about 10 percent of pastures 2 and 3, as well as bluegrass that is intermixed at varying proportions with native grasses in most areas of the allotment. Palatability of these species could be particularly decreased in pasture 3 due to somewhat later season grazing in this pasture, therefore contributing to selective use of native grasses. Infrequent use of pasture 4 likely contributes to increased use of pastures 2 and 3. Although typically reported use has been less than initial estimated carrying capacity, adjustments have not been made for non-use of pasture 4 that would decrease carrying capacity. Moderate to high stocking conducted nearly seasonlong in pastures 2 and 3 can decrease plant vigor and increase the susceptibility to invasive grass establishment.

Sharp-tailed Grouse – Existing management is projected to maintain existing sharp-tailed grouse habitat, but will not ensure High structure herbaceous grasslands, thereby limiting the potential to enhance grouse nesting and brooding habitat. As noted earlier, the high Authorized Use, which is 15 percent higher than initial estimated carrying capacity, is a concern.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 579 federal AMs.
- Managing stock tanks to pull livestock away from woody draws and to control distribution.
- Maintaining current grazing system but changing season of use within rotation.

ADAPTIVE OPTIONS:

- Fencing high-value woody draws.
- Improving upon natural barrier between pasture 2 and 3 to control livestock access.

- Adding a livestock tank in north half of Section 26, pasture 3, and adjusting tank management accordingly.
- Adjusting Authorized Use.
- Fencing reservoir in pasture 3.

Range

Initial Actions – Because the initial Authorized Use would remain the same as current management, the permittee would be allowed to harvest the same amount of forage. Maintaining the current grazing system but changing the season of use within the rotation would change the timing of federal AMs harvest and allow for graminoid species to be grazed at different periods of the growing season providing opportunities for initial growth and/or regrowth of herbaceous species. Changes in livestock distribution would be minimal because of the size of the pastures, topography, and location of existing water developments within the pastures.

Managing stock tanks to pull livestock away from woody draws and to control distribution would shift livestock grazing pressure from tank to tank as they are turned on and off. Areas within the pasture would have some deferment allowing the potential for initial growth and regrowth of herbaceous species. This would increase the intensity of permittee management to ensure that no one area was over utilized. Since livestock would still have access to the entire pasture, woody draws of concern would still have trailing due to the topography and location of existing water sources.

Adaptive Options – Fencing high-value woody draws would have little to no change in livestock distribution across the allotment. Forage within the exclosures would no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may occur on remaining forage. There will be a cost to install and maintain these fences.

Improving the natural barrier between pasture 2 and 3 to control livestock access would initiate a two-pasture deferred rotation because livestock would be restricted to only one of the pastures at a time. Livestock distribution would change because livestock would be confined to one pasture, and the intensity and frequency of livestock grazing would be different from current conditions.

Extending the existing pipeline into Section 26 and adding a stock tank would allow for more flexibility in tank management and reduce the intensity of grazing in heavily grazed areas. It would also even out the livestock grazing pressure throughout pasture 3. Currently, there are no water developments in the proposed area of the pasture.

Adjusting Authorized Use downward would result in fewer livestock numbers, less grazing days, or a combination of the two because of the turn-in permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock but, the amount of forage harvested would be less than the existing amount.

Fencing the reservoir in pasture 3 would prevent livestock from utilizing the reservoir for water. Forage within the exclosures would no longer be available for livestock grazing. Livestock distribution would not change due to the distance from the existing water developments and the topography of the pasture. Due to the location of the existing water developments, fencing off the

reservoir would assist in water management. If left unfenced, livestock would still utilize the reservoir and herbaceous species in the area.

Riparian

Initial Actions – Proposals including managing stock tanks to pull livestock away from woody draws and changing season of use would have minimal effect on the nonfunctional condition of the unnamed tributary to Blacktail Creek. The equivalent level of livestock use would continue on the riparian corridor of the unnamed tributary to Blacktail Creek resulting in a continuation of effects.

It is expected that desired conditions on the unnamed tributary to Blacktail Creek would be achieved over a long period of time (several decades).

Adaptive Options – Fencing high-value woody draws should have no effect on riparian condition along the unnamed tributary to Blacktail Creek because there would be no expected change in livestock distribution and the distance of separation.

Improving the natural barrier between pastures 2 and 3 to control livestock access should benefit riparian conditions if the time allowed to access to the corridor is shortened. Riparian conditions would improve by minimizing trailing and trampling in the riparian area allowing for herbaceous and woody riparian vegetation recovery.

Developing rangeland water and the installation of a stock tank in the north half of Section 26 in pasture 3 would help move livestock concentration away from the riparian stream corridor and improve riparian conditions. Riparian conditions would improve by minimizing trailing and trampling allowing for herbaceous and woody riparian vegetation recovery.

Reducing Authorized Use should help improve the uplands vegetation which in turn reduces overland flow which would further benefit the riparian conditions along the unnamed tributary to Blacktail Creek. A reduction in overland flow delivered to the creek would result in reduced stream velocities allowing for the establishment of riparian vegetation which would build stream banks.

Fencing the reservoir in pasture 3 should result in better livestock distribution and have minimal effect on riparian conditions along the unnamed tributary to Blacktail Creek.

It is expected that desired conditions on the unnamed tributary to Blacktail Creek would be achieved in 10 to 15 years.

Woody Draws

Initial Actions – Managing stock tanks to control livestock distribution likely occurs to some degree at present and has the potential to decrease excessive browsing and trampling disturbances within adjacent woody draws. However, the ability to control livestock distribution in pasture 3 would be reduced by the two tanks that are separated by less than 2,000 feet. One of the tanks is situated near a cluster of At Risk woody draws, so a high degree of tank deferment would be necessary to facilitate improved conditions in this area. A major livestock trail extends between the two tanks and continues to an unfenced reservoir 1,700 feet north of the northern tank, potentially contributing to continued use of woody draws clustered around the tank, as well as draws around the reservoir. A second unfenced reservoir occurs at the north end of the pasture but does not appear functional. One water tank and a developed spring of questionable reliability serve pasture 2, so

water management might be less effective in this pasture. Although the natural barrier between pastures 2 and 3 is only partially effective, management of tanks in both pastures could control utilization of pasture 2.

Implementing a deferred rotation between pastures 2 and 3, and possibly pasture 4, would be unlikely to increase the proportion of Healthy woody draw conditions. Woody draws would continue to experience livestock disturbances each year and potential recovery periods during half or a portion of the grazing season would be insufficient for woody plants to replace browsed tissue and increase in height before the next year or episode of browsing. Pasture 3 would continue to experience the majority of grazing disturbance because it is twice the size of pasture 2 and necessitates a longer season of use. Ineffective natural barriers between pastures 2 and 3 would impede implementation of the deferred rotation.

Continuation of current levels of use would maintain existing woody draw disturbances and conditions. Potentially increased stocking to the level of Authorized Use would contribute to decreasing woody draw conditions. Infrequent use of pasture 4 may contribute to increased use in pastures 2 and 3.

Adaptive Options – Fencing woody draws and/or decreasing Authorized Use would increase the potential for improved woody draw conditions by removing or decreasing livestock browsing and trampling disturbances that would facilitate the regeneration of desired woody species. Exclusion of livestock impacts through fencing would provide the fastest and greatest degree of woody draw improvement, but regeneration of woody species could be impaired by increasing litter and invasive grass layers. Fencing of one woody draw would have a high potential to result in increased disturbance within adjacent unfenced woody draws.

Improving the fenceline and natural barriers between pastures 2 and 3 would facilitate the deferred rotation, but as discussed, the rotation is unlikely to result in appreciable improvement of woody draws.

Fencing the primary or most dependable reservoir in pasture 3 would increase the effectiveness of water management to control livestock distribution that could assist the maintenance or slight improvement of adjacent woody draw conditions by controlling the level of browsing and trampling disturbances.

Adding another water tank at the north end of pasture 3 could enhance livestock distribution across the allotment and decrease the level of browsing and trampling disturbances within woody draws that occur around existing tanks or current primary use areas. However, woody draws around the new tank location that have a high potential to be in a Healthy condition associated with secondary range would experience increased disturbances and decreasing condition.

Herbaceous Structure

Initial Actions – It is expected under the initial proposed actions that the herbaceous structure distribution would be maintained. The overall effectiveness of managing tanks to control livestock distribution is questionable given the distribution of tanks and the unfenced water source in pasture 3. The adaptive action of fencing the reservoir could improve the potential effectiveness of water management. Changing the season of use within the current grazing system (seasonlong) may not

affect the herbaceous structure appreciably. Though the timing of grazing would change, distribution is not expected to change appreciably because the water sources would still be attractants in late June to mid-July. Authorizing 579 AMs is 15 percent higher than initial estimated carrying capacity, after accounting for cow size. A high Authorized Use level typically results in limited opportunities to improve the proportion of High structure in the allotment and the overall herbaceous structure distribution. The steeper terrain on the periphery of the pastures, particularly pasture 3, would continue to experience lighter use in patches, and therefore carry the assumed levels of Moderate and High herbaceous structure. But the more gentle topography, which encompasses the existing water sources, would continue to experience high levels of use.

Adaptive Options – Adjusting the Authorized Use would be highly effective to manipulate the herbaceous structure towards enhancing and ensuring structure objectives are moving towards or meeting objectives. Fencing specific woody draws could have effects relative to the size and location of the exclosure but is not expected to be appreciable due to the relatively small amount of woody draw habitat projected to be fenced. Improving the fenceline between pastures 2 and 3 would allow the managers to more efficiently apply a deferred rotation. The effectiveness of this to herbaceous structure would depend on the Authorized Use level at the time of implementation. The lower the Authorized Use level, the more improvement to the herbaceous structure distribution there could be, especially the proportion of High herbaceous structure. Placing a tank in the northern portion of pasture 3 would generally result in a more homogenized herbaceous structure distribution by impacting potential secondary range which is assumed to have a higher chance of carrying Moderate to High herbaceous structure. Fencing the reservoir in pasture 3 would aid in the proposed water management system. Possible water management scenarios could result in promoting a more variable cattle distribution and improved herbaceous structure heterogeneity but these scenarios are not outlined here.

Seral Stages

Initial Actions – Greater deferment between pastures 2 and 3 would increase the potential for maintaining existing seral stages or facilitating shifts towards late stages by increasing opportunities for plants to complete critical growth stages during the spring and fall in alternate years. However, ineffective natural barriers between pastures 2 and 3 would impede implementation of the deferred rotation. No specific use is proposed for pasture 4.

Proposed stock tank management to control livestock distribution and utilization probably occurs to some extent at present and would have the potential of contributing to changes in the season of use around each tank, thereby increasing opportunities for plants to complete critical growth stages and increase in vigor and production. However, control of the tanks could also increase the evenness of livestock grazing in portions of the allotment, contrary to desired conditions of maintaining a mosaic of grazing pressure and seral stages. Concentrated use around the unfenced reservoir in pasture 3 could be accomplished by shutting off the two water tanks in the pasture, but the reservoir would remain accessible even when use is desired in another portion of the pasture. Water management would be less effective in pasture 2 and 4 due to the limited number of reliable water supplies.

Continuation of current levels of reported use would contribute to the maintenance of current plant composition and trends despite potential implementation of a deferred rotation. Potentially increased stocking at the level of Authorized Use would facilitate shifts towards early seral stages. About 10 percent of the acreage dominated by crested wheatgrass, as well as additional acreage with intermixed Kentucky bluegrass that are of low palatability during the majority of the grazing season would contribute to high utilization of the native component that decreases the potential for achieving late seral stages.

Adaptive Options – Improving the fenceline and natural barrier between pastures 2 and 3 would increase the ability to implement a deferred rotation and achieve the associated benefits of controlling utilization and increasing or maintaining plant vigor.

Adding another water tank at the north end of pasture 3 would have positive and negative effects. Livestock distribution and the evenness of utilization would increase, thereby decreasing the mosaic of grazing pressure and seral stages. Pasture observations in the north and northeast portion of the pasture indicated intermingled patches of native and invasive grasses. Increased use in this area would impede the development or maintenance of late seral stages but would contribute to decreased litter that could slow the spread of invasive grasses.

Fencing the primary reservoir in pasture 3 would increase the potential for water management to control livestock distribution and utilization, thereby influencing plant vigor, production, and seral development around each of the watering sites.

Fencing woody draws would not have an appreciable influence on plant composition or seral stages outside the fence due to the small size of these exclosures. Invasive grasses would have a high potential to increase and dominate within the exclosures where herbaceous layers have not already transitioned to Invaded Grass States.

Decreasing Authorized Use would facilitate shifts towards late seral stages by decreasing the level of grazing and trampling disturbances, while increasing Authorized Use would have the opposite effect. Sufficiently decreased levels of use would facilitate increased litter accumulation with the potential to assist invasive grass increases.

Sharp-tailed Grouse

Initial Actions – It is expected under the initial proposed actions that grouse habitat would be maintained consistent with assumptions. It is not expected that there would be enhancement of grouse nesting and brooding habitat under the initial actions of this alternative. It appears that managing the tanks could have limited utility to enhance habitat due to the distribution of tanks, an unfenced reservoir, and the Authorized Use level which exceeds the initial estimated carrying capacity by 15 percent. Changing the season of use within the current grazing system (seasonlong) is not expected to make appreciable changes for grouse habitat. The Authorized Use level is 15 percent higher than the initial estimated carrying capacity, which would typically limit the opportunities to improve High structure vegetation.

Adaptive Options – Adjusting the Authorized Use would have a positive impact on grouse nesting and brooding habitat of the adaptive actions listed. Existing Authorized Use level exceeds the initial estimated carrying capacity by 15 percent, after accounting for cow size. Reducing the Authorized

Use level would allow for more residual cover to remain at the end of the year, and for potential carry over to the following spring. Fencing specific woody draws could have negative effects to the structure distribution relative to the size and location of the exclosure(s) but is not expected to be appreciable due to the relatively small amount projected to be fenced. Improving the natural boundary between pastures 2 and 3 would allow the managers to effectively apply a deferred rotation as implied by the initial action of changing season of use within the current grazing system (seasonlong). The impact of this to herbaceous structure could depend on the Authorized Use level at the time of implementation. Fencing the reservoir in pasture 3 would allow the initial action for tank management to be more effective and could contribute to promoting improvement in the herbaceous structure distribution. Adding a tank in the northern portions of pasture 3 would generally promote more even use across the pasture. Placing a tank in this part of the pasture would reduce the amount of secondary range, assumed to carry most, or all, of the High herbaceous structure within this allotment. Unless structure is made up elsewhere in the allotment, it is projected that the assumption of this allotment meeting structure objectives may no longer be valid.

Effects of Alternative 3A

The effects of Alternative 3A are the same as Alternative 3 with the following exceptions.

INITIAL ACTIONS:

- Constructing an extension to the existing range water pipeline in pasture 3 into the northwestern quarter of Section 26, T143N, R101W (this action is moved from Adaptive Options in Alternative 3 to Initial Actions in Alternative 3A).

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 3A are the same as Alternative 3.

Range

Initial Actions – Constructing an extension to the existing range water pipeline in pasture 3 into the northwestern quarter of Section 26, T143N, R101W and adding a stock tank would allow for more flexibility in stock tank management, reduce the intensity of grazing in heavily grazed areas, and even out the livestock grazing pressure throughout the pasture. Currently there are no water developments in the proposed area of the pasture.

Riparian

Initial Actions – Developing rangeland water and the installation of a stock tank in the northern half of Section 26 in pasture 3 would help move livestock concentration away from the riparian stream corridor and improve riparian conditions. Riparian conditions would improve by minimizing trailing and trampling in the riparian area allowing for herbaceous and woody riparian vegetation recovery.

It is expected that desired conditions on the unnamed tributary to Blacktail Creek would be achieved in 10 to 15 years.

Woody Draws – The effects of this action are discussed under Adaptive Options in Alternative 3.

Herbaceous Structure – The effects of this action are discussed under Adaptive Options in Alternative 3.

Seral Stages – The effects of this action are discussed under Adaptive Options in Alternative 3.

Sharp-tailed Grouse – The effects of this action are discussed under Adaptive Options in Alternative 3.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes:

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 4 are the same as Alternative 3.

Range

Initial Actions – Authorized Use for this allotment would be 577 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 579 federal AMs converted to AUMs by adjusting for cow size is 666 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 13 percent reduction in AUMs from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment.

Riparian

Initial Actions – Reducing Authorized Use to 513 AUMs should help improve the uplands vegetation which in turn reduces overland flow which would further benefit the riparian conditions along the unnamed tributary to Blacktail Creek. A reduction in overland flow delivered to the creek would result in reduced stream velocities allowing for the establishment of riparian vegetation which would build stream banks.

It is expected that desired conditions on the unnamed tributary to Blacktail Creek would be achieved in 10 to 15 years.

Woody Draws

Initial Actions – Reducing Authorized Use by 13 percent according to initial estimated carrying capacity and adjustments for cow size would result in potential levels of use 1-8 percent greater than typically reported use, thereby resulting in no effect on current woody draw conditions. Stock tank management could provide slight benefits to woody draw conditions as discussed under Alternative 3 but would be limited by the relatively close proximity of existing tanks, current trailing routes, and an unfenced reservoir. Effects of the deferred rotation were discussed under Alternative 3 and would not change with the reduction in Authorized Use.

Herbaceous Structure

Initial Actions – Adjusting the Authorized Use based on an AUM and accounting for cow size would strengthen the assumption made by the IDT that the allotment is meeting the herbaceous structure distribution.

Seral Stages

Initial Actions – Reducing Authorized Use by 13 percent according to initial estimated carrying capacity and adjustments for cow size would result in potential levels of use 1 to 8 percent greater than typically reported use, thereby maintaining current seral stages and trends in plant composition. Beneficial effects of the deferred rotation and water tank management on seral stage were discussed under Alternative 3.

Sharp-tailed Grouse

Initial Actions – Adjusting the Authorized Use based on an AUM and accounting for cow size would appreciably move the allotment towards ensuring maintenance and enhancement of grouse nesting and brooding habitat. The reduction in Authorized Use should result in more residual cover at the end of the year to carry over to the following spring.

ALLOTMENT 288

Table 288.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 288 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 3.65 – Rangelands With Diverse Natural-Appearing Landscapes	467	74	
Management Area 6.1 – Rangeland With Broad Resource Emphasis	168	26	
Total allotment acres	634	100	
NFS acres	634	100	
State land acres	0	0	
Private land acres	0	0	
Current permitted livestock grazing (AMs) on NFS lands			268
Initial estimated carrying capacity (AUMs) on NFS lands			216
Number of pastures containing NFS lands			1

Table 288.2 — Allotment 288 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	There are no perennial or intermittent stream reaches in this allotment.	None
Woody draws	All of the sampled woody draws were At Risk due to lack of regeneration and impacts to shrub layer.	Increase seedling and sapling survival and reduce impacts to the shrub layers.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Meeting Objectives High – Below Objectives 2004 Transects: 1.14; 1.76 2004 Stations percent: Low-67.5/Moderate-32.5/High-0	Manage for additional High structure on biologically capable habitats.
Seral stages	Three sample sites were at mid seral stages. Broken land/crested wheatgrass comprises about 25 percent of the pasture and invasive grasses are frequent within native communities.	Maintain native grass communities and decrease or limit the spread of invasive grasses.
Sharp-tailed grouse	There are no known leks within the allotment or within 1 mile of the allotment. The central ridgeline and associated ridges and herbaceous side slopes running approximately northeast have potential to contribute an appreciable amount of grouse nesting and brooding habitat.	Manage for increased High vegetative structure on biologically capable sites to enhance nesting and brooding habitat
Remarks	No known noxious weeds on NFS lands.	

Table 288.3 — Allotment 288 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 268 federal AMs • Three-year average permitted use is 207 federal AMs.* • Permit type: Turn-in. • Rotation: Seasonlong. • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 268 • Create a four-pasture deferred rotation utilizing Allotment 230 pasture 1, Allotment 288 pasture 2, Allotment 256 pasture 2, and the proposed riparian pasture in Allotment 256. • Manage stock tanks to control livestock distribution. **Adaptive Options** • Fence high-value woody draws. • Adjust Authorized Use. • Utilize a temporary electric or permanent fence to diagonally fence pasture 2 northwest to southeast.	**Initial Actions** • Authorized federal AUMs: 216 • Create a four-pasture deferred rotation utilizing Allotment 230 pasture 1, Allotment 288 pasture 2, Allotment 256 pasture 2, and the proposed riparian pasture in Allotment 256. • Manage stock tanks to control livestock distribution. **Adaptive Options** • Fence high-value woody draws. • Utilize a temporary electric fence to diagonally fence pasture 2 northwest to southeast to create crested wheatgrass pasture. • Adjust Authorized Use.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings once every 3 years. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 288 — Existing Condition

Range – This allotment is approximately 634 acres of solely NFS lands and has one pasture. Currently, this allotment is issued a turn-in permit for 268 AMs by the MGA. It is also the headquarters allotment associated with a common allotment, Blacktail Common. Current AMs

provided by NFS lands can be found in Table 288.1. This allotment is located primarily in the Badlands geographic area with the uplands in the south/southeast portion of the allotment classified as being in the Rolling Prairie geographic area. Water developments within this allotment include a reservoir and two stock tanks off of a range water pipeline system.

Current management on this allotment consists of 30 head typically turned out into the allotment around May 15th and stay until approximately December 15th. An additional 64 head are turned into the allotment around mid-October which also stay until approximately December 15th. This description equates to a seasonlong grazing system that intensifies in the last two and a half months of the season. Plant composition in the uplands in the south/southeast is dominated by crested wheatgrass. Outside of this area the composition changes to a more native dominated component but does have a heavy expression of Kentucky bluegrass in areas.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there were no known state listed noxious weeds or county listed weeds within this allotment.

Oil and gas development on NFS lands in this allotment has removed no acres from livestock access. A total of approximately 7.5 acres of oil and gas pads and access roads have been reclaimed and are or will be available for livestock access. Associated forage from these acres is approximately 0.0 and 2.3 AUMs, respectively.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – All five woody draw samples were At Risk with high trailing disturbances, a lack of tree regeneration, and desirable shrub patches confined to localized sites. Severe channel cutting occurred along some drainages that resulted in poor livestock accessibility and contributed to increased woody species regeneration and structure.

Herbaceous Structure – The two randomly selected VOR transects in 2004 had VOR transect averages of 1.14 (Low structure class) and 1.76 (Moderate structure class). The station frequency of these transects is 67.5 percent Low, 32.5 percent Moderate, and 0 percent High. Neither of the two transects were re-surveyed in 2005.

Seral Stages – Approximately 78 acres was identified as broken land but a larger area encompassing about 160 acres, or 25 percent, on both sides of Blacktail Road was dominated by crested wheatgrass with intermixed native grasses and areas of bluegrass. Native grasses with frequent occurrences of bluegrass and other invasive grasses dominated the remainder of the pasture.

A sere plot located along the edge of broken land was at a mid-late seral stage with light amounts of bluegrass. A repeated pace transect in broken land at the south end of the pasture indicated little change in species frequency between 1979 and 2009 other than an increase of sedge. Total plant frequency decreased while clubmoss sharply increased. Kentucky bluegrass and annual brome each occurred at a frequency of 14 percent on an NDSU sample plot on a Thin Claypan ecological site just outside the edge of broken land. These species comprised only 6 percent of the biomass from clipped plots and the site was at a mid-late seral stage. Another sere plot well outside of broken land on a Loamy ecological site was at a mid seral stage with dominance of western wheatgrass and blue

grama. Bluegrass and traces of crested wheatgrass constituted about 18 percent of the relative grass canopy cover.

Of seven ecoplots sampled during the late 1990s along the edge of broken land or within the expanded area of invasive grass dominance, about 29 percent were at late seral stages while 71 percent were at mid stages. Field observations suggest that the current proportion of late seral stages is likely to be lower, but two belt transects measured near previous ecoplots indicated plant dominance similar to the previous measurements.

Sharp-tailed Grouse – There are no known leks within the allotment or within 1 mile of the allotment. The central ridgeline and associated ridges and herbaceous side slopes running approximately northeast have potential to contribute an appreciable amount of grouse nesting and brooding habitat.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed after 2 years.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment; therefore, there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – Woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. Existing invasive grasses within woody draws and potential increases of these species as a result of increasing litter with the removal of livestock grazing would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock there would be an increased opportunity for the development of High and Moderate herbaceous structure, and a decrease in the quantity of Low herbaceous structure in the allotment.

Seral Stages – The removal of livestock grazing would facilitate increased litter accumulation that would assist increases of bluegrass and transitions to Invaded Grass States with decreased maintenance of native plant communities. Portions of the pasture would transition within 5 to 10 years, while other areas might require as long as 15 years due to lighter occurrences of bluegrass.

Sharp-tailed Grouse – The increase in potential High structure herbaceous grasslands from the removal of livestock would appreciably enhance nesting and brooding habitat for sharp-tailed

grouse. The long-term projection (>10 to 15 years) is that the area would eventually experience declining forb diversity resulting in decreasing foraging opportunities plus the potential increasing dominance of invasive grasses could negatively impact nesting and brooding quality.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by a turn-in grazing association permit, and Authorized Use is 268 federal AMs.
- Cow/calf pairs are run seasonlong.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws – Continuation of seasonlong grazing at recently reported levels of use that exceed initial estimated carrying capacity by 10 to 16 percent after adjusting for cow size would result in the persistence or gradual decline of At Risk woody draw conditions due to the lack of successful regeneration. Potentially increased stocking to the level of Authorized Use that exceeds initial estimated carrying capacity by 43 percent would contribute to declining woody draw conditions as a result of increased browsing and trampling disturbances.

Herbaceous Structure – Current management is projected to continue the existing herbaceous structure distribution. It would also provide limited opportunities to improve overall herbaceous structure conditions and promote an increase in the proportion of High herbaceous structure. The Authorized Use level is 43 percent higher than the initial estimated carrying capacity. Late season intensification of use would reduce residual cover from potential fall measurements.

Seral Stages – Continuation of current management would result in the predominance of mid seral stages but with a moderately high potential for increased amounts of invasive grasses. Seasonlong grazing can limit the ability of plants to complete critical growth stages, thereby decreasing plant vigor, impeding the development of late seral stages, and potentially increasing the susceptibility to invasive grass spreading. Grazing often initiated in May could contribute to utilization of crested wheatgrass along Blacktail Road, but also creates the potential for premature use of native grasses that decreases plant vigor. Pasture observations indicate light utilization of crested wheatgrass (Figure 288.1), so additional grazing pressure is likely exerted on the native grass component. This would be particularly true when turn-in is delayed until June as a result of decreasing crested wheatgrass palatability. Recent levels of reported use that exceed initial estimated carrying capacity by 10 to 16 percent after adjusting for cow size compound the degree of native grass utilization that

inhibits the development of late seral stages. Potentially increased stocking to the level of Authorized Use that exceeds initial estimated carrying capacity by 43 percent would contribute to shifts towards early seral stages and/or invasive grass spreading.

Figure 288.1 — Repeated pace transect within broken land during the fall of 2009 with lightly utilized crested wheatgrass and grazed needle-and-thread, sedge, and blue grama in the interspaces.

Sharp-tailed Grouse –

Existing management would not enhance High structure herbaceous grasslands, thus limiting the potential to enhance potential grouse nesting and brooding habitat. As noted above, the Authorized Use is 60 percent higher than the initial estimated carrying capacity.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 268 federal AMs.
- Creating a four-pasture deferred rotation utilizing Allotment 230 pasture 1, Allotment 288 pasture 2, Allotment 256 pasture 2, and the proposed riparian pasture in allotment 256.
- Managing stock tanks to control livestock distribution.

ADAPTIVE OPTIONS:

- Fencing high-value woody draws.
- Adjusting Authorized Use.
- Utilizing a temporary electric or permanent fence to diagonally fence pasture 2 northwest to southeast.

Range

Initial Actions – Because the initial Authorized Use would remain the same as current management, the permittee would be allowed to harvest the same amount of forage. However, the use of these federal AMs would be different than the existing condition because forage would be harvested at different times of the grazing season compared to the current rotations.

Creating a four-pasture deferred rotation would not change the livestock distribution in this allotment because of the size and topography. A four-pasture deferred rotation would change the season of use within the pastures from year to year providing opportunities for initial growth and/or regrowth of herbaceous species. The permittee would have to combine several herds into one herd to accommodate the four-pasture deferred rotation.

Managing the existing stock tanks would allow managers the flexibility of controlling livestock distribution and livestock grazing pressure around the area of the stock tanks. However, this would increase the intensity of permittee management to ensure that no one area was over utilized.

Adaptive Options – Fencing high-value woody draws would have little to no change in livestock distribution across the allotment. Forage within the exclosures would no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may occur on remaining forage. There will be a cost to install and maintain these fences.

Adjusting Authorized Use downward would result in fewer livestock numbers, fewer grazing days, or a combination of the two because of the management as a turn-in permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock, but the amount of forage harvested would be less than the existing forage harvested.

Utilizing a temporary electric or permanent fence to diagonally fence pasture 2, northwest to southeast, would assist in utilizing the crested wheatgrass when it is range ready and defer use of the native herbaceous species until they reach grazing readiness. There would be an initial cost of installing the fence along with annual maintenance of the fence.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws

Initial Actions – Including the pasture in a four-pasture deferred rotation with three other allotments/pastures would result in the persistence or slight improvement of woody draw conditions. Although the season of grazing would be shorter and vary each year compared to current seasonlong use, the number of livestock and evenness of distribution would increase, thereby ensuring continued woody draw disturbances. Although woody plants would have longer periods to recover from browsing and trampling disturbances, longer periods are required for woody species to replace harvested tissue compared to herbaceous species and sapling regeneration would continue to be impeded. Currently reported levels of use would continue to result in relatively high woody draw disturbances, and potentially increased stocking to the level of Authorized Use would result in decreasing conditions.

Management of two stock tanks to control livestock distribution and utilization could assist improved woody draw conditions around the north water tank. The south water tank occurs on a large plateau with broken land and a lack of adjacent woody draws, so management of this tank would primarily aid in pulling livestock away from the north tank. An unfenced reservoir in the southeast quarter of the pasture would decrease the effectiveness of tank management, and poor woody draw conditions around the reservoir would persist. The effectiveness of water tank management would also be decreased by available water along a fork of Blacktail Creek during a portion of the year.

Adaptive Options – Fencing woody draws and/or decreasing Authorized Use would increase the potential for improved conditions by removing or decreasing livestock browsing and trampling disturbances that would facilitate the regeneration of desired woody species. Exclusion of livestock impacts through fencing would provide the fastest and greatest degree of woody draw improvement, but regeneration of woody species could be impaired by increasing litter and invasive grass layers. Fencing of one woody draw would have a high potential to result in increased disturbance within adjacent unfenced woody draws. Decreasing Authorized Use would require reductions of 20 percent or more to affect a decrease in levels of currently reported use and an increase of woody draw conditions.

Constructing temporary fencing to delineate the area of broken land and crested wheatgrass along the Blacktail Road corridor would contribute to decreased woody draw disturbances and increased conditions because most of the draws would not be accessible when grazing is conducted in the fenced area.

Herbaceous Structure

Initial Actions – In light of an Authorized Use that is 43 percent higher than initial estimated carrying capacity, it is projected that implementing a deferred rotation with other allotments and a tank rotation would not have an appreciable positive effect on herbaceous structure. Depending on specific rotation dates, it is not expected that there would be sufficient growing season remaining for regrowth, particularly given the impacts of heavy use on plant physiology that would tend to impede regrowth. Rotating tanks when there is an unfenced water source and with the proposed Authorized Use level, will be ineffective due to, essentially, the increased use on less area of the allotment. The natural management tendency will be to attempt to even out the use but this will be difficult due to the unfenced reservoir.

Adaptive Options – Adjusting the Authorized Use would be the most effective tool to achieve, or move toward, structure objectives. Under this alternative, balancing the Authorized Use with the initial estimated carrying capacity could go beyond the 10- to 15-year time frame. Fencing specific woody draws could have effects relative to the size and location of the exclosure but is not expected to be appreciable due to the relatively small amount of woody draw habitat projected to be fenced. Temporarily fencing pasture 2 to more effectively utilize non-native grasses could improve herbaceous structure in the non-native sites if the grazing period ends early enough for regrowth to occur.

Seral Stages

Initial Actions – Including the pasture in a four-pasture deferred rotation with three other allotments/pastures would facilitate increased plant development and shifts towards late seral stages by increasing opportunities for the completion of critical growth stages. Although livestock density and distribution would increase across the pasture as a result of greater livestock numbers, greater time would be available for plant recovery and regrowth. Increased livestock distribution could also assist in impeding litter accumulation that can facilitate the spread of invasive grasses. Continued stocking at current levels of reported use that exceed initial estimated carrying capacity by 10 to 16 percent could impede potential seral development, particularly with regard to the stand of crested wheatgrass that comprises about 25 percent of the pasture and that appears to be underutilized and

therefore contributes to increased utilization of native grass components. Potentially increased stocking to the level of Authorized Use would contribute to shifts towards early seral stages.

Managing the two stock tanks to control livestock distribution and utilization would alleviate excessive use around a particular tank and could be coordinated to increase use of crested wheatgrass when it is palatable around the southern tank. Utilization around an unfenced reservoir about 3000 feet to the east would remain unmanaged. Water is also present during portions of the year along a fork of Blacktail Creek that extends through the northeast portion of the pasture, thereby decreasing the effectiveness of water tank management where it is needed within native grass communities.

Adaptive Options – Constructing temporary fencing to delineate the area of broken land and crested wheatgrass along the Blacktail Road corridor would increase utilization of this forage component, thereby increasing plant vigor, production, and seral development of the native component. As the other pastures proposed in the deferred rotation are native dominated, this action could compliment early season use of Allotment 288 in the grazing rotation.

Fencing woody draws would not have an appreciable effect on seral stages due to the small size of the exclosures, but invasive grasses would have a high potential to increase within the exclosures with the removal of grazing and increases in plant litter.

Decreasing Authorized Use would assist increased plant vigor, production, and seral development by decreasing the level of grazing disturbances. Reductions of more than 20 percent would be needed to affect a decrease in levels of currently reported use. Sufficient levels of reduction would begin to facilitate the accumulation of plant litter that would assist the spread of invasive grasses.

Sharp-tailed Grouse

Initial Actions – In light of an Authorized Use that is 43 percent higher than initial estimated carrying capacity, it is projected that implementing a deferred rotation with other allotments and a tank rotation would not have an appreciable positive effect on grouse nesting habitat. Depending on specific rotation dates, it is not expected that there would be sufficient growing season remaining for regrowth, particularly given the impacts of heavy use on plant physiology that would tend to impede regrowth, thus limiting grouse nesting cover the following spring. Rotating tanks when there is an unfenced water source and with the proposed Authorized Use level, will be ineffective due to, essentially, the increased use on less area of the allotment. The natural management tendency will be to attempt to even out the use but this will be difficult due to the unfenced reservoir. Without an increase in High herbaceous structure, the potential for enhancing spring grouse nesting habitat would be limited.

Adaptive Options – Adjusting the Authorized Use could have a positive impact on grouse nesting and brooding habitat. Existing Authorized Use level exceeds the initial estimated carrying capacity by 43 percent, after accounting for cow size. Reducing the level would allow for more residual cover to remain at the end of the year and the potential for more carryover to the following spring to help meet grouse nesting needs. Under this alternative, balancing the Authorized Use with the initial estimated carrying capacity would go beyond 10- to 15-year time frame. Fencing specific woody draws could have negative effects to the structure distribution relative to the size and location of the

exclosure(s) but is not expected to be appreciable due to the relative small amount projected to be fenced at this time. Temporarily fencing pasture 2 to more effectively utilize non-native grasses could increase the amount of High herbaceous grasslands in the non-native sites if the grazing period ends early enough for regrowth to occur.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes:

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 4 are the same as Alternative 3.

Range

Initial Actions – Authorized Use for this allotment would be 216 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 268 federal AMs converted to AUMs by adjusting for cow size is 308 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 30 percent reduction in AUMs from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration when planning the rotation for the allotment.

Riparian – There are no perennial or intermittent stream reaches in this allotment.

Woody Draws

Initial Actions – Decreasing Authorized Use by 30 percent according to initial estimated carrying capacity and adjustments for cow size would facilitate increased woody draw conditions by decreasing the level of browsing and trampling disturbances. The proposed reduction would be 9 to 14 percent less than recently reported use.

Herbaceous Structure

Initial Actions – In light of an Authorized Use that is balanced with the initial estimated carrying capacity, it is projected that herbaceous structure would improve due to increased residual cover levels at the end of the year.

Seral Stages

Initial Actions – Decreasing Authorized Use by 30 percent, 9 to 14 percent less than currently

reported use, would contribute to increased plant vigor, production, and seral development, with an increased potential for achieving the desired proportion of seral stages.

Sharp-tailed Grouse

Initial Actions – Balancing the Authorized Use with the initial estimated carrying capacity could permit regrowth in early grazed years and the accumulation of residual cover potentially increasing the proportion of High herbaceous structure to carry over to spring grouse nesting cover.

ALLOTMENT 289

Table 289.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 289 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 3.65 – Rangelands With Diverse Natural-Appearing Landscapes	2,570	55	
Management Area 6.1 – Rangeland With Broad Resource Emphasis	2,066	45	
Total allotment acres	6,929	100	
NFS acres	4,636	67	
State land acres	0	0	
Private land acres	2,293	33	
Current permitted livestock grazing (AMs) on NFS lands			1,789
Initial estimated carrying capacity (AUMs) on NFS lands			1,862
Number of pastures containing NFS lands			6

Table 289.2 — Allotment 289 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	A portion of North Creek runs through the allotment. Surveys conducted in 2006 rated it at PFC. Scairt Woman Draw flows through the allotment. A portion (2.1 mi.) was rated at PFC and the remaining (0.2 mi.) was rated at NF.	Maintain PFC. Maintain Scairt Woman Draw at PFC and move NF portion toward PFC.
Woody draws	45 percent of the sampled woody draws were Healthy, 33 percent were At Risk, and 22 percent were Unhealthy. At Risk and Unhealthy woody draws exhibit low regeneration, no saplings, no shrub layer, grazing impacts dugout, and impacts associated with winter feeding near woody draws.	Improve seedling regeneration, sapling and shrub survival.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Below Objectives High – Below Objectives 2004 Transects: 1.13; 1.03; 2.11; 1.18; 1.06; 1.61; 1.41; 1.03 2004 Stations: Low-75.6/Moderate-24.4/High-0 2005 Transects: 1.54 2005 Stations percent: Low-0.0/Moderate-100/ High-0.0	Manage for additional Moderate and High structure on biologically capable habitats.
Seral stages	Of ten sample sites, nine were at mid seral stages and one was at a late seral stage. All samples contained light to moderate amounts of invasive grasses and portions of the winter pastures are at or approaching Invaded Grass States.	Maintain native plant communities and a range of seral stages while limiting or decreasing the spread of invasive grasses.
Sharp-tailed grouse	There are no known leks within the allotment. There is up to seven leks that are within a one mile radius of the allotment. Within the allotment, there is approximately 1,500 to 2,000 acres within the 1 mile proximity radius.	Manage to enhance sharp-tailed grouse nesting and brooding habitat by increasing the quality and quantity of High vegetative structure on biologically capable sites.
Remarks	Approximately 18 acres of noxious weeds on NFS lands, 5 acres on private of Canada thistle and burdock. Weeds are being treated. A Region 1 Forest Service sensitive species, Tawny crescent butterfly was observed in this allotment in 2005.	

Table 289.3 — Allotment 289 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 1,789 federal AMs • Three-year average permitted use is 1,679 federal AMs.* • Permit type: Inventory (12 months). • Rotation: Modified deferred rotation. • Class(s) of livestock: Cow/calf pairs and yearlings. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 1,789 • In pasture 3 manage livestock tanks to more effectively draw cattle away from woody draws. • Add a pipeline and a stock tank in both pastures 2 and 3. • Fence south boundary of Section 2 and integrate new pasture into a two-pasture deferred rotation. **Adaptive Options** • Fence high-value woody draws. • Split pasture 3 with a north/south fence and implement a three-pasture deferred rotation. • Adjust Authorized Use.	**Initial Actions** • Authorized federal AUMs: 1,862 • In pasture 3, manage livestock tanks to more effectively draw cattle away from woody draws. • Add pipeline and a stock tank in both pastures 2 and 3. • Fence south boundary of Section 2 in pasture 2 and integrate new pasture into a two-pasture deferred rotation. **Adaptive Options** • Fence high-value woody draws. • Split pasture 3 with a north/south fence and implement a three-pasture deferred rotation. • Adjust Authorized Use.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings annually for 3 years then reevaluate survey frequency. • Complete Properly Functioning Condition survey once every 3 years then once every 5 years if a positive trend has been established. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 289 — Existing Condition

Range – This allotment is approximately 6,929 acres, with 4,636 acres of NFS lands, the rest private. Currently, this allotment is issued a private allocation inventory permit for 250 head for eight months by the MGA. This allotment has been subdivided into eight pastures, six containing NFS lands. The pastures range from 81 to 2,765 acres. Current AMs provided by NFS lands can be found in Table 289.1. This allotment is located in both the Badlands and Rolling Prairie geographic areas. Water developments in this allotment include reservoirs and a pipeline system with stock tanks.

Pasture 3 is the largest of the eight pastures and has rolling prairie topography in the western half and badlands topography in the eastern half. The distribution map from 2004 indicates that the grazing pattern follows the topography. This year's utilization in these sections is close to the 30 to 40 percent range. There is a mosaic pattern in the soils and plant communities. The majority of this pasture has native herbaceous plant communities, but crested wheatgrass is present in the southwestern corner. The presence of crested wheatgrass is a result of historical cultivation of this area and reclamation of old oil and gas access roads. The permittee has been making an effort to move supplement around and is using water to disperse the grazing. The permittee also tries to keep the livestock out of the pasture until the third week of May or June 1st, due to the native herbaceous plant communities.

Pasture 2 is approximately 1,960 acres. This pasture is normally used in the spring and winter months. The northern portion of Section 14 had evidence that winter feeding took place. Section 2 showed very little use with the exception of the southeastern corner near the reservoir.

Pasture 4 is approximately 250 acres, and is currently used as a fall pasture with some spring use. Because of its small size, livestock utilize the whole pasture. Topography in this pasture goes from a plateau area in the southern end to a steep draw. Blue grama, thread leaf sedge, needle-and-thread, and western wheatgrass can be found on the plateau top with prairie sandreed on the shoulder slopes. Depending on the aspect of the slope, little bluestem and some creeping juniper can be found on the shoulder/back slopes.

Pastures 7 and 8 are used jointly as breeding and calving pastures. Both pastures contain areas of crested wheatgrass mixed with natives to solely native stands. Pasture 6 is primarily used as a bull pasture, and contains 60 acres of NFS lands.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there is approximately 18 acres of Canada thistle and burdock. The Billings County Weed Board has been informed of and has made an attempt to control some of these infestations.

Oil and gas development on NFS lands in this allotment has removed no acres from livestock access. A total of approximately 13.2 acres of oil and gas pads and access roads have been reclaimed and are or will be available for livestock access. Associated forage from these acres is approximately 0.0 and 5.3 AUMs, respectively.

Riparian –

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
289-02	North Creek (2)	0.33					0.33
289-03	Scairt Woman Dr (1)	2.13					2.13
289-03	Scairt Woman Dr (2)					0.22	0.22

Two streams flow in Allotment 289. North Creek (Reach 2) crosses pasture 2 and was rated PFC by the interdisciplinary team in 2006. Scairt Woman Draw (Reaches 1 and 2) flows in pasture 3. Most (2.1 miles) of Scairt Woman Draw has a functionality rating of PFC, though the lower 0.2 mile has a functionality rating of NF. The transition from PFC to NF coincides with the presence/absence of beavers. Where beavers are present and dams have been constructed, water is stored in ponds, and a riparian plant community is thriving. Where beavers are absent, there is no evidence of a water table, no water storage in the banks of the channel, and virtually no riparian plant community on the floodplain or stream banks.

The desired condition is to maintain PFC and to promote the welfare of beavers in this stream so that their range might increase into that segment of Scairt Woman Draw that is currently rated as NF.

Woody Draws – Across the allotment, 45 percent of sampled woody draws were Healthy, 33 percent were At Risk, and 22 percent were Unhealthy.

The lower end of a woody draw in the eastern side of pasture 2 was Healthy (Figure 289.1), while the upper end with greater accessibility was At Risk. A sampled woody draw at the southern end of the pasture was Healthy while an adjacent draw in pasture 4 was At Risk. Recent observations indicated Healthy conditions of other woody draws in pastures 2 and 4 that could appreciably increase the proportion of Healthy communities.

Figure 289.1 — Woody draw sampled in pasture 2 of exceptional condition and diverse species composition.

Of four woody draws sampled in pasture 3, 50 percent were Healthy, 25 percent were At Risk, and 25 percent were Unhealthy. At Risk sites were associated with relatively open terrain and easy livestock access.

The only woody draw present in pasture 7 occurred below a dugout pond and was Unhealthy. A single small woody draw was present in pasture 8 but not sampled.

Herbaceous Structure – In 2004, eight randomly selected herbaceous dominated VOR transects were surveyed. Six transects were measured in the Low structure class and two transects were measured in the Moderate class. No High structure transects were measured. The consolidated station averages showed Low structure stations at 75 percent and Moderate stations at approximately 25 percent. No stations were measured in the High structure category (≥5.5 inches).

One transect was resurveyed in 2005. It was measured in the Moderate structure class. The station data showed 65 percent of the stations were in the Low structure class and 35 percent of the stations were Moderate. No High structure stations were recorded.

Seral Stages – Of ten sample sites across the allotment, nine were at mid seral stages and the tenth was at a late-mid stage. Light to moderate amounts of invasive grasses were present at all sample sites and areas of invasive grass dominance were observed among the small winter pastures and primary use areas of the summer pasture.

Pasture 2 consisted of 1,324 NFS acres in two large and one small parcel divided by private land. Native grass communities dominated with only a 34-acre parcel of broken land occurring in the north section of NFS land. The only data point in the north section of NFS land involved a Robel transect along a plateau that recorded native cool season grasses as the four dominant species. An NDSU plot on a Claypan ES in the south NFS section was at a mid seral stage with 33 percent frequency of Kentucky bluegrass.

Pasture 3 is the largest pasture, 2,765 acres, and is the primary pasture of summer use. Broken land comprised less than 5 percent of the pasture but areas of invasive grasses are scattered throughout. One sample site was at a late-mid seral stage and seven sites were at mid seral stages. Some mid seral communities were verging on early stages with high amounts of blue grama and clubmoss.

- An NDSU sample on a Thin Loamy ES on the far west-central area of the pasture was at a mid seral stage but bluegrass comprised 35 percent of the total biomass. Frequency of Kentucky bluegrass and Canada bluegrass were 64 percent and 50 percent, respectively. Bluegrass dominance was observed in a large area in the northwest corner of the pasture and a Robel transect and belt transect on the edge of this area recorded bluegrass as the first and third dominant species, respectively.
- An NDSU plot in the southwest corner of the pasture on a Thin Loamy ES was at a mid seral stage with 23 percent frequency of both Kentucky bluegrass and annual brome. No biomass data were collected.
- Two Robel transects in broken land south of the above plot recorded a mixture of invasive and native grasses.

- An NDSU plot on a Claypan ES in the north-central area of the pasture was at a mid seral stage with dominance of blue grama and western wheatgrass. Kentucky bluegrass and annual brome frequency were 10 percent and seven percent respectively. Two Robel transects 1,500 feet north of the plot recorded blue grama and western wheatgrass as the dominant species.
- An NDSU plot on a Sandy ES in the south central portion of the pasture was at a mid seral stage with light amounts of invasive grasses.
- Relative plant frequency of bluegrass increased from two percent to 13 percent between 1980 and 2010 along a repeated pace transect south of the above site. Relative plant frequency of western wheatgrass decreased from 33 percent to 16 percent, while needlegrass decreased from 10 percent to one percent.
- An NDSU plot on a Loamy ES in the northeast quarter of pasture was at a mid-early seral stage with dominance of needle-and-thread and sedge. Frequency of Kentucky bluegrass was 50 percent and it comprised about 15 percent of the grass production. Frequency of cheatgrass and Japanese brome was seven percent and 10 percent, respectively.
- Another NDSU plot on a Loamy ES in the southeast quarter of the pasture was at a mid seral stage with dominance of blue grama, sedge, and needle-and-thread, and 10 percent frequency of Kentucky bluegrass.
- A robel transect along a plateau 1,000 feet to the east recorded western wheatgrass, blue grama, and needlegrass, while a belt transect 3,000 feet the southeast on the same plateau recorded western wheatgrass, green needlegrass, and inland saltgrass (*Distichlis spicata* (L.) Greene var. *stricta* (Torr.) Beetle).
- Two sere plots in the southeast corner of the pasture were at late-mid and mid seral stages with western wheatgrass, blue grama, and needle-and-thread, and relatively light amounts of invasive grasses.

Pasture 4 consisted of 250 acres and bordered the south end of pasture 2. Broken land constituted 11 percent in the southeast corner of the pasture but crested wheatgrass dominance was observed over a larger area.

NFS land comprised about 51 acres, 25 percent, of pasture 6, where field observations indicated an Invaded Grass State dominated by Kentucky bluegrass with needle-and-thread.

Pasture 7 consisted of 169 acres, with 36 percent broken land. A robel transect outside of broken land recorded western wheatgrass, needle-and-thread, and Kentucky bluegrass as the three dominant species, while a nearby belt transect recorded Kentucky bluegrass, needle-and-thread, and Junegrass.

Pasture 8 consisted of 81 acres, most of which is broken land. Relative plant frequency of Kentucky bluegrass increased from zero to 19 percent between 1980 and 2009, while relative plant frequency of crested wheatgrass decreased from 91 percent to 57 percent. Frequency of clubmoss increased from zero to 15 percent.

Sharp-tailed Grouse – There are no known leks within the allotment. However, there is potentially up to seven leks that are within a 1-mile radius of the allotment. A couple of leks have exhibited

sporadic visitation in the spring while others have not been observed since 2005. Within the allotment, there is approximately 1,500 to 2,000 acres within the 1-mile proximity radius of these leks.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed after 2 years.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment, so there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian conditions along North Creek and Scairt Woman Draw as described in the existing condition would improve and evolve toward desired riparian conditions over time. Improvement would result from the establishment of riparian vegetation which would capture sediment and build stream banks.

Woody Draws – Woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. Existing invasive grasses within woody draws, and potential increases of these species as a result of increasing plant litter with the removal of livestock grazing, would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock there would be an increased opportunity for the development of High and Moderate herbaceous structure, and a decrease in the quantity of Low herbaceous structure in the allotment.

Seral Stages – The removal of livestock grazing would facilitate shifts towards late seral stages among native dominated communities. However, the frequent occurrence of invasive grasses measured or observed across the allotment suggests a high potential for shifts to Invaded Grass States. Increasing plant litter with the removal of livestock grazing would facilitate an increase of invasive grasses with transitions occurring over large portions of the allotment over the next ten years. Potential transitions would be delayed in areas of the allotment with less frequent invasive grasses.

Sharp-tailed Grouse – The projected increase in potential High structure herbaceous grasslands from the removal of livestock would, initially, appreciably enhance nesting and brooding habitat for sharp-tailed grouse.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by an inventory grazing association permit, and Authorized Use is 1,789 federal AMs.
- Cow/calf pairs and yearlings are run in a modified deferred rotation.
- See allotment map in Appendix B for current range developments.

Range – The existing federal AMs permitted to the grazing association would continue. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian conditions along North Creek and Scairt Woman Draw as described in the existing condition would continue.

Woody Draws – The current proportion of woody draw conditions would persist under existing management in which the conditions developed. The potential would occur for declining conditions among At Risk and Unhealthy sites with minimal regeneration as older trees are lost and not replaced. Seasonlong grazing and the relative scarcity of woody draws contribute to At Risk conditions in pasture 3. Winter use of pastures 2 and 4 has contributed to At Risk conditions of some woody draws, but Healthy communities are also present. The range of conditions is likely to be associated with hay feeding locations in relation to adjacent draws, and topographic features that result in drifting snow and inaccessibility of other draws.

Herbaceous Structure – Current management is projected to continue to approximate the existing herbaceous structure distribution. Current management would provide limited opportunities to improve the herbaceous structure conditions and promote an increase in the proportion of High herbaceous structure. An Authorized Use that is 10 percent higher than initial estimated carrying capacity, the unaccounted winter use, and distribution in pasture 3, could be contributing to herbaceous structure conditions.

Seral Stages – Current management would result in the continued predominance of mid seral stages with a high potential for increasing invasive grasses as influenced within different pastures by premature grazing of native grasses, winter hay feeding (Figure

Figure 289.2 — Winter hay feeding site at south end of pasture 2 observed during April 2009. The lack of standing plant cover indicates high levels of trampling and/or grazing during hay feeding.

289.2), and seasonlong grazing at potentially high levels of use. Portions of pasture 3 exhibited relatively low production of blue grama, western wheatgrass, and clubmoss compared to the initial estimated carrying capacity that assumes production equal to the potential community, thereby creating the potential for excessive utilization in the pasture. A stand of crested wheatgrass in the southwest corner of pasture 3, along with areas of bluegrass dominance, are of low palatability during the grazing season and contribute to the level of native grass utilization. Hay feeding introduces seed of invasive grasses and sweet clover and contributes to the prominence of these species in several pastures. Although reported use is appreciably less than Authorized Use, grazing during relatively open periods of the winter that is not counted towards Authorized Use adds to the total level of utilization.

Sharp-tailed Grouse – Existing management would not enhance High structure herbaceous grasslands because of the Authorized Use level, the unaccounted winter use, and distribution in pasture 3, thus limiting the potential to enhance potential grouse nesting and brooding habitat.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 1,789 federal AMs.
- In pasture 3, managing livestock tanks to more effectively draw cattle away from woody draws.
- Adding a pipeline and a stock tank in both pastures 2 and 3.
- Fencing south boundary of Section 2 and integrating new pasture into a two-pasture deferred rotation.

ADAPTIVE OPTIONS:

- Fencing high-value woody draws.
- Splitting pasture 3 with a north/south fence and implementing a three-pasture deferred rotation.
- Adjusting Authorized Use.

Range

Initial Actions – Because the initial Authorized Use would remain the same as current management, the permittee would be allowed to harvest the same amount of forage. The timing of the removal of forage within the pastures would change from the existing condition because of the proposed initial actions. Deferring turnout until June 1st on native pastures, with the exception of inventory permits where early turnout would be allowed one out of 3 years, would have an effect on this allotment since it carries an inventory permit through the MGA and there are no pastures within the allotment that are designated as crested wheatgrass pastures. Wintered on this allotment is 250 head of livestock are and the effects of this proposed Design Criteria would be that 250 AMs in 2 out of the 3 years would have to remain on feed, or the permittee would have to find other pasture to graze for the month of May.

Managing livestock tanks in pasture 3 to move livestock away from the woody draws would improve the distribution of livestock throughout the pasture and would create a rotation which

would provide the opportunity for initial growth and/or regrowth native herbaceous species in areas that traditionally received heavier use.

Adding a stock tank in both pastures 2 and 3 would improve the distribution of livestock in both pastures because of the unreliable livestock water provided by reservoirs in pasture 3 and the lack of water developments in the northern portion of Section 2 in pasture 2. Without adding the stock tank, the initial action of fencing the southern boundary of Section 2 would not provide any benefits because livestock would not have a reliable water source and a two-pasture deferred rotation would not be feasible.

Fencing the southern boundary of Section 2 would create an additional summer pasture and would allow for a two-pasture deferred rotation to be carried out. An analysis of available AMs per pasture should be performed to determine the number of grazing days allowed in each pasture. Livestock distribution would change because livestock would be confined to a smaller area and the new pasture would be utilized during the summer grazing season.

Adaptive Options – Fencing high-value woody draws would have little to no change in livestock distribution across the allotment. Forage within the exclosures would no longer be available for livestock grazing. Depending on the size of the exclosure, increased livestock grazing pressure may occur on remaining forage. There will be a cost to install and maintain the fencing to prevent livestock access to the woody draws.

Splitting pasture 3 with a north/south fence and implementing a three-pasture deferred rotation would confine livestock to a smaller area and change livestock distribution. An analysis of available AMs per pasture should be performed to determine the number of grazing days allowed in each pasture.

Adjusting Authorized Use downward would result in fewer livestock numbers because of the inventory permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock but the amount of forage harvested would be less than the existing forage harvested.

Riparian

Initial Actions – Managing livestock tanks in pasture 3 to more effectively draw livestock away from woody draws should have minimal effect on riparian conditions along Scairt Woman Draw. The level of use along the riparian corridor of Scairt Woman Draw would be expected to continue.

Developing rangeland water and the installation of stock tanks in pastures 2 and 3 would help move livestock concentration away from the riparian stream corridors and improve riparian conditions. Riparian conditions would improve by minimizing trailing and trampling in the riparian area allowing for herbaceous and woody riparian vegetation recovery.

Fencing the south boundary of Section 2 and integrating a new pasture into a two-pasture deferred rotation would benefit riparian conditions along North Creek allowing for the continuation of desired conditions because of reduced use.

It is expected that desired conditions on Scairt Woman Draw, reach 2, would be achieved in 10 to 15 years.

Adaptive Options – Fencing high-value woody draws should have no effect on riparian conditions along Scairt Woman Draw and North Creek because there would be no expected change in livestock distribution and the distance of separation.

Splitting pasture 3 with a north/south fence and implementing a three-pasture deferred rotation should benefit riparian conditions along Scairt Woman Draw. The three-pasture deferred rotation would benefit riparian conditions if the time livestock were on the creek was reduced. If livestock use on the riparian corridor was reduced conditions would improve by minimizing trailing and trampling allowing for riparian vegetation recovery.

Reducing Authorized Use should help improve the uplands vegetation which in turn reduces overland flow which would further benefit the riparian conditions along Scairt Woman Draw. A reduction in overland flow delivered to the creek would result in reduced stream velocities allowing for the establishment of riparian vegetation which would build stream banks.

It is expected that desired conditions on Scairt Woman Draw, Reach 2, would be achieved in 5 to 10 years.

Woody Draws

Initial Actions – Adding a stock tank to pastures 2 and 3 would have the potential of increasing browsing and trampling disturbances and decreasing conditions within adjacent woody draws, depending to some degree on the location of the tanks. Adding a water tank in pasture 2 could alleviate some use along North and Camp Creeks, but the new tank would likely be closer to woody draws and create the potential for decreasing conditions. Managing or controlling five existing and one new water tank in pasture 3 to decrease woody draw disturbances is unlikely to result in shifts from At Risk to Healthy conditions. The relative scarcity of woody draws in the pasture, and/or their occurrence along primary use or trailing areas, would ensure their continued use during the seasonlong grazing period. Topographic conditions appeared to be of greater influence on woody draw conditions compared to the distance to water, as some At Risk communities with easy access were located well away from water, while some Healthy communities with steeper terrain were located adjacent to water. Unmanaged dugout ponds and drainages with intermittent surface water would decrease the effectiveness of water tank management in portions of the pasture with adjacent woody draws.

Fencing the north end of pasture 2 to create a deferred rotation with pasture 3 would shift the season of use in the new pasture from winter to summer, with an increased potential for woody draw disturbances and decreased conditions. High livestock density with a short grazing season would occur in the new 640-acre pasture to accommodate livestock numbers in the much larger area of pasture 3. The resulting high level of livestock distribution, along with increased woody draw access without drifting snow in the new pasture, would contribute to increased woody draw disturbances and decreasing conditions. Grazing periods in pasture 3 would be only slightly reduced compared to current conditions due to its four-fold greater size compared to the new pasture, and the relative scarcity of draws in pasture 3 would maintain relatively high levels of livestock disturbance. Woody draws conditions in the remaining south portion of pasture 2 would also have

the potential to decrease as a result of the decreased pasture size and increased density of wintering livestock contributing to increased trampling disturbances.

Adaptive Options – Fencing woody draws and/or decreasing Authorized Use would increase the potential for improved conditions by removing or decreasing livestock browsing and trampling disturbances that would facilitate the regeneration of desired woody species. Exclusion of livestock impacts through fencing would provide the fastest and greatest degree of woody draw improvement, but increasing plant litter and invasive grass layers could impede the regeneration of woody species. Fencing of one woody draw would have a high potential to result in increased disturbance within adjacent unfenced woody draws. Decreases in Authorized Use would have to be large to affect a decrease in utilization because Authorized Use appreciably exceeds reported use for 5 of 6 years and winter use is not credited towards the amount of total use.

Splitting pasture 3 with a north-south fence and implementing a three-pasture deferred rotation with the new pasture at the north end of pasture 2 would have similar results as the two-pasture rotation discussed above. Increased livestock densities within the smaller pasture sizes would increase the evenness of livestock distribution with potentially increased browsing and trampling disturbances and decreased woody draw conditions compared to current management. Increased periods for recovery and regrowth of browsed and trampled woody plants would occur, but would not be sufficient to ensure successful regeneration due to slow growth response of woody plants to these disturbances.

Herbaceous Structure

Initial Actions – Managing tanks could have some utility, though the number of unfenced reservoirs and potential water availability in drainages, e.g. Scairt Woman Draw, would reduce the effectiveness. However, distribution, intensity, or seasonality of use, could be altered some due to the tendency of the tanks to be situated in more of an upland setting whereas the reservoirs are in more of a drainage situation near draws. Managing the tanks could result in some decreased use in the extreme western portion of pasture 3 and in the eastern portion of pasture 3 but that is not detailed in the proposal at this time. Though an additional tank in pasture 3 could add some management flexibility, it would also promote more even use and decrease secondary range, as in the case of a proposed tank in pasture 2. However, the density of developed water in pasture 2, 0.3 developed water sources per section including private is significantly lower than pasture 3, 2.3 developed water sources per section. Fencing pasture 2 into two pastures and creating a deferred rotation would tend to promote more even use of the pasture and decrease secondary range by concentrating livestock into a smaller area, though for a shorter time frame. It is not expected that an adequate amount of time would be provided for appreciable regrowth by fall. The Authorized Use exceeds the initial estimated carrying capacity by 10 percent, accounting for cow size. A high level of use relative to the initial estimated carrying capacity would result in reduced levels of residual cover.

Adaptive Options – Adjusting the Authorized Use could be the best tool to manipulate the herbaceous structure to be moving towards or meeting objectives. This tool would also allow for other management tools to be more effective. Fencing specific woody draws could have effects relative to the size and location of the exclosure, but is not expected to be appreciable due to the

relative small amount of woody draw habitat projected to be fenced. Combined with the Section 2 portion of pasture 2, creating a three-pasture deferred rotation with a divided pasture 3 would promote more even use of all pastures and decrease the secondary range usage by concentrating livestock into a smaller area for a shorter time frame. Pasture 2 could be the most impacted since it is currently part of a larger pasture where portions are perhaps secondary range. It is not expected that an adequate amount of time will be provided for appreciable regrowth by fall under a three-pasture rotation. It is possible that Moderate structure may displace some of the Low structure areas under this scenario.

Seral Stages

Initial Actions – Adding stock tanks to pastures 2 and 3 would increase grazing and trampling disturbances around the tanks with shifts towards early seral stages and potential increases of invasive grasses. Adding a sixth water tank in the 2,800-acres of pasture 3, along with intermittent reservoirs and at least one creek, would increase the evenness of grazing disturbances and would not contribute to the desired mosaic of grazing pressure and seral stages across the pasture. Utilization in late July less than half-way through the grazing season was estimated at 50 percent on an NDSU plot in the northeast quarter of pasture 3 in the general area of the proposed tank, suggesting minimal need for an additional tank. The sample plot was at a mid seral stage with invasive grasses comprising 15 percent of the grass production. Management of water tanks in the pasture to control livestock distribution and utilization would similarly increase the evenness of utilization and the predominance of mid seral stages rather than a mosaic of stages. Although water tanks could be managed to provide an extended period of non-use in alternating areas of the pasture to achieve late seral stages, this opportunity currently exists and is not specifically proposed. The natural tendency involves obtaining a moderate degree of use around each tank without causing excessive use before moving to the next tank.

Fencing the north end of pasture 2 to create a deferred rotation with pasture 3 would shift the primary season of use in the new pasture from winter to summer. Along with delaying turn-in until June 1st, this would end adverse effects of premature grazing in the new pasture with the potential to increase plant vigor by allowing for the completion of critical early season growth stages. A deferred rotation in pasture 3 could assist in maintaining or increasing plant vigor by increasing opportunities for the completion of critical growth stages and recovery from grazing disturbances.

The newly created pasture by fencing the south boundary of Section 2 would be less than one-fourth the size of pasture 3 and would therefore offset a relatively small degree of use in pasture 3. Livestock density in the new pasture would be high and contribute to even livestock distribution across the pasture compared to winter and spring use that is likely to be concentrated around hay feeding areas. Thus, secondary range in this pasture with the potential for supporting late seral stages would decrease. Adverse effects of hay feeding and premature spring grazing at the north end of pasture 2 would be transferred or concentrated to the south end of the pasture, or pastures 6, 7, and 8, with an increased potential for shifts to early seral stages and the spread of invasive grasses. Grazing periods outside the winter months are partially coordinated or overlap with high invasive grass palatability in these pastures, but there are indications of increasing invasive grasses.

Potentially increased stocking to the level of Authorized Use that exceeds initial estimated carrying capacity by 10 percent would contribute to shifts towards early seral stages.

Adaptive Options – Splitting pasture 3 with a north-south fenceline and implementing a three-pasture deferred rotation with the north end of pasture 2 would increase periods for plant recovery, regrowth, and the completion of critical growth stages, potentially increasing plant vigor and forage production. However, the evenness of livestock distribution and utilization would increase with increased livestock densities and smaller pasture sizes, thereby decreasing the mosaic of grazing pressure and seral stages and the extent of secondary range. The predominance of mid seral stages would persist.

Fencing woody draws would not have an appreciable effect on upland seral stages as a result of the small size of the exclosures.

Decreasing Authorized Use would increase the potential for shifts to late seral stages by decreasing the level of grazing and trampling disturbances. However, potential reductions would have to be large because Authorized Use appreciably exceeds reported use for 5 of 6 years and additional winter use is not credited towards Authorized Use.

Sharp-tailed Grouse

Initial Actions – Managing tanks could contribute to providing a mosaic of disturbance and contribute to increased sites of High structure. However, since there are a number of unfenced reservoirs intermixed with the tanks, the effectiveness of this action could be limited with the exception of the east-southeastern portions of pasture 3 and maybe the extreme western edge of the pasture 3. Adding a stock tank to pasture 2 and pasture 3 would tend to promote a more even use of pasture 3 and decrease secondary range in pasture 2. Depending on the location of the proposed tank in pasture 2, there could be impacts to a sensitive species, Tawny crescent butterfly, located in the southern portion of the pasture. Fencing pasture 2 into two pastures and creating a deferred rotation could increase evenness of use by concentrating livestock in a smaller area, though for a shorter time frame. It is not expected that an adequate amount of time would be provided for appreciable regrowth by fall, depending on rotation patterns. The Authorized Use exceeds the initial estimated carrying capacity by 10 percent, accounting for cow size. A high level of use relative to the initial estimated carrying capacity would result in reduced levels of residual cover, therefore potentially limiting grouse nesting habitat the next spring.

Adaptive Options – Adjusting the Authorized Use would have a positive impact on grouse nesting and brooding habitat. Existing Authorized Use level exceeds the initial estimated carrying capacity by 10 percent, after accounting for cow size. Reducing the level would allow for more residual cover remaining at the end of the year, and potential carry over to the following spring for grouse nesting habitat needs. This tool would allow for other management tools to be more effective. Fencing specific woody draws could have negative effects to the structure distribution relative to the size and location of the exclosure(s) but is not expected to be appreciable due to the relative small amount of woody draw habitat projected to be fenced and the localized scope of the fences. Creating a three-pasture deferred rotation with a divided pasture 3 with pasture 2 would tend to promote more even use of all pastures and decrease the secondary range usage by concentrating

livestock into a smaller area for a shorter time frame. Pasture 2 could be the most impacted since it is currently part of a larger pasture where portions are perhaps secondary range. It is not expected that an adequate amount of time will be provided for appreciable regrowth by fall under a three-pasture rotation. It is possible that Moderate structure may displace some of the Low structure areas under this scenario because of an improvement over time in density of vegetation.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 4 are the same as Alternative 3.

Range

Initial Actions – Authorized Use for this allotment would be 1,862 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 1,789 federal AMs converted to AUMs by adjusting for cow size is 2,057 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a nine percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration when planning the rotation for the allotment.

Riparian

Initial Actions – The effects would be the same as described previously in Alternative 3.

It is expected that desired conditions on Scairt Woman Draw, reach 2, would be achieved in 10 to 15 years.

Woody Draws

Initial Actions – Decreasing Authorized Use by nine percent after adjusting for cow size would have a minimal effect on woody draw conditions because the level of potential use would remain greater than reported levels of use during most years. There would be minimal potential for appreciably increasing the proportion of Healthy woody draws in pasture 3 where improvement is most needed due to the scarcity of draws that would ensure a high degree of continued browsing and trampling disturbances.

Herbaceous Structure

Initial Actions – Adjusting the Authorized Use based on an AUM and accounting for cow size would begin to move the allotment to meeting or moving towards the herbaceous structure distribution through the reduction of use that would leave more residual cover.

Seral Stages

Initial Actions – Decreasing Authorized Use by nine percent after adjusting for cow size would have minimal effect on current conditions or trends of plant composition because the level of potential use would remain appreciably greater than levels of use reported during most years.

Sharp-tailed Grouse

Initial Actions – Establishing the Authorized Use based on the initial estimated carrying capacity and accounting for cow size should permit the accumulation of residual cover and the enhancement of grouse nesting and brooding cover.

ALLOTMENT 300

Table 300.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 300 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 3.65 – Rangelands With Diverse Natural-Appearing Landscapes	1,300	100	
Total allotment acres	1,300	100	
NFS acres	1,300	100	
State land acres	0	0	
Private land acres	0	0	
Current permitted livestock grazing (AMs) on NFS lands			486
Initial estimated carrying capacity (AUMs) on NFS lands			524
Number of pastures containing NFS lands			1

Table 300.2 — Allotment 300 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	The water lot located on Magpie Creek was surveyed in 2006 and rated as FAR-D.	Move FAR-D reach of Magpie Creek towards PFC.
Woody draws	50 percent of the sampled woody draws were Healthy, and 50 percent were At Risk. The At Risk woody draws exhibited little or no regeneration, low saplings numbers and some headcutting.	Increase successful recruitment of woody species.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Below Objectives High – Below Objectives 2004 Transects: 1.91; 1.19; 1.19 2004 Stations percent: Low-73.3/Moderate-26.6/High-0.0	Manage for additional Moderate and High structure on biologically capable habitats.
Seral stages	All five sample sites were at mid seral stages with native grass dominance and light to moderate invasive grasses. Eighteen percent of the pasture consists of broken land.	Maintain native plant dominance while achieving desired seral proportions, and limit the increase of invasive grasses.
Sharp-tailed grouse	There are no known leks within the allotment. There are three known leks that are within a one-mile radius of the allotment. Within the allotment, there is approximately 300 to 500 acres within the one mile proximity radius of these leks.	Manage to enhance sharp-tailed grouse nesting and brooding habitat by increasing the quality and quantity of High vegetative structure on biologically capable sites.
Remarks	Some absinth wormwood noted.	

Table 300.3 — Allotment 300 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action	Alternative 3A	Alternative 4
• Authorized Use is 486 federal AMs • Three-year average permitted use is 436 federal AMs.* • Permit type: Turn-in (common allotment). • Rotation: Seasonlong. • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 486 • Develop rangeland well which may be located in this allotment or Allotment 283. Construct a water pipeline to supply two stock tanks. A stock tank would be located in each allotment. • Once well is developed exclude livestock access to spring in the southeast quarter of Section 28. • Rehabilitate entrenched livestock trails inside the waterlot located in the northeast corner of the allotment and create a water gap in the far northeast corner with a hardened livestock watering area. **Adaptive Options** • Cross fence allotment dividing the allotment into two pastures. • Adjust Authorized Use	**Initial Actions** • Authorized federal AMs: 486 • Develop rangeland well which may be located in this allotment or Allotment 283. Construct a water pipeline to supply two stock tanks. A stock tank would be located in each allotment. • Rehabilitate entrenched livestock trails inside the waterlot located in the northeast corner of the allotment and create a water gap in the far northeast corner with a hardened livestock watering area. **Adaptive Options** • Cross fence allotment dividing the allotment into two pastures. • Adjust Authorized Use	**Initial Actions** • Authorized federal AUMs: 524 • Develop rangeland well which may be located in this allotment or Allotment 283. Construct a water pipeline to supply two stock tanks. A stock tank would be located in each allotment. • Fence and reclaim spring in the southeast quarter in Section 28. • Rehabilitate entrenched livestock trails inside the waterlot located in the northeast corner of the allotment (limit access to water lot until riparian vegetation is reestablished). • Remove fence on west side of alleyway in Section 27. **Adaptive Options** • Cross fence allotment dividing the allotment into two pastures. • Extend pipeline by three quarters of a mile from new tank in Section 28 toward Magpie Creek and add a stock tank in Section 27. Rehabilitate waterlot. • Adjust Authorized Use.

Alternative 2 - Current Management	Alternative 3 - Proposed Action	Alternative 3A	Alternative 4
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings annually for 3 years then reevaluate survey frequency. • Complete Properly Functioning Condition survey once every 3 years then once every 5 years if a positive trend has been established. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3.	**Monitoring** • Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 300 — Existing Condition

Range – This allotment is approximately 1,300 acres of solely NFS lands. This is a common allotment with one pasture. The allocated AMs for this allotment are divided up among three permittees. Currently, the common is permitted through each permittee's associated headquarters permit by the MGA. Current AMs provided by NFS lands can be found in Table 300.1. This allotment is located in both the Badlands and Rolling Prairie geographic areas. A spring is the only developed water source but Magpie Creek is accessible to livestock in the far northeastern corner of the allotment.

Distribution mapping indicated that livestock use was fairly evenly distributed throughout the pasture. Some of the lowland areas received heavier use than others, but overall utilization by ocular estimate was around 40 to 50 percent. There was a good native species component throughout the allotment. Crested wheatgrass exists in the areas that had oil activity, the southeastern portion of Section 28 and the eastern part of Section 27. Litter cover was good throughout this allotment. This allotment has good potential meeting the 3.5 VOR for High structure. Lowlands are comprised of western wheatgrass/green needlegrass. The midlands have western wheatgrass/needle-and-thread. And the uplands have little bluestem, blue grama, and sideoats grama (*Bouteloua curtipendula* (Michx.) Torr.) that trends to threadleaf sedge, needle-and-thread, and blue grama.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there were no known state-listed or county-listed noxious weeds within this allotment. However, during the woody draw surveys within this allotment a population of absinth wormwood was identified. At this time, the amount and number of infestations are unknown. One of the permittees has made an attempt to control some of these infestations with herbicide. Increased oil and gas activity and other uses on

the grasslands can provide potential for other invasive and noxious weeds. Within this allotment, there is a potential for 11 of 12 state-listed and the county listed noxious weeds.

Oil and gas development on NFS lands in this allotment has removed no acres from livestock access. A total of approximately 5.0 acres of oil and gas pads and access roads have been reclaimed and are or will be available for livestock access. Associated forage from these acres is approximately 0.0 and 1.9 AUMs, respectively.

Riparian –

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
300-01	Magpie Creek (1b)				0.12		0.12

Magpie Creek (reach 1b) flows through the northeastern corner of pasture 1 in Allotment 300. This corner has been fenced into a water lot that serves livestock in pasture 1 of Allotment 300, pasture 1 of Allotment 302, and pastures 1 and 5 of Allotment 277. The interdisciplinary team gave this water lot a functionality rating of FAR-D in 2006.

- Identified problems with this water lot, include:
- Unacceptably high concentrations of livestock from multiple pastures in this small water lot over too much of the growing season with inadequate rest and recovery periods for plants;
- High levels of hill slope erosion, livestock trailing, and bank erosion;
- Heavy loss of riparian plants;
- Manure and sediment related to livestock; and
- Trampling on the banks and in the channel.

There is a developed unnamed spring and tank in the southeastern quarter of Section 28, T144N, R100W. There are multiple seeps located in a draw setting. The main source is collected and piped a short distance to a stock tank. There is livestock trampling, heavy use, and debris located in the potential riparian areas of the multiple seeps. The collection area is fenced but other water lot fences were down allowing livestock access to the spring's complex.

Figure 300.1 — Water lot in the northeastern corner of Allotment 300 pasture 1 is adversely affected by the concentration of livestock. Riparian vegetation is browsed, trampled, or completely missing along the banks. The banks are severely eroded from cattle trailing. Livestock loaf along stream and manure content is high in the channel and on banks.

Woody Draws – Of six woody draw samples, 50 percent were Healthy and 50 percent were At Risk. The primary water source involved a developed spring with At Risk woody draw conditions along the drainage bottom. Healthy conditions across the pasture were most frequent along steep upper slopes below ridgelines with active tree and shrub reproduction.

Figure 300.2 — Upper end of woody draw with high reproduction as evidenced by numerous saplings and young trees.

Herbaceous Structure – In 2004, three randomly selected herbaceous dominated VOR transects were surveyed. Two transects were measured in the Low structure class and one transect was measured in the Moderate class. No High structure transects were measured. The consolidated station averages were Low structure stations at 73 percent and Moderate stations at approximately 27 percent. No stations were measured in the High structure category. No transects were resurveyed in 2005.

Seral Stages – Plant composition measurements indicate a predominance of mid seral stage native plant communities along upland plateaus and slopes with relatively light but consistent occurrences of invasive bluegrass. Broken land comprising about 18 percent of the pasture along the largest plateaus was dominated by crested wheatgrass with intermixed native grasses. There is a moderate potential for the occurrence of late seral stages in secondary range distant from the main plateaus.

An NDSU sample plot on a Claypan ES near the center of broken land was at a mid seral stage for broken land with native grasses greatly exceeding crested wheatgrass in frequency, cover, and production. Fringed sage exhibited the greatest amount of species production and prohibited a late seral stage rating. Canada bluegrass and annual brome occurred at frequencies of 14 percent and 7 percent respectively, but were not present in the clipped plots. Another NDSU plot along the north boundary of broken land on a Sandy ES was at a mid seral stage with intermixed crested wheatgrass and lesser amounts of Kentucky and Canada bluegrass. A sere plot north of the NDSU sample and just outside broken land was at a mid -early seral stage with blue grama and needle-and-thread dominance. A Robel transect in broken land recorded sedge and blue grama as the dominant species with lesser amounts of crested wheatgrass and western wheatgrass. Another Robel transect along a ridgeline in unbroken land recorded little bluestem and sedge as the dominant species. A repeated pace transect in broken land at the south end of the pasture indicated decreased frequency of crested wheatgrass and western wheatgrass and increased frequency of needle-and-thread. Total plant frequency increased between 1978 and 2009. Relative plant frequency of Kentucky bluegrass increased from zero to 8 percent.

A Loamy ES on the shoulder of a plateau on the east side of the pasture was at a mid seral stage with moderate amounts of invasive grasses. A sere plot near broken land on a Loamy ES on this side of the pasture was at a mid-late seral stage with light to moderate invasive grasses. A nearby Robel transect was suggestive of mid seral stages, and two belt transects along upper drainage slopes recorded native grasses as the three dominant species.

Sharp-tailed Grouse – There are no known leks within the allotment. However, there are three leks that are within a one-mile radius of the allotment. Within the allotment, there is approximately 300 to 500 acres within the one mile proximity radius of these leks.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed after 2 years.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment so there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian condition along Magpie Creek and unnamed spring as described in the Existing Condition would improve and evolve toward desired riparian conditions over time. Improvement would result from the establishment of riparian vegetation which would capture sediment and build stream banks.

Woody Draws – Woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. Existing and potential increases of invasive grasses in the woody draw understory as assisted by increasing plant litter with the removal of livestock grazing would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock there would be an increased opportunity for the development of High and Moderate herbaceous structure, and a decrease in the quantity of Low herbaceous structure in the allotment.

Seral Stages – The removal of livestock grazing would facilitate shifts towards late seral stages. However, the accumulation of plant litter with the removal of livestock grazing would facilitate increases of invasive grasses and gradual transitions to Invaded Grass States with decreased maintenance of native plant communities. Transitions would occur in portions of the pasture within ten years, while other areas might require as long as fifteen years due to lower amounts of invasive grasses.

Sharp-tailed Grouse – The projected increase in potential High structure herbaceous grasslands from the removal of livestock would appreciably enhance nesting and brooding habitat for sharp-tailed grouse.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by a turn-in grazing association permit (common allotment), and Authorized Use is 486 federal AMs.
- Cow/calf pairs are ran seasonlong.
- See allotment map in Appendix B for current range developments.

Range – The existing federal AMs permitted to the grazing association would continue. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and

county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian conditions along Magpie Creek and unnamed spring as described in the Existing Condition would continue.

Woody Draws – Woody draw conditions would not improve under current management in which they developed. The primary water source involving a developed spring at the head of a woody draw contributes to high browsing and trampling disturbances and At Risk conditions along the drainage bottom. Similar browsing and trampling disturbances resulting in At Risk conditions were observed along the lower reaches of several drainages with low gradients and easy livestock access, while the upper portion of the drainages below ridge shoulders exhibited steeper slopes that decreased livestock access and contributed to Healthy conditions. Seasonlong grazing contributes to high woody draw disturbances when livestock seek extended green periods of the understory and escape from heat and insect pests. Potentially increased stocking to the level of Authorized Use that exceeds initial estimated carrying capacity by 7 percent after adjusting for cow size would increase the degree of woody draw disturbances compared to currently reported levels of use.

Herbaceous Structure – Current management is projected to continue to retain the existing herbaceous structure distribution. Current management would provide limited opportunities to improve herbaceous conditions and promote an increase in the proportion of High structure. An Authorized Use that is seven percent higher than the initial estimated carrying capacity would contribute to the existing herbaceous structure conditions.

Seral Stages – Continuation of current management should result in the maintenance of native dominated plant communities over the next 10 to 15 years, but with the potential for increasing amounts of invasive grasses that consistently occurred in NDSU plots and sere plots. Early June turn-in dates are appropriate for the native component and allow for the completion of critical early season growth periods. However, crested wheatgrass in broken land and other invasive grass occurrences are of low palatability during the large majority of the grazing season and contribute to selective use of the native component with potentially excessive levels of use. Consistent grazing through October or November occurs during the second critical growth period and can contribute to a decreased ability for plants to translocate carbohydrate reserves to the root system for the following year's growth, with potentially decreased plant vigor impeding the development of late seral stages. Annual repetition of heavy seasonlong grazing can also increase the susceptibility of native plant communities to invasive grass establishment. Currently reported levels of use, as well as a greater value of Authorized Use, would qualify as heavy grazing in view of assumptions used to estimate carrying capacity.

Sharp-tailed Grouse – Existing management would not enhance High structure herbaceous grasslands, thus limiting the potential to enhance potential grouse nesting and brooding habitat. An Authorized Use that is seven percent higher than the initial estimated carrying capacity would contribute to the existing grouse nesting habitat conditions.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 486 federal AMs.
- Developing a rangeland well which may be located in this allotment or Allotment 283. Constructing a water pipeline to supply two stock tanks. A stock tank would be located in each allotment.
- Once well is developed, excluding livestock access to spring in the southeastern quarter of Section 28.
- Rehabilitating entrenched livestock trails inside the waterlot located in the northeastern corner of the allotment and creating a water gap in the far northeastern corner with a hardened livestock watering area.

ADAPTIVE OPTIONS:

- Cross fencing allotment, dividing the allotment into two pastures.
- Adjusting Authorized Use.

Range

Initial Actions – Because the initial Authorized Use would remain the same as current management, the permittees would be allowed to harvest the same amount of forage.

Developing a rangeland water well and adding a stock tank may change livestock distribution depending on the location of the tank. If the tank is located away from the existing spring and the spring is fenced, livestock distribution would change because there would be not be the attraction of water.

Excluding livestock access to the spring in the southeastern quarter of Section 28, once the well is developed, may change livestock distribution depending on the location of the proposed tank.

Rehabilitating the entrenched livestock trails inside the water lot and creating a water gap in the far northeastern corner with a hardened watering area would not affect livestock distribution because the water lot is currently available for livestock use.

Adaptive Options – Cross fencing the allotment into two pastures would create a two-pasture rotation system. An analysis of available AMs per pasture should be performed to determine the number of grazing days allowed in each pasture. Livestock distribution would change because livestock would be confined to a smaller area access to the entire pasture would be restricted.

Adjusting Authorized Use downward would result in fewer livestock numbers, less grazing days, or a combination of the two because of the turn-in permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock but the amount of forage harvested would be less than the existing amount.

Riparian

Initial Actions – The proposal to add a water source in the uplands to decrease livestock's dependence on Magpie Creek for water should permit improvement in riparian conditions along Magpie Creek. The new water source developed to pull livestock away from the riparian corridor would benefit riparian conditions by minimizing bank sloughing, trailing, trampling, and loafing, allowing for herbaceous and woody riparian vegetation recovery.

The exclusion of livestock from the spring's complex in Section 28 would allow for the reestablishment of a portion of the associated lentic riparian habitat that has been lost from past use and trampling. The development would continue to be used for livestock watering, reducing a portion of available water for riparian habitat support.

The proposal is to rehabilitate entrenched livestock trails inside the water lot located in the northeastern part of the allotment and create a water gap with a hardened watering area. This should improve riparian conditions within this reach of Magpie Creek. Hardening the watering areas on Magpie Creek would benefit stream conditions through this reach by protecting banks from livestock trampling and trailing.

It is expected that desired conditions on Magpie Creek would be achieved in 10 to 15 years.

Adaptive Options – Cross-fencing the allotment, dividing it into two pastures, would benefit riparian conditions along Magpie Creek by reducing the livestock time of use in half. This would benefit riparian conditions by minimizing bank sloughing, trailing, trampling, and loafing, allowing for herbaceous and woody riparian vegetation recovery.

Reducing Authorized Use should help improve the uplands vegetation, reducing the overland flow, further benefitting the riparian conditions along Magpie Creek. A reduction in overland flow would result in reduced stream velocities allowing for the establishment of riparian vegetation which would build stream banks.

It is expected that desired conditions on Magpie Creek would be achieved in 5 to 10 years.

Woody Draws

Initial Actions – Constructing a water well and livestock tank that would be located in the uplands and fencing the developed spring at the head of a woody draw would facilitate increased conditions of the draw by decreasing browsing and trampling disturbances. Overflow from the spring and other amenities of the draw would continue to attract livestock, but the level of disturbance would be decreased compared to current conditions. Suitable selection of the new tank location would help avoid or minimize increased disturbances within other woody draws. The developed spring would be available for use during maintenance or repair of the proposed water well and pipeline.

Rehabilitating entrenched livestock trails leading to a waterlot along a short segment of Magpie Creek in the northeast corner of the pasture would decrease erosion problems and the amount of stream area accessible to livestock. There would be some potential for improved conditions or increased extent of small woody draw and shrub patches along the perimeter of the water lot.

Adaptive Options – Woody draw conditions would have a limited potential to improve if the allotment is divided into two pastures. Assuming implementation of a deferred rotation, the period

of potential browsing and trampling disturbances would decrease by about 50 percent. However, increased livestock density within the smaller pastures would increase the evenness of grazing disturbances, thereby contributing to increased woody draw disturbances within secondary range where conditions tend to be Healthy. Shorter grazing periods in each pasture would provide longer recovery periods for browsed woody plants, but would not be sufficient for woody species to replace lost tissue before the next grazing season.

Decreasing Authorized Use would facilitate increased woody draw conditions by decreasing browsing and trampling disturbances, with the degree of effect proportional to the decrease in use. Current levels of Authorized Use exceed reported use by 4 to 15 percent, so reductions would have to appreciably exceed the lower limit of this range to have an effect.

Herbaceous Structure

Initial Actions – The Authorized Use exceeds the initial estimated carrying capacity by seven percent, accounting for cow size. A high level of use relative to the initial estimated carrying capacity would result in lower levels of residual cover. The effects of adding a stock tank while fencing a spring development would be dependent on the location of the tank. If tank is near the spring, then livestock distribution and the spatial arrangement of herbaceous structure is not expected to change appreciably from existing conditions. The more distant the new tank is placed from the spring then the distribution and the spatial arrangement of herbaceous structure would change as well. Rehabilitating the livestock trails around the waterlot will not alter livestock use patterns appreciably and therefore will not affect herbaceous structure.

Adaptive Options – Adjusting the Authorized Use would be the most effective tool to manipulate herbaceous structure. Cross fencing the allotment and implementing a deferred rotation could result in more even livestock use due to the same number of livestock in a smaller pasture, though for shorter periods. This increases livestock distribution efficiency. It is not expected that an adequate amount of time would be provided for appreciable regrowth to occur before fall thus limiting herbaceous structure conditions.

Seral Stages

Initial Actions – Constructing a water well and livestock tank that would be located in the uplands would result in increased grazing and trampling disturbances and a shift towards early seral stages around the tank. Impacts to native vegetation could be decreased by placing the tank in an area with high amounts of crested wheatgrass. Placing the tank on the main plateau near the center of the pasture and relatively close to the developed spring would not appreciably change livestock distribution and would decrease effects on secondary range with the potential for supporting late seral communities.

Rehabilitating entrenched livestock trails in the northeast corner of the pasture would have minimal effect on seral stages or plant composition across the pasture because livestock distribution would not change.

Continuation of currently reported use would maintain present seral stages and plant composition, but with the potential for gradually increasing invasive grasses as discussed under Alternative 2.

Potentially increased stocking to the level of Authorized Use would facilitate shifts towards early seral stages.

Adaptive Options – Dividing the allotment into two pastures with a deferred rotation would adversely affect the achievement of desired seral stages. Although decreases in the period of grazing would increase opportunities for the completion of critical growth stages, livestock density and distribution would increase within the smaller pastures and decrease the potential for maintaining a mosaic of stages across the allotment or late seral stages in secondary range. However, there could be some benefit associated with decreased plant litter that could slow the spread of invasive grasses.

Decreasing Authorized Use would facilitate shifts towards late seral stages by decreasing grazing and trampling disturbances, with the degree of effect proportional to the decrease in use. However, potential decreases in use would have to result in appreciably lower levels of use than currently reported use.

Sharp-tailed Grouse

Initial Actions – The Authorized Use exceeds the initial estimated carrying capacity by seven percent, accounting for cow size. A high level of use relative to the initial estimated carrying capacity could result in reduced levels of residual cover in the fall with less potential carryover for spring grouse nesting needs. The effects of developing a tank to replace a developed spring would depend on the placement of the tank. The closer the new tank is to the existing spring development, the less change in livestock distribution and the spatial arrangement of potential sharp-tailed grouse habitat. If the tank is further away from the spring, the more the changes to livestock distribution and the spatial arrangement of potential sharp-tailed grouse habitat.

Adaptive Options – Adjusting the Authorized Use could have a positive impact on grouse nesting and brooding habitat. The existing Authorized Use level exceeds the initial estimated carrying capacity by seven percent, after accounting for cow size. Reducing this level would allow for more residual cover remaining in the fall with increased potential carry over the following spring for the potential enhancement of grouse nesting habitat. Cross fencing the allotment and entering a deferred rotation could result in more even livestock use due to the livestock concentration in a smaller pasture, though for a shorter period, increasing livestock distribution efficiency. It is projected that an inadequate amount of time would be provided for appreciable regrowth of herbaceous structure by fall. Therefore, the action would not enhance grouse nesting cover.

Effects of Alternative 3A

The effects of Alternative 3A are the same as Alternative 3 with the following stated exceptions.

INITIAL ACTIONS:

- Dropping the initial action of reclaiming the spring in the southeastern quarter of Section 28 once the well is developed.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 3A are the same as Alternative 3.

Range

Initial Actions – The effect of this action would be that three range water sources would be available for livestock in this pasture, but livestock distribution would not likely change much due to the topography of the pasture.

Riparian

Initial Actions – The effects of Alternative 3A are the same as Alternative 3 with the following exception: livestock would not be excluded from the spring's complex in Section 28. Livestock use and trampling would continue on the associated lentic riparian habitat resulting in continued dysfunctional conditions.

Woody Draws

Initial Actions – Maintaining access to the developed spring would contribute to continued browsing and trampling disturbances in the associated woody draw, but at a decreased level compared to current conditions as a result of the proposed additional stock tank constructed in the uplands. Nonetheless, there would be a decreased potential for achieving Healthy woody draw conditions around the developed spring compared to Alternative 3. Suitable selection of the new tank location would help avoid or minimize increased disturbances within other woody draws.

Herbaceous Structure

Initial Actions – Unless the new tank is located near the spring, it is probable that an additional water facility would encourage a more even livestock utilization and the associated spatial arrangement of herbaceous structure would be increasingly homogenized.

Seral Stages

Initial Actions – Allowing continued access to the developed spring would not appreciably affect existing upland conditions due to the relatively close proximity of the new tank location to the spring that would result in minimal change in livestock distribution within the upland habitat.

Sharp-tailed Grouse

Initial Actions – Continued use of the developed spring would not enhance grouse nesting and brooding habitat. Three water sources would tend to contribute to homogenizing herbaceous structure across the allotment with reduced levels of potential carry over for grouse nesting habitat.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.
- Fencing and reclaiming spring in the southeast quarter in Section 28.

- Removing the fence on west side of alleyway in Section 27.

ADAPTIVE OPTIONS:

- Extending the pipeline by 3/4 mile from new tank in Section 28 toward Magpie Creek and adding a stock tank in Section 27. Rehabilitating the waterlot.

Range

Initial Actions – Authorized Use for this allotment would be 524 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 486 federal AMs converted to AUMs by adjusting for cow size is 559 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a six percent reduction from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration when planning the rotation for the allotment.

Reclaiming the spring in the southeastern quarter of Section 28 may change livestock distribution because there would no longer be a water source, depending on the location of the proposed stock tank.

Removing the fence on the western side of the alleyway in Section 27 would increase the available forage for livestock grazing by approximately 50 acres. Livestock distribution would not be expected to change because of the small acreage.

Adaptive Options – Extending a pipeline 3/4 mile from the new stock tank in Section 28, adding a stock tank in Section 27, and reclaiming the water lot on Magpie Creek would not affect livestock distribution because the new stock tank would be in the vicinity of the existing water lot.

Riparian

Initial Actions – The spring development in Section 28 would be reclaimed. The entire associated lentic riparian habitat would reestablish over time as result of excluding livestock use and trampling.

The fence on the western side of the alleyway in Section 27 would be removed. This should better distribute livestock and would not have an effect on riparian conditions due to the distance of separation.

It is expected that desired conditions on Magpie Creek would be achieved in 10 to 15 years.

Adaptive Options – The addition of a stock tank in Section 27 along with the rehabilitation of the water lot on Magpie Creek would result in achieving desired riparian conditions in a short time by excluding livestock from the creek. This would provide the best opportunity for riparian vegetation to reestablish itself in the least amount of time as result of the exclusion and related effects such as trailing and trampling.

It is expected that desired conditions on Magpie Creek would be achieved in 2 to5 years.

Woody Draws

Initial Actions – Reducing Authorized Use by six percent after adjusting for cow size would facilitate slight increases in woody draw conditions by decreasing the level of browsing and trampling disturbances. However, the effects would be reduced by the proposed level of Authorized Use that would be two percent less to eight percent greater than typically reported use.

Reclaiming and fencing the developed spring after construction of a water well and stock tank as discussed under Alternative 3 would contribute to Grasslands Plan goals and objectives for restoring and maintaining 80 percent of spring habitats in a high ecologic condition. Browsing and trampling disturbances would be reduced within the woody draw below the spring, but a degree of use would continue due to overflow from the spring and other amenities provided by the draw. The degree of continued use of the draw would be influenced by the size of the exclosure and the amount of overflow available outside the exclosure, as well as the location of the tank proposed in the uplands. The proportion of sampled woody draws in a Healthy condition would have the potential to increase from 50 percent to 67 percent if conditions of the woody draw associated with the spring were to improve sufficiently.

Removing the alleyway fenceline on the east edge of the allotment would not have an appreciable effect on woody draw conditions due to the relatively small extent and patchy occurrence of woody draws in the alleyway. Woody draws were not sampled in this area, but aerial photographs do not suggest the occurrence of high condition draws.

The general effects of rehabilitating entrenched trails leading to a water lot on Magpie Creek were discussed under Alternative 3. The additional action of limiting livestock access to the lot until riparian conditions improve would have the potential of increasing disturbances within woody draws adjacent to the proposed water tank because it would be the only water source available. Although the effects of concentrated use around the water tank could be temporary, it would likely be necessary to limit livestock access to the water lot at regular intervals to maintain desired riparian conditions.

Adaptive Options – Adding a second water tank to replace the water lot along Magpie Creek that would be reclaimed would have the potential to facilitate the development or increase the extent of small woody draw patches along the creek margins. However, increased disturbances around the new water tank would have the potential of increasing browsing and trampling disturbances in adjacent woody draws depending on the tank location.

Herbaceous Structure

Initial Actions – Adjusting the Authorized Use based on an AUM and accounting for cow size would contribute to achieving or moving toward structure objectives. Removing the alleyway fence and allowing use to return to the permittees of Allotment 300 would result in approximately a four percent additional land base available for forage and herbaceous structure within the allotment. Fencing and reclaiming the spring development, along with the development of a new well, would maintain the two main watering sources within this allotment. The effects of reclaiming the spring site would be similar to just fencing the spring action in Alternative 3.

Adaptive Options – Closing the waterlot in the extreme northeast corner and adding a tank in a more central location would contribute to more homogenous distribution by livestock within the allotment.

Seral Stages

Initial Actions – Reducing Authorized Use by 6 percent after adjusting for cow size and initial estimated carrying capacity would have minimal effect on seral stages because the level of Authorized Use would be 2 percent less to 8 percent greater than typically reported use.

Removing the alleyway along the east side of the pasture would add acreage to the allotment and increase the amount of available forage production, but would not have an appreciable effect on stocking levels or seral stages across the 1,300-acre pasture. Increased use of the alleyway would facilitate shifts towards early seral stages compared to short periods of annual use that presently occur while moving livestock between other pastures/allotments.

Reclaiming and fencing the developed spring would not have an appreciable effect on upland herbaceous vegetation relative to constructing a new water well and tank within the uplands that was discussed under Alternative 3.

Rehabilitating entrenched livestock trails in the Magpie Creek water lot and limiting access until riparian conditions improve would decrease livestock grazing in this area of the pasture. Potential shifts towards late seral stages in this area would be countered by shifts towards early seral stages around the proposed water tank, but would contribute to maintaining a mosaic of grazing pressure and seral stages. The mosaic of grazing pressure would decrease when access to the water lot is regained, but the potential would occur for periodic closure of the lot because riparian conditions would regress with annual seasonlong access to the creek.

Adaptive Options – Adding a second water tank would result in shifts towards early stages around the tank site as a result of increased grazing and trampling disturbances. The desired mosaic of grazing pressure and seral stages would decrease because the evenness of livestock distribution across the pasture would increase. Disturbances associated with construction of the water pipeline and increased grazing and trampling around the tank site would have the potential to contribute to the establishment or increase of invasive grasses.

Further reductions in Authorized Use would increase the potential for shifts towards late seral stages relative to Alternative 3 because reductions would start at a lower level of use. The effects of dividing the allotment into two pastures were discussed under Alternative 3 and would not be appreciably different with the reduction in Authorized Use.

Sharp-tailed Grouse

Initial Actions – Establishing the Authorized Use based on the initial estimated carrying capacity and accounting for cow size could permit more accumulation of residual cover in the fall and the potential enhancement of grouse nesting and brooding cover in the following spring. Fencing and reclaiming the spring development, along with the development of a new well, would maintain the two main watering sources within this allotment. The effects of reclaiming the spring site would be similar to just fencing the spring action from Alternative 3. Removing the alley way fence would add approximately four percent to the allotment to potentially produce sharp-tailed nesting habitat.

Adaptive Options – Closing the waterlot in the extreme northeast corner and adding a tank in a more central location would contribute to more homogenous distribution by livestock within the allotment and limit the potential to produce grouse nesting habitat.

ALLOTMENT 301

Table 301.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 301 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 1.31 – Backcountry Recreation Nonmotorized	1,275	27	
Management Area 3.65 – Rangelands With Diverse Natural-Appearing Landscapes	3,443	73	
Total allotment acres	4,734	100	
NFS acres	4,717	100	
State land acres	0	0	
Private land acres	17	0	
Current permitted livestock grazing (AMs) on NFS lands			1,666
Initial estimated carrying capacity (AUMs) on NFS lands			1,734
Number of pastures containing NFS lands			3

Table 301.2 — Allotment 301 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	Magpie Ck. 97-99 survey rated PFC, 2004 survey part PFC and part FAR-NA, 2006 survey rated at PFC except for 1/8 mile segment which was rated FAR-D.	Need to move FAR-D reach towards PFC.
Woody draws	Of the sampled woody draws 47 percent were Healthy, 35 percent were At Risk and 18 percent were Unhealthy. At Risk and Unhealthy woody draws exhibit low regeneration, no shrub layer, access by livestock and headcutting.	Increase successful recruitment of woody species.
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Exceeding Objectives High – Below Objectives 2004 Transects: 2.18; 1.63; 1.61; 1.61; 1.73; 1.43; 1.39; 1.76 2004 Stations percent: Low-47.78/Moderate-52.22/High-0.0 2005 Transects: 2.36; 2.48; 2.00; 3.28 2005 Stations percent: Low-10.0/Moderate-88.75/High-1.25.	Manage for additional High structure on biologically capable habitats.
Seral stages	Of 11 sample sites, 73 percent were at mid seral stages, 9 percent were at late, and 18 percent were at an Invaded State.	Limit the spread of invasive grasses and maintain native plant communities while increasing the proportion of early and late seral stages.
Sharp-tailed grouse	There are two known leks within the allotment. There are two known leks within 1 mile of the allotment. One lek in the middle of pasture 3, which has been known to be active from at least 1999, recently became inactive. Within the allotment, there are approximately 3,000 to 3,500 acres within the 1-mile proximity radius of these leks.	Manage to enhance sharp-tailed grouse nesting and brooding habitat by increasing the quality and quantity of High vegetative structure on biologically capable sites.
Remarks	Canada thistle, burdock and field bindweed (*Convolvulus arvensis* L.) identified in woody draws.	

Table 301.3 — Allotment 301 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action	Alternative 3A	Alternative 4
• Authorized Use is 1,666 federal AMs • Three-year average permitted use is 1,541 federal AMs.* • Permit type: Turn-in (common allotment). • Rotation: Modified twice-over/deferred rotation • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 1,666 • Repair existing water developments which would offer more management opportunities. • Install a cross fence in pasture 1 and implement a four pasture deferred rotation. • Fence out two spring areas, install check valve to dump water back into riparian areas once stock tanks are full. • Move existing water tanks away from seeps/boggy areas. **Adaptive Options** • Increase livestock numbers and shorten season of use. • Adjust Authorized Use.	**Initial Actions** • Authorized federal AMs: 1,666 • Repair existing water developments which would offer more management opportunities. • Install a cross fence in pasture 1 and implement a four pasture deferred rotation. • Move existing water tanks away from seeps/boggy areas. **Adaptive Options** • Increase livestock numbers and shorten season of use. • Adjust Authorized Use.	**Initial Actions** • Authorized federal AUMs: 1,734 • Repair existing water developments which would offer more management opportunities. • Install a cross fence in pasture 1 and implement a four pasture deferred rotation. • Fence out two spring areas, install check valve to dump water back into riparian areas once stock tanks are full. • Move existing water tanks away from seeps/boggy areas. **Adaptive Options** • Increase livestock numbers and shorten season of use. • Construct a 42 acre riparian exclosure on Magpie Creek in pasture 1, Section 20. (Reach 1) • Adjust Authorized Use.

Alternative 2 - Current Management	Alternative 3 - Proposed Action	Alternative 3A	Alternative 4
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings annually for 3 years, then reevaluate survey frequency. • Complete Properly Functioning Condition survey once every 3 years then once every 5 years if a positive trend has been established. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3.	**Monitoring** • Same as Alternative 3.

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction.**

Allotment 301 — Existing Condition

Range – This allotment is approximately 4,734 acres and contains 4,717 acres of NFS lands with the rest private. The allocated AMs for this allotment are divided up among two permittees. Currently, the common is permitted through each permittee's associated headquarters permit by the MGA. Current AMs provided by NFS lands can be found in Table 301.1. This allotment is located in the Badlands geographic area. This allotment has been subdivided into three pastures and range in size from 590 to 2,254 acres. Water developments include reservoirs, springs, and a dugout with Magpie Creek running through the northern portion of the allotment.

Prior to 1974, this allotment was part of the historic Magpie Common which included several permittees. Prior to 2004, the management in this allotment consisted of the permittee from Allotment 283 starting in pasture 1 for approximately a week and then moving to the originally scheduled pasture. The past four of 5 years, this permittee has tried to run a modified twice-over/deferred rotation system. The other permittee from Allotment 278 brought his livestock to the common area after breeding was completed. From a review of allotment worksheets, it was difficult to follow if this permittee would rotate into the same pastures as the other permittee.

Pasture 1 is approximately 2,254 acres and mostly consists of rolling prairie with woody draws leading down into Magpie Creek. The lowlands contain Kentucky bluegrass, western wheatgrass, and green needlegrass with small patches of western snowberry. Litter cover was relatively good throughout the sites. Utilization in 2004 was heavy. The transitional areas going from the lowlands to the uplands contained a variety of native species such as western wheatgrass, needle-and-thread, green needlegrass, prairie sandreed, little bluestem, blue grama, and sideoats grama with patches of western snowberry. These areas also had relatively good litter cover, and use in 2004 was somewhat lighter on most of these sites. The uplands contain a good variety of native species and plant community types. Some of the species that were identified were threadleaf sedge, needle-and-thread, blue grama, and little bluestem. Overall, this pasture have a good native forb component but there are some areas that have excessive fringed sagewort, field pussy-toe (*Antennaria neglecta* Greene), and green sagewort (*Artemisia campestris* L. subsp. *caudata* (Michx.) Hall & Clem.). In most of the woody draws, quaking aspen occurs frequently, especially in drainages where there is groundwater discharge and a high water table. Beaver activity is quite noticeable in the northeastern portion of pasture 1. Sharp-tailed grouse were seen in this pasture during data collection efforts.

Pasture 3 is approximately 590 acres. This pasture's plant composition is made up of mixed native herbaceous species with crested wheatgrass. In some areas there is more of a crested wheatgrass dominated plant component with some native herbaceous species. The woody draws near the water lot in the northwestern corner shows signs of use.

Pasture 4 is approximately 1,877 acres. The diversity of topography plays a role in livestock distribution with the majority of use occurring in the southeastern portion with some isolated heavy use areas along the eastern side to Magpie Creek. On the southern and southwestern side there is a good sized crested wheatgrass community. There are also isolated crested wheatgrass communities due to oil field activity. Most of the native communities have a good native grass-like and forb species components with good litter cover. There are scattered patches of western snowberry and Rocky Mountain juniper. The stretch of Magpie Creek in the northern portion of the pasture is in good condition with desired species. Young green ash trees were also growing along this stretch.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there were no known state-listed noxious weeds or county listed weeds within this allotment. However, during the woody draw surveys and Forest Service range staff surveys, populations of Canada thistle, burdock, and field bindweed were identified. At this time the amount and number of infestations are unknown.

Oil and gas development on NFS lands in this allotment has removed a total of approximately 9.3 acres from livestock access. Approximately 5 acres of oil and gas pads and access roads have been reclaimed and are, or will be, available for livestock access. Associated forage from these acres is approximately 3.0 and 1.6 AUMs, respectively.

Riparian –

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
301-01	Magpie Creek (2)	1.87			0.14		2.01
301-04	Magpie Creek (3)	2.04					2.04

Magpie Creek (Reaches 2 and 3) traverses pasture 1 and 4 of Allotment 301. These reaches have a functionality rating of PFC except for a 0.1-mile reach, which is rated as FAR-D, in the northern end of pasture 1 near the boundary with Allotment 131 (chart above). This short segment occurs near the two-track stream crossing that is near a private residence in Allotment 131. The following was noted for this segment of stream:

- Extensive livestock trailing along the banks.
- Lots of hoof shear on banks and post-holing of riparian soil by livestock.
- An abundance of manure in and near the channel.
- Loss of water storage in banks and loss of base flow.

There are two developed springs with associated lentic riparian habitat. There is livestock use and trampling on the spring habitats.

Figure 301.1 — Livestock concentrate in the reach of Magpie Creek immediately south of Allotment 131 and in the north end of pasture 301-1. The riparian vegetation is browsed and trampled here, the streamflow is interrupted here and water is confined to instream palustrine basins during the low-flow season, and fish kill is common in this reach during the heat of summer.

Woody Draws – Of 17 woody draw samples throughout the allotment, 47 percent were Healthy, 35 percent were At Risk, and 18 percent were Unhealthy. The proportion of woody draw conditions in each pasture is similar to the total proportions for the allotment. Water sources involved developed springs and dugout ponds located along drainages where livestock concentrations have contributed to At Risk woody draw conditions with extensive trailing and browsing disturbances (Figure 301.2).

Figure 301.2 (a), (b), and (c) — Livestock trailing disturbances occurring along drainages with developed springs and reservoirs.

Herbaceous Structure – In 2004, eight randomly selected herbaceous-dominated VOR transects were surveyed. Two transects were measured in the Low structure class and six transects were measured in the Moderate class. No High structure transects were measured. The consolidated station averages were Low structure stations at 47.8 percent and Moderate stations at approximately 52.2 percent. No stations were measured in the High structure category.

Four transects were resurveyed in 2005. All four were measured in the Moderate structure class. The station data showed 10 percent of the stations were in the Low structure class, 88.8 percent of the stations were Moderate, and 1.2 percent of the stations were in the High structure class.

In September, 2006, two VOR transects were subjectively selected in some of the highest cover observed by members of the IDT. These transects were conducted as a result of a challenge to the 2004 and 2005 results. One transect was measured at 3.06 inches and the other at 1.59 inches. Both are in the Moderate class. After measuring these transects and found to be Moderate, it was determined that there was not enough High structure grasslands in the rest of the allotment to fully address the structure objectives.

Seral Stages – Several vegetation samples from the allotment indicate a predominance of mid seral stages (73 percent) with consistent invasive grass occurrences. One sample (9 percent) was at a late seral stage while two samples (18 percent) were at Invaded Grass States. Two sample measurements indicated an increasing trend of invasive grasses.

Pasture 1 comprises about 1,718 acres, with only traces of broken land but larger areas with high amounts of bluegrass and annual brome. Pasture 2 is presently managed with pasture 1 as a single pasture, but about 300 acres (56 percent) of pasture 2 south of Magpie Road consists of rugged terrain distant from water that likely results in minimal livestock use.

- An NDSU sample in the northwest portion of pasture 1 was identified as a Loamy ES but appeared to cross into a Thin Loamy ES as evidenced by high frequency and cover of little bluestem. Both ecological sites appeared to be at mid seral stages. Kentucky bluegrass and crested wheatgrass occurred at a frequency of 20 percent and 10 percent respectively, but bluegrass comprised only 5 percent of the clipped biomass plots. A nearby Robel transect recorded sedge and bluegrass as the dominant species.
- A remeasured ecoplot on a Thin Loamy ES about 900 feet southeast of the NDSU plot indicated a moderate increase of bluegrass but a larger increase in western wheatgrass and needle-and-thread with decreases in sedge and blue grama. Seral stage increased from mid to late-mid between 1998 and 2007.
- A remeasured pace transect along the southwest pasture boundary indicated more than a two-fold increase in total plant frequency and a decrease in bare ground. Relative plant frequency of bluegrass increased from 7 percent to 12 percent and sedge increased from 3 percent to 20 percent between 1978 and 2010.
- A sere plot on a Sandy ES in the northeast quarter of the pasture was at a mid-early seral stage with patches of bluegrass dominance.
- An NDSU plot on a Loamy ES along the east-central pasture boundary was at a mid-early seral stage with dominance of sedge, blue grama, and needle-and-thread, and 22 percent frequency of Kentucky bluegrass.
- A Clayey ES at the south end of the pasture, as well as a similar site in pasture 2 (managed with pasture 1), were at mid seral stages with light amounts of Kentucky bluegrass.
- A Thin Loamy ES above a drainage was at an Invaded Grass State with Kentucky bluegrass occurring at a frequency of 65 percent and comprising 60 percent of the total plant production.
- Three additional Robel transects and one belt transect dispersed across the pasture recorded sedge or blue grama as the dominant species, suggesting mid seral stages. Bluegrass was recorded as the second dominant species in one of the Robel transects.
- Four of five ecoplots measured during the late 1990s were at mid seral stages, while the fifth site was at a late seral stage with dominance of needlegrass, prairie sandreed, little bluestem, and sand bluestem.

Pasture 3 comprises about 600 acres, with 10 percent identified as broken land in the center of the pasture, and an additional area constituting about 14 percent of the pasture containing high amounts of crested wheatgrass, bluegrass, and smooth brome. Four ecoplots from the late 1990s indicated a predominance of early seral stages in primary habitat types and late stages in secondary habitat types.

- An ecoplot in the northwest corner of the pasture measured during 1998 was at an early seral stage with dominance of blue grama and buffalo grass. A belt transect measured on this site in

2004 recorded sedge and blue grama as the dominant species, while a nearby Robel transect recorded threadleaf sedge and needle-and-thread, all suggestive of early to mid seral stages.

- An ecoplot in the southeast quarter of the pasture was at an early seral stage with blue grama and sedge dominance and trace amounts of Kentucky bluegrass. A belt transect measured on this site recorded western wheatgrass and blue grama as the dominant species, suggesting an increase in seral stage.
- Two ecoplots located about 500 feet northwest and 1,300 feet southwest of the above site were at late seral stages for little bluestem/threadleaf sedge/prairie sandreed habitat types.

Pasture 4 comprised about 1,877 acres, with 5 percent broken land.

- An NDSU sample on a Claypan ES near the north-central portion of the pasture was at a mid-late seral stage with Kentucky bluegrass comprising four percent of the grass production. Low total grass production and almost 40 percent bare ground prohibited a late seral rating.
- Two Robel transects on low hills above Magpie Creek at the north end of the pasture recorded sedge and needlegrass as the dominant species, while another transect along Magpie Creek was suggestive of a late seral stage and a high condition silver sagebrush/western wheatgrass habitat type. Invasive grasses were not recorded as dominant species among these sites.
- An NDSU plot identified as a Loamy ES appeared to cross into a Thin Loamy ES and was at a mid seral stage. No invasive grasses were measured on the clipped plots or transects. A Robel transect located along a broad ridgeline about 700 feet to the northwest recorded sedge and little bluestem as the dominant species.
- A belt transect in broken land in the southwest corner of the pasture was dominated by crested wheatgrass with scattered occurrences of needle-and-thread. A Robel transect just outside this parcel of broken land recorded sedge and blue grama as the two dominant species, with lesser amounts of needlegrass and western wheatgrass.
- An ecoplot on the southern edge of the pasture adjacent to Magpie Road was at an early seral stage for a western wheatgrass/green needlegrass HT, while an adjacent prairie sandreed HT was at a late seral stage.
- An ecoplot in the southeast corner of the pasture on the edge of broken land was at an early-mid seral stage with dominance of blue grama, while another ecoplot outside of broken land on a little bluestem/threadleaf sedge HT was at a mid-early seral stage with blue grama and buffalo grass dominance.

Sharp-tailed Grouse – There are two known leks within the allotment and two known leks within 1 mile. One lek in the middle of pasture 3, first located in 1999, very recently became inactive. Within the allotment, there are approximately 3,000 to 3,500 acres within the 1-mile proximity radius of the active leks.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed after 2 years.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment so no contribution towards CP funds would be made. Removal or maintenance of existing range infrastructure would be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian condition along Magpie Creek and unnamed springs as described in the Existing Condition would improve and evolve toward desired riparian conditions over time. Improvement would result from the establishment of riparian vegetation which would capture sediment and build stream banks.

Woody Draws – Woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. Existing invasive grasses within woody draws, and potential increases of these species as a result of increasing litter with the removal of livestock grazing, would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock, there would be an increased opportunity for the development of High and Moderate herbaceous structure, and a decrease in the quantity of Low herbaceous structure in the allotment.

Seral Stages – The removal of livestock grazing would have the potential to facilitate shifts towards late seral stages. However, increasing invasive grasses and transitions to Invaded Grass States would occur with the removal of livestock grazing and the accumulation of plant litter, thereby impeding the development of late seral stages and decreasing the maintenance of native plant communities. Transitions would occur in portions of the allotment within ten years, while other areas might require as long as 15 years due to lower amounts of invasive grasses.

Sharp-tailed Grouse – The projected increase in potential High structure herbaceous grasslands from the removal of livestock would appreciably enhance nesting and brooding habitat for sharp-tailed grouse.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by a turn-in grazing association permit (common allotment), and Authorized Use is 1,666 federal AMs.

- Cow/calf pairs are ran in a modified deferred rotation.
- See allotment map in Appendix B for current range developments.

Range – Existing federal AMs permitted to the grazing association would continue. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian conditions along Magpie Creek and unnamed springs as described in the Existing Condition would continue.

Woody Draws – The proportion of 47 percent Healthy woody draws among the sampled sites would persist or gradually decrease under current management in which existing conditions developed. Developed springs and reservoirs adjacent to woody draws would continue to result in high browsing and trampling disturbances that impedes the regeneration of woody species. Authorized Use that exceeds initial estimated carrying by 10 percent after adjusting for cow size would contribute to the potential for high browsing and trampling disturbances.

Herbaceous Structure – Current management is projected to continue to approximate the existing herbaceous structure distribution and provide limited opportunities to improve the herbaceous structure distribution, particularly increase the proportion of High herbaceous structure. An Authorized Use that is 10 percent higher than initial estimated carrying capacity could contribute to the conditions.

Seral Stages – Continuation of current management and grazing rotations would maintain the persistence of native dominated communities with a predominance of mid seral stages in primary areas of use and some occurrences of late seral stages in secondary range. However, invasive grasses measured in most of the sample plots would have a high potential to continue increasing. Authorized Use that exceeds initial estimated carrying capacity by 10 percent after adjusting for cow size, frequent premature spring grazing, and twice-over rotations in some pastures have the potential to decrease plant vigor and assist invasive grass spreading. Areas of crested wheatgrass or Invaded Grass States with low palatability during a large portion of the grazing season would compound these effects by increasing the level of native grass utilization.

Sharp-tailed Grouse – Existing management would not enhance High structure herbaceous grasslands and limit the potential to enhance potential grouse nesting and brooding habitat. An Authorized Use that is 10 percent higher than initial estimated carrying capacity could contribute to the conditions by limiting residual cover.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 1,666 federal AMs

- Repairing existing water developments which would offer more management opportunities.
- Installing a cross fence in pasture 1 and implementing a four-pasture deferred rotation.
- Fencing out two spring areas, installing check valve to dump water back into riparian areas once stock tanks are full.
- Moving existing water tanks away from seeps/boggy areas.

ADAPTIVE OPTIONS:

- Increasing livestock numbers and shortening season of use.
- Adjusting Authorized Use.

Range

Initial Actions – Because the initial Authorized Use would remain the same as current management, the permittees would be allowed to harvest the same amount of forage. However, the use of these AMs would be different than the existing condition.

Repairing the neglected water developments would improve the distribution of by reducing the distance to water which would reduce grazing pressure on current dependable water sources.

Installing a cross fence in pasture 1 would change the livestock distribution because the pasture would be split into two smaller pastures. Implementing a four-pasture deferred rotation after the installation of this cross fence would allow for more flexibility in controlling livestock distribution, allowing for longer periods of deferment which would provide opportunities for initial growth and/or regrowth of herbaceous species.

Fencing out spring areas, installing check valves, and moving existing stock tanks away from seeps/boggy areas, would not have an effect on the livestock distribution throughout the allotment. However, this action would aid in diverting livestock use away from these areas.

Adaptive Options – Increasing livestock numbers and shortening the grazing season would require permittees to find other pastures to graze "off permit" before they go back to their associated headquarters allotments. This action would allow for a longer recovery period for native herbaceous species and the flexibility in increasing the deferment of grazing. However, the same amount of forage would be harvested from the allotment which has the potential of changing the distribution due to climatic conditions and palatability of herbaceous species.

Adjusting Authorized Use downward would result in fewer livestock numbers, less grazing days, or a combination of these, due to the turn-in permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock but the amount of forage harvested would be less than the existing forage harvested.

Riparian

Initial Actions – Repairing existing water developments would benefit riparian conditions along Magpie Creek by pulling livestock away from the riparian corridor and reducing pressure on the creek for a water source. Riparian conditions would improve by minimizing trailing and trampling and allowing for herbaceous and woody riparian vegetation recovery.

The four-pasture deferred rotation should lead to longer recovery periods and improved plant health and riparian conditions within the corridor. The key would be to control the length of each grazing period, especially in those pastures that are used during the warm season.

The exclusion of livestock from the springs would benefit associated riparian habitat by the removal of livestock use and trampling. Returning excess water to the riparian area would maintain riparian habitat at the source.

Moving existing water tanks away from seeps/boggy areas would improve riparian conditions by reducing livestock trampling and use.

It is expected that desired conditions on Magpie Creek would be achieved in 10 to 15 years.

Adaptive Options – Increasing livestock numbers and shortening the season of use should benefit riparian conditions by reducing the duration of livestock use. Riparian conditions would improve by minimizing trailing and trampling and allowing for herbaceous and woody riparian vegetation recovery.

Reducing Authorized Use should help improve the uplands vegetation which in turn reduces overland flow further benefitting the riparian conditions along Magpie Creek. A reduction in overland flow would result in reduced stream velocities and allow for the establishment of riparian vegetation which would build stream banks.

It is expected that desired conditions on Magpie Creek would be achieved in 5 to 10 years.

Woody Draws

Initial Actions – Reconstructing two developed springs by moving the water tank further from the spring source that would be fenced, and installing check valves that would maintain flow at the spring when the water tank is full, would improve ecological conditions of the springs and contribute to Grasslands Plan objectives for restoring or maintaining 80 percent of riparian habitat in high ecologic condition. Portions of woody draw habitat adjacent to the spring and within the fenced exclosure would also increase in condition, but trailing and browsing impacts along the drainages and adjacent woody draws would continue at some degree depending on final placement of the water tank. The tanks could be managed to control livestock access and distribution and limit the degree of woody draw disturbances around the reconstructed sites. However, three other developed springs and at least three reservoirs would remain unmanaged and contribute to continued woody draw impacts.

Repairing poorly functioning water developments would have the potential of increasing the evenness of livestock distribution, thereby decreasing woody draw disturbances in some areas but increasing disturbances in others.

Splitting pastures 1 and 2 that are presently managed as one pasture, and implementing a four-pasture deferred rotation rather than the current twice-over rotation, could facilitate slight improvement in woody draw conditions by decreasing the period of time that livestock have access to draws in an individual pasture. However, potential shifts from At Risk to Healthy woody draw conditions would be unlikely to occur among a large portion of the sampled communities. Woody draw disturbances could decrease in the first pasture of the rotation as a result of cooler

temperatures and fewer insect pests, and would alternately benefit individual pastures according to the deferred rotation. However, the extended grazing season would maintain the potential for woody draw disturbances during the heat of summer, as well as during cooler fall temperatures when livestock browsing of woody species can increase (Uresk 1986). Pasture 2 is only one-third the size of the two largest pastures and would therefore decrease the degree of shorter grazing periods among the other pastures. Additionally, more than half of pasture 2 consists of rugged terrain with the primary area of use accessed along a drainage with an extensive woody draw that is likely to be in a Healthy condition as a result of low levels of current use. Thus, there would be a high potential for decreasing woody draw conditions in this area.

Potentially increased stocking to the level of Authorized Use that exceeds currently reported use by 0 to 20 percent would contribute to decreasing woody draw conditions.

Adaptive Options – Decreasing the period of grazing with increased livestock numbers could increase the intensity of woody draw disturbances. Decreased woody draw disturbances might occur in the first pasture of use each season as a result of cooler temperatures and fewer insect pests, but the deferred rotation would result in a low frequency of this advantage among individual pastures and would therefore decrease the potential for improved conditions. Sufficiently shortened grazing seasons could alleviate fall browsing of woody species, but the increase in summer livestock density would ensure continued woody draw disturbances.

Decreasing Authorized Use would facilitate increased woody draw conditions by decreasing browsing and trampling disturbances, but reported levels of current use that are often less than Authorized Use would decrease the degree of potential benefit.

Herbaceous Structure

Initial Actions – The proposed Authorized Use exceeds the initial estimated carrying capacity by 10 percent accounting for cow size could limit the level of residual cover by fall. The effectiveness of installing a cross fence and implementing a four-pasture deferred rotation would be limited by the proposed Authorized Use, because of the uniformity of use associated with smaller pastures, and limiting regrowth periods. In addition, much of pasture 2 would be dominated by badlands terrain (southern portions of section 32 and eastern portion of section 29) and would be generally unavailable and unproductive. Fencing/installing check valves at two spring areas is not expected to affect herbaceous structure distribution because the water would still be available and livestock use would still occur. Moving stock tanks from the seeps/boggy areas is not expected to appreciably change the spatial arrangement or the quantities of herbaceous structure, due to the short distance that tanks are expected to be moved. The effects to the adjacent uplands would be displaced from the current location to the new location.

Adaptive Options – Adjusting the Authorized Use would be the most effective tool available to manipulate herbaceous structure by increasing the amount of residual cover near the end of the grazing season. Increasing numbers and shortening the season could have potential to lengthen regrowth periods but the effectiveness to improve herbaceous structure distribution would be limited under the initially proposed Authorized Use level.

Seral Stages

Initial Actions – Reconstructing two developed springs would allow increased control of livestock distribution and utilization with the potential for contributing to a mosaic of desired seral stage proportions. However, three other springs and three reservoirs would remain unmanaged and decrease the potential for controlling livestock distribution across the allotment.

Consistent stocking at the level of Authorized Use that exceeds initial estimated carrying capacity by 10 percent after adjusting for cow size, and that has ranged from 0 to 20 percent greater than reported use, would impede the development or maintenance of late seral stages. Low palatability of invasive grasses occurring during frequent grazing seasons in each pasture would contribute to selective use of native grasses and impede the development of late seral stages.

Dividing pastures 1 and 2 with a cross fence would have only a small effect on increasing livestock distribution due to rugged secondary range comprising a large portion of pasture 2. However, implementing a four-pasture deferred rotation would increase opportunities for plant recovery and the completion of critical growth periods compared to the current three-pasture rotation that usually includes a twice-over rotation. Potential increases in plant vigor would be further assisted by delaying turn-in until June 1st by allowing for the completion of critical early-season growth periods. However, the effect of low invasive grass palatability would be increased by delaying turn-in until June 1st or range readiness onto the native dominated allotment, thereby maintaining or increasing selective use of the native component.

Adaptive Options – Compressing the grazing season with increased livestock numbers would increase the evenness of livestock distribution and potentially contribute to increased use and decreasing seral stages in secondary range. However, there would be an increased potential for plant recovery and regrowth and the completion of critical growth stages compared to the current grazing system.

Decreasing Authorized Use would facilitate shifts towards late seral stages by decreasing the level of grazing and trampling disturbances, but reported levels of current use that are often less than Authorized Use would decrease the degree of potential benefit.

Sharp-tailed Grouse

Initial Actions – The proposed Authorized Use exceeds the initial estimated carrying capacity by 10 percent, accounting for cow size, which would limit the level of residual cover that could be carried over the winter for grouse nesting needs. Installing a cross fence and implementing a four-pasture deferred rotation to improve potential grouse habitat would be limited by the proposed initial Authorized Use, increased uniformity of herbaceous vegetation associated with the smaller pastures, and limiting regrowth periods. Fencing two spring areas is not expected to affect livestock distribution appreciably because the tanks will remain in the same location. Moving stock tanks from the seeps/boggy areas is not expected to appreciably change the spatial arrangement or the quantities of potential grouse habitat, due to the short distance that tanks are expected to be moved.

Adaptive Options – Adjusting the Authorized Use would be the most effective tool available to manipulate herbaceous structure by increasing the amount of residual cover that could be carried over the winter for grouse nesting needs the following spring. Increasing numbers while shortening

the season could have potential to lengthen regrowth periods but the effectiveness to improve grouse habitat would be limited under the proposed initial Authorized Use level.

Effects of Alternative 3A

The effects of Alternative 3A are the same as Alternative 3 with the following stated exceptions.

INITIAL ACTIONS:

- Dropping the initial action of fencing out spring areas and installing check valve to dump water back into riparian areas once stock tanks are full.

ADAPTIVE OPTIONS:

- The adaptive options and effects in Alternative 3A are the same as Alternative 3 except as stated above.

Range

Initial Actions – This action would continue current management for the spring developments and would have no effect on Authorized Use or livestock distribution.

Riparian

Initial Actions – Continued livestock access to the springs would result in the existing level of livestock use and trampling. If the check valves were not installed, excess water would be lost through the over flow and not returned to maintain the riparian habitat at the source.

Woody Draws

Initial Actions – Wetland habitat and adjacent woody draw conditions would decrease around two springs that would be reconstructed without fencing and without reconstructing the plumbing system to maintain flow at the spring when the water tanks are full. The majority of spring flow would be collected and overflow the tank site onto non-wetland habitat that would be heavily trampled by livestock. Wetland habitat around the spring would decrease under drier conditions with the removal of most spring flow that would be piped to the water tank located further from the collection area. Furthermore, it would not be possible to control flow to the tank in order to manage livestock distribution in the surrounding pasture. Thus, conditions of the spring habitat and adjacent woody draws would remain similar or decrease relative to current conditions (Figure 301.2).

Herbaceous Structure

Initial Actions – Not placing check valves on the springs would not change livestock distribution and so would not generally change the existing herbaceous structure distribution.

Seral Stages

Initial Actions – Relocating spring fed water tanks further from the collection area without reconstructing the plumbing system so that flow to the tank can be controlled would remove the potential for managing livestock distribution and utilization and facilitating the desired proportion of seral stages in the affected pastures. Not fencing the site of the spring collection area and current wetland habitat would decrease the potential for maintaining any semblance of the wetland

community that remains after piping the large majority of the spring flow to the re-located water tank, but would have no affect on upland seral stages.

Sharp-tailed Grouse
Initial Actions – Not placing check valves on the springs would not generally change livestock distribution and so would not change existing grouse habitat conditions.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.

ADAPTIVE OPTIONS:

- Constructing a 42-acre riparian exclosure on Magpie Creek in pasture 1, Section 20 (Reach 1).

Range
Initial Actions – Authorized Use for this allotment would be 1,734 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 1,666 federal AMs converted to AUMs by adjusting for cow size is 1,916 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a nine percent reduction in AUMs from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season when planning the rotation for the allotment.

Adaptive Options – Constructing a 42-acre exclosure on Magpie Creek in pasture 1 would remove livestock grazing within the exclosure. Because of the size of the exclosure and their associated available federal AUMs, an adjustment in Authorized Use would be necessary. Due to the overall size of pasture 6 and location of existing livestock water developments there would be minimal changes in livestock distribution but grazing intensity around the exclosure would increase.

Riparian
Initial Actions – The Authorized Use is adjusted from 1,666 AMs to 1,734 AUMs. Reducing Authorized Use should help improve the uplands vegetation which reduces overland flow further benefitting the riparian conditions along Magpie Creek. A reduction in overland flow delivered to the creek would result in reduced stream velocities allowing for the establishment of riparian vegetation that build stream banks.

It is expected that desired conditions on Magpie Creek would be achieved in 5 to 10 years.

Adaptive Options – The 42-acre riparian exclosure proposed for pasture 1 would provide the best opportunity for riparian vegetation to reestablish itself in the least amount of time by excluding livestock from the riparian corridor in areas treated and the related effects such as trailing and trampling. Typically areas recommended for exclosures have been chronically overgrazed or

trampled by livestock trailing, and there is currently insufficient vegetation to protect banks and channels from erosion. The use of riparian pastures and exclosures has proven to be effective in the Little Missouri Badlands (e.g., note the riparian response within the exclosures along Ash Coulee) in reestablishing desired riparian vegetation and controlling sediment loads.

It is expected that desired conditions on Magpie Creek would be achieved in 2 to 5 years.

Woody Draws

Initial Actions – Decreasing Authorized Use by 9 percent according to initial estimated carrying capacity and adjustments for cow size would slightly assist improved woody draw conditions by decreasing the level of browsing and trampling disturbances. However, the proposed level of use would range from nine percent greater to ten percent less than currently reported use, thereby reducing the potential degree of benefit. As discussed under Alternative 3, the four-pasture deferred rotation would be unlikely to shift At Risk woody draws to Healthy. The location of several developed springs and reservoirs with uncontrolled access would continue to impede improved conditions of adjacent woody draws.

Adaptive Options – Constructing a 42-acre riparian exclosure in pasture 1 would facilitate the improvement and increase in extent of woody draw patches along the perimeter of the exclosure, depending on its location, by removing or greatly decreasing the frequency of livestock browsing and trampling disturbances.

Herbaceous Structure

Initial Actions – Balancing the Authorized Use with the initial estimated carrying capacity and accounting for cow size could result in increased levels of residual cover at the end of the year and an improved herbaceous structure distribution. A more balanced Authorized Use would permit the other tools to be more effective.

Adaptive Options – Construction of a 42-acre riparian exclosure could have mixed results but is expected to improve the vegetative structure conditions within the exclosure. However, the small size would not make an appreciable difference in the overall herbaceous structure distribution for this large allotment.

Seral Stages

Initial Actions – Decreasing Authorized Use by nine percent according to initial estimated carrying capacity and adjustments for cow size would facilitate slight shifts towards late seral stages by decreasing the level of grazing disturbances. However, the proposed level of use would range from nine percent greater to ten percent less than currently reported use, thereby reducing the potential degree of benefit. The four-pasture deferred rotation and June 1st turn in dates would contribute additional benefits to plant vigor and facilitate shifts towards late seral stages as discussed under Alternative 3, with an increased potential to achieve seral stage objectives. The potential for invasive grasses to increase would persist, and decreased palatability of the invasive component with the delayed turn-in date would maintain or increase selective use of the native component.

Adaptive Options – Constructing a 42-acre riparian exclosure along Magpie Creek would have little influence on seral stages outside the exclosure. The potential would occur for the development of late seral stages along the perimeter of the exclosure by removing or greatly decreasing the

frequency of livestock grazing disturbances, but the increase in plant litter would facilitate invasive grass increases.

Decreasing Authorized Use would increase the potential for shifts to late seral stages compared to Alternative 3 because of the lower starting point or level of Authorized Use, but invasive grasses would have the potential to increase with increasing plant litter at sufficiently reduced levels of use.

Sharp-tailed Grouse

Initial Actions – Balancing the Authorized Use with the initial estimated carrying capacity and accounting for cow size could result in increased levels of residual cover at the end of the year for spring grouse nesting needs the following year. A more balanced Authorized Use could permit the other tools to be more effective.

Adaptive Options – Construction of an approximately 42-acre riparian exclosure could have mixed results but is expected to improve the vegetative habitat conditions within the exclosure. However, the small size could create an ecological sink for individual grouse plus the small size of the exclosure would not make an appreciable overall positive effect for grouse habitat.

ALLOTMENT 302

Table 302.1 — An existing summary of management areas, land ownership acreage, permitted livestock, initial estimated carrying capacity, and number of pastures for Allotment 302 in the North Billings County AMP Revisions project area

Summary	Acres	Percent	Number
Management Area 1.31 – Backcountry Recreation Non-motorized	563	25	
Management Area 2.1 – Special Interest Areas	239	11	
Management Area 3.65 – Rangelands With Diverse Natural-Appearing Landscapes	545	24	
Management Area 6.1 – Rangeland With Broad Resource Emphasis	905	40	
Total allotment acres	4,398	100	
NFS acres	2,253	51	
State land acres	467	11	
Private land acres	1,678	38	
Current permitted livestock grazing (AMs) on NFS lands			1,044
Initial estimated carrying capacity (AUMs) on NFS lands			1,051
Number of pastures containing NFS lands			2

Table 302.2 — Allotment 302 – Key issues, existing condition, need for action

Key Issues	Existing Condition	Need for Action
Riparian	Magpie Creek 98-99 Survey –PFC 2004 Survey – FAR-NA 2006 Survey - PFC	Maintain PFC
Woody draws	50 percent of the sampled woody draws are Healthy, 40 percent are At Risk, and 10 percent are Unhealthy. Main concern is lack of regeneration. The Unhealthy woody draws are associated with water.	Increase survival rate for seedlings and saplings
Herbaceous structure	Transect Results: Low – Exceeding Objectives Moderate – Below Objectives High – Below Objectives 2004 Transects: 1.11; 1.2; 1.08; 1.15; 1.26; 1.91 2004 Stations percent: Low-78.3/Moderate-21.7/ High-0.0 2005 Transects: 1.85; 1.76 2005 Stations percent: Low-47.5/Moderate-50/High-2.5	Manage for additional Moderate and High structure on biologically capable habitats.
Seral stages	All seven sample sites were at mid seral stages with light to moderate amounts of invasive grasses. 18 and 31 percent broken land in the two pastures with varying mixtures of invasive and native grasses.	Maintain or increase native communities while increasing early and late seral stages. Limit the spread of invasive grasses.
Sharp-tailed grouse	There are three leks within 1 mile of the allotment and there are none within the allotment that are known to be active on a regular basis.	Manage to enhance sharp-tailed grouse nesting and brooding habitat by increasing the quality and quantity of High vegetative structure on biologically capable sites.
Remarks	Trace of Canada thistle and burdock. There is a population of black cottonwood (*Populus acuminata* Rydb.) on this allotment.	

Table 302.3 — Allotment 302 by alternative

Alternative 2 - Current Management	Alternative 3 - Proposed Action Alternative 3A	Alternative 4
• Authorized Use is 1,044 federal AMs • Three-year average permitted use is 966 federal AMs.* • Permit type: Turn-in (common allotment). • Rotation: Modified deferred rotation • Class(s) of livestock: Cow/calf pairs. • See allotment map in Appendix B for current range developments.	**Initial Actions** • Authorized federal AMs: 1,044 • Annually change season of use between pastures 1 and 2. • Fence three reservoirs to control access to water in pasture 2. **Adaptive Options** • Adjust Authorized Use. • Temporarily fence crested wheatgrass areas and early graze once every 3 years.	**Initial Actions** • Authorized federal AUMs: 1,051 • Change season of use between pastures 1 and 2. Temporarily fence crested wheatgrass areas and graze early every third year (see Allotment 130). • Fence three reservoirs to control access to water in pasture 2. Manage tank and reservoirs to control animal distribution. **Adaptive Options** • Adjust Authorized Use.
Monitoring • Review annual planned management identified in allotment worksheets. • Conduct annual allotment inspections to monitor current management. • Conduct annual fall tour inspections to determine next season's management needs.	**Monitoring** • Survey woody draws once every 3 to 5 years. • Gather Visual Obstruction Readings annually for 3 years then reevaluate survey frequency. • Complete Properly Functioning Condition survey once every 5 years. • Collect vegetative composition data once every 3 to 5 years.	**Monitoring** • Same as Alternative 3

***Medora Grazing Association 3-year average permitted use based on permits for the years 2005 through 2007. Year 2005 included a mandatory drought reduction**

Allotment 302 — Existing Condition

Range – This allotment is approximately 4,398 acres in size, including 2,253 acres of NFS lands. The allocated AMs for this allotment are divided among two permittees. Currently, the common is permitted through each permittee's associated headquarters permit by the MGA. Current AMs provided by NFS lands can be found in Table 302.1. This allotment is located in both the Badlands and the Rolling Prairie geographic areas. This allotment has been subdivided into two pastures and range from 2,013 to 2,385 acres. Water developments include reservoirs, a pipeline system with stock tanks, and a spring with Magpie Creek running through the southern end of the allotment.

Prior to 1974, portions of this allotment were part of the historical Magpie Common which included several more permittees.

The current rotation has been somewhat of a deferred rotation. However, both permittees have been allowed to rotate through one of the pastures twice. The permittee from Allotment 130 normally turns onto pasture 1 around May 5th with 138 head for 15 to 16 days. The second permittee, from Allotment 131, turns into the common around June 1st with 134 head and, depending on which pasture the other permittee starts in, rotates into the other pasture around the same time. The number of days each permittee grazes in the pasture varies. A review of their allotment worksheets shows times when one would rotate pastures and the other would stay in the first pasture for several more days. The permittee from Allotment 131 adjusts his days to come back to pasture 2 if they started in this pasture first. Another challenge within this allotment is the historical use in areas within each pasture due to the location of past/existing reservoir locations. The eastern portion of pasture 2 and the northern portion of pasture 1 show evidence of heavier use and also cultivation during the homesteading era.

Pasture 1 is the larger of the two pastures in this allotment, and consists of mostly private land with smaller portions of NFS and state lands. The northern NFS lands in this pasture consist of mostly crested wheatgrass with some native graminoid species. The evidence of past cultivation is persistent on the gently rolling topography. The plant community switches to a more native species component on the slopes leading down to Scairt Woman Draw. Distribution is the heaviest on the crested wheatgrass/native areas but livestock use is more moderate dropping down into Scairt Woman Draw. The southeastern portion containing NFS land is made up of crested wheatgrass and native mix with a more native species component moving into the woody draws and steeper slopes.

Pasture 2 consists of primarily NFS lands, with a smaller portion of private land. Past oil field activity and cultivation is prevalent in the eastern portion of this pasture. The southeast to east side is a mosaic of crested wheatgrass with a native understory, primarily blue grama, with a little western wheatgrass and needle-and-thread and clubmoss. Hillsides and hilltops have patchy communities of little bluestem, sideoats grama, and creeping juniper, especially the sandy ecological sites. The lowlands and midlands have a western wheatgrass and green needlegrass plant community. The high use area with crested wheatgrass made up most of southeastern to eastern area of the pasture. North and east of road, the plant community turns into a native mix, with small patches of crested wheatgrass in areas of past or existing oil activity. The northwest/western edge of the pasture is considerably rougher and has a more native plant community.

Sharp-tailed grouse were observed within pasture 2 during the allotment. Western snowberry patches are also prevalent throughout this allotment.

The noxious weed analysis (GIS Weed Layer 1992–2004) indicated that there were no known state-listed or county-listed noxious weeds within this allotment. However, during the woody draw surveys, a trace of Canada thistle was identified. Increased oil and gas activity and other uses on the grasslands can provide potential for other invasive and noxious. Within this allotment there is a potential for 10 of 12 state-listed and the county-listed noxious weeds.

Oil and gas development on NFS lands in this allotment has removed approximately 14.1 acres from livestock access. Approximately 22.9 acres of oil and gas pads and access roads have been reclaimed and are or will be available for livestock access. Associated forage from these acres is approximately 6.4 and 10.4 AUMs, respectively.

Riparian –

Allotment-Pasture	Stream (reach)	Riparian Functionality Rating (miles)					Total
		PFC	FAR-U	FAR-NA	FAR-D	NF	
302-01	Magpie Creek (1c)	0.28					0.28
302-01	Magpie Creek (2)	0.22					0.22

Magpie Creek flows through pasture 1 of Allotment 302. Magpie Creek has a functionality rating of PFC and is at desired condition.

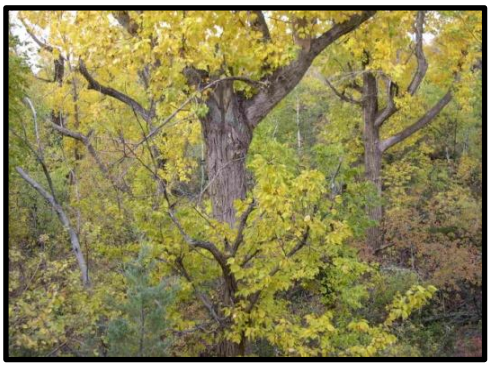


Figure 302.1 — Stand of black cottonwood in Healthy woody draw of pasture 2.

Woody Draws – Of the 10 woody draws sampled, 50 percent were Healthy, 40 percent were At Risk, and 10 percent were Unhealthy. Two woody draw samples in pasture 1 were Healthy and At Risk. Of eight woody draw samples in pasture 2, 50 percent were Healthy, 38 percent were At Risk, and 12 percent were Unhealthy. A population of black cottonwood that is uncommon on the Little Missouri National Grasslands occurred in one of the draws and was Healthy (Figure 302.1).

Herbaceous Structure – In 2004, six randomly selected herbaceous dominated VOR transects were surveyed. Five of the transects were measured in the Low structure class, and one transect was measured in the Moderate class. No High structure transects were measured. The consolidated station averages were Low structure stations at 78.3 percent and Moderate stations at approximately 21.7 percent. No stations were measured in the High structure category.

Two transects were re-surveyed in 2005. Both were measured in the Moderate structure class. The station data showed 47.5 percent of the stations were in the Low structure class, 50 percent of the stations were Moderate, and 2.5 percent of the stations were in the High structure class.

Seral Stages – NFS land comprises 640 acres, or 27 percent of pasture 1 (which is 2,385 acres), and occurs in two main parcels and two minor parcels along the pasture edges. Broken land constitutes about 31 percent of NFS land and occurs in each of the two large NFS parcels.

The sample revealed that a sere plot on the edge of broken land at the north end of pasture 1 was at a mid seral stage, with high amounts of needle-and-thread and native grasses exceeding crested wheatgrass in basal cover. Light amounts of invasive grasses were present. A repeated pace transect in this area indicated an increase in relative plant frequency of needle-and-thread from 3 percent to 14 percent between 1978 and 2010, and a decrease in Kentucky bluegrass from 17 percent to 12

percent. A Robel transect located in the interior of broken land recorded crested wheatgrass as the dominant species, with patches or red three-awn, Kentucky bluegrass, and needle-and-thread.

Most broken land in the south parcel of NFS land did not appear to be seeded to crested wheatgrass, and a sere plot was at a mid seral stage with western wheatgrass, sedge, and blue grama dominance. Kentucky bluegrass constituted about 13 percent of the relative grass basal cover. Relative plant frequency of Kentucky bluegrass increased from 3 percent to 19 percent along a repeated pace transect in this area between 1978 and 2010, while relative frequency of western wheatgrass decreased by a similar amount. A belt transect outside of broken land recorded sedge and needle-and-thread as the dominant grasses. A Robel transect on a small parcel of NFS land on the west edge of the pasture recorded sedge and western wheatgrass as the dominant species.

NFS land comprised 78 percent of pasture 2, with about 18 percent of this consisting of broken land in three parcels. Vegetation samples were more numerous in this pasture and are summarized below.

- An ecoplot in the north parcel of broken land was at a mid seral stage with equal cover of crested wheatgrass and blue grama. A nearby Robel transect recorded crested wheatgrass, red three-awn, and Kentucky bluegrass.
- An NDSU plot on a Loamy ES at the north edge of the pasture was at a mid-early seral stage with dominance of needle-and-thread and sedge. Bluegrass occurred at a frequency of 50 percent and comprised 14 percent of the grass production.
- An NDSU plot on a Clayey ES in the east-central portion of the pasture was at a mid seral stage but appeared to cross into a Thin Loamy ES. Kentucky bluegrass, Canada bluegrass, and annual brome frequency were 23 percent, 10 percent, and 7 percent respectively.
- An NDSU plot on a Sandy ES near the edge of broken land at the south end of the pasture was at a mid seral stage. Sedge appeared to be overwhelmingly dominant but a diverse mixture of species was present and the site had experienced about 50 percent utilization. Kentucky bluegrass comprised about 23 percent of the grass biomass.
- An ecoplot from 1998 on the southwest corner of the above parcel of broken land was at a late-mid seral stage with equal dominance of crested wheatgrass and green needlegrass. A current belt transect measured on this site recorded western wheatgrass, Junegrass, and sedge.
- An ecoplot in unbroken land in the east-central portion of the pasture was at an early seral stage with 80 percent relative cover of blue grama. A belt transect measured at this site recorded blue grama, sedge, and Junegrass.
- Two additional Robel transects measured in unbroken land recorded native grasses as the dominant species.

Sharp-tailed Grouse – There are three leks within 1 mile of the allotment and there are none within the allotment that are known to be active on a regular basis. The area encompassed by the overlap is between 300 to 500 acres.

Effects of Alternative 1

INITIAL ACTIONS:

- After notification to the affected permittee, all livestock would be removed 2 years later.
- Most range infrastructure would begin to be removed concurrently.

Range – A 100 percent reduction in the existing federal AMs permitted to the grazing association would occur. No grazing fees would be collected from this allotment so there would be no contribution towards CP funds. Removal or maintenance of existing range infrastructure would be the responsibility of the Forest Service. There is a potential for the spread of noxious weeds because of reclamation of the removed range infrastructures. The Forest Service would be solely responsible for the control of noxious weeds in the allotment. Some noxious weed species spread may decrease due to the removal of livestock as one vector source.

Riparian – The riparian condition along Magpie Creek as described in the Existing Condition would continue and evolve toward the potential riparian community.

Woody Draws – Woody draw conditions would improve with the removal of livestock browsing and trampling disturbances that would facilitate the regeneration and growth of desired woody species. Existing invasive grasses within woody draws, and potential increases of these species as a result of increasing litter with the removal of livestock grazing, would have the potential for slowing or decreasing the degree of woody draw improvement.

Herbaceous Structure – With the removal of livestock there would be an increased opportunity for the development of High and Moderate herbaceous structure, and a decrease in the quantity of Low herbaceous structure in the allotment.

Seral Stages – The removal of livestock grazing would facilitate shifts towards late seral stages, but over time and as litter accumulates with the removal of grazing, invasive grasses would increase and result in transitions to Invaded Grass States with decreased maintenance of native plant communities. Transitions would occur in portions of the allotment within 10 years, while other areas might require as long as 15 years due to lower amounts of invasive grasses.

Sharp-tailed Grouse – The projected increase in potential High structure herbaceous grasslands from the removal of livestock would appreciably enhance nesting and brooding habitat for sharp-tailed grouse.

Effects of Alternative 2

CURRENT ACTIONS:

- Allotment is permitted by a turn in grazing association permit (Common Allotment), and Authorized Use is 1,044 federal AMs.
- Cow/calf pairs are run in a two-pasture modified deferred rotation.
- See allotment map in Appendix B for current range developments.

Range – Continuation of the existing federal AMs permitted to the grazing association would occur. Grazing fees would be collected from this allotment, and contribute towards CP funds. Maintenance of existing range infrastructure would be the responsibility of the grazing association. Noxious weeds control would continue to be cooperatively managed by the Forest Service, grazing association, and county weed boards. Livestock and the associated permit management would continue to be vectors for the spread of noxious weeds.

Riparian – The riparian conditions along Magpie Creek as described in the Existing Condition would continue.

Woody Draws – Continuation of current management would perpetuate or gradually decrease the proportion of 50 percent Healthy woody draws. Less than Healthy woody draws were often situated near developed water sources and would continue to experience high degrees of disturbance, while Healthy draws were located in secondary range with lower degrees of livestock use. Summer grazing periods with a second rotation through the first pasture of use each year would contribute to the degree of woody draw browsing and trampling disturbances. Consistently increased stocking to the level of Authorized Use would contribute to decreasing woody draw conditions compared to typically reported levels of use.

Herbaceous Structure – Current management is projected to continue the existing herbaceous structure distribution and provides limited opportunities to improve structure distribution. An Authorized Use that is 14 percent higher than initial estimated carrying capacity would be contributing to the conditions.

Seral Stages – Continuation of current management would result in the persistence of mid seral stages that were present in all sample plots. Multiple grazing rotations in each pasture provide some opportunity for plants to complete critical growth periods during alternate years. However, premature mid-May grazing during alternate years in each pasture has the potential to decrease plant vigor and production, and a second rotation later in the season can compound these effects. Existing invasive grasses measured in most sample sites have a high potential to increase under current levels of use and premature grazing. Contributions of crested wheatgrass and bluegrass that are of decreased palatability during frequent grazing seasons would increase the level of native grass utilization compared to assumptions of equal forage utilization.

Sharp-tailed Grouse – Existing management would not enhance High structure herbaceous grasslands, thus limiting the potential to enhance potential grouse nesting and brooding habitat. An Authorized Use that is 17 percent higher than initial estimated carrying capacity and the deferred rotation would be contributing to the conditions.

Effects of Alternative 3

INITIAL ACTIONS:

- Authorizing 1,044 federal AMs.
- Annually changing season of use between pastures 1 and 2.
- Fencing three reservoirs to control access to water in pasture 2.

ADAPTIVE OPTIONS:

- Adjusting Authorized Use.
- Temporarily fencing crested wheatgrass areas and early grazing once every 3 years.

Range

Initial Actions – Because the initial Authorized Use would remain the same as current management, the permittee would be allowed to harvest the same amount. The timing of the removal of forage within the pastures would change from the existing condition because of the proposed initial actions. Annually changing the season of use between pastures 1 and 2 may change the distribution of livestock within the pastures, but depends on the use of other management tools, such as supplemental mineral/protein due to the palatability of the herbaceous species. Currently these pastures are made up of both crested wheatgrass and native graminoid species. Without an attractant, livestock would tend to avoid the areas of crested wheatgrass later in the grazing season and put extra grazing pressure on the native species. This action would provide opportunities for initial growth and/or regrowth of herbaceous species in each pasture from year to year.

Fencing off the reservoirs in pasture 2 in combination with the two-pasture deferred grazing system would allow the managers to adjust the timing and duration of livestock grazing within areas of pasture 2.

Adaptive Options – Adjusting Authorized Use downward would result in fewer livestock numbers, less grazing days, or a combination of the two because of the turn-in permit for this allotment. Adjusting Authorized Use would not change the distribution of the livestock, but the amount of forage harvested would be less than the current harvest.

Temporarily fencing and grazing crested wheatgrass areas early one out of every 3 years would allow native grasses the opportunity to reach range. Livestock distribution would change when temporary fencing is installed since livestock would be confined to a smaller area. Livestock grazing pressure would be higher within the fenced off area, and in return, other undesirable species may be utilized.

Riparian

Initial Actions – It is expected that desired conditions along Magpie Creek would continue with the initial actions proposed.

Annually changing season of use between pastures 1 and 2 would have no effect on riparian conditions along Magpie Creek because livestock use on the creek would not increase.

Fencing three reservoirs to control access to water in pasture 2 would have no effect on riparian conditions along Magpie Creek due to livestock being located in a different pasture.

Adaptive Options – It is expected that desired conditions along Magpie Creek would continue with the adaptive options proposed.

Reducing Authorized Use should help improve the uplands vegetation which in turn reduces overland flow, further benefitting the riparian conditions along Magpie Creek. A reduction in overland flow delivered to the creek would result in reduced stream velocities allowing for the establishment of riparian vegetation which would build stream banks.

Temporarily fencing crested wheatgrass areas with early grazing once every 3 years would have no effect on riparian conditions along Magpie Creek because livestock use would not increase.

Woody Draws

Initial Actions – Switching to a deferred rotation from the modified twice-over system would not contribute to appreciable improvement of woody draw conditions because the majority of the grazing season would continue during the warm summer months when livestock are apt to seek woody draw amenities. The close proximity of water sources to several draws would contribute to the persistence of browsing and trampling disturbances.

Fencing three reservoirs in pasture 2 would facilitate the control of livestock distribution and utilization with a degree of decreased browsing and trampling disturbances within adjacent At Risk woody draws that occur around two of the reservoirs. However, woody draws would continue to be sought for shade and escape from insect pests.

Consistently increased stocking to the level of Authorized Use compared to currently reported use would contribute to increased woody draw disturbances and decreased conditions.

Adaptive Options – Decreasing Authorized Use would facilitate increased woody draw conditions by decreasing browsing and trampling disturbances, with the degree of effect proportional to the decrease in use. Planned or reported use has been appreciably less than Authorized Use during 5 of 6 years, so reductions in Authorized Use would have to approach 40 percent to affect a decrease in actual use.

Temporarily fencing crested wheatgrass for early season use once every 3 years would decrease livestock access to woody draws for a short portion of the grazing season. However, this would not be sufficient to shift from At Risk to Healthy woody draw conditions due to the low frequency and short influence of the action.

Herbaceous Structure

Initial Actions – The Authorized Use exceeds the initial estimated carrying capacity by 14 percent, accounting for cow size, which could result in limiting the level of residual cover. The effectiveness of annually changing the season of use would be limited due to the proposed Authorized Use and the inadequate regrowth time available after rotating. Fencing reservoirs to control access could aid in water management. Possible management scenarios could result in promoting a more uneven livestock distribution and improved herbaceous structure heterogeneity but alternative scenarios are not proposed at this time. However, it is projected that the effectiveness of water management would be limited due to the proposed initial Authorized Use level.

Adaptive Options – Adjusting the Authorized Use could have a positive impact on the herbaceous structure distribution by allowing for higher residual cover levels to remain after grazing. Temporarily fencing the crested wheatgrass and grazing early has the potential to improve herbaceous structure. If the fence were retained for the grazing season to allow for the full potential regrowth, higher herbaceous structure could be improved. But if the temporary fence is removed after the focused grazing period (one every 3 years), then it is expected that some use, patch grazing, and trampling would occur within the stand and regrowth would not reach its potential.

Seral Stages

Initial Actions – Switching to a deferred rotation from the modified twice-over system, along with delaying turn-in onto native dominated pastures until June 1st, would increase opportunities for plants to complete critical growth periods and increase in vigor. Potential contributions of crested wheatgrass and invasive grasses that would be of low palatability during the majority of the grazing season at least 2 of every 3 years would contribute to selective utilization of the native component and impede the development of late seral stages. Consistently increased stocking to the level of Authorized Use compared to currently reported use would facilitate shifts towards early seral stages with an increased potential for invasive grass spreading.

Fencing three reservoirs and managing a water tank to control livestock access would allow for management of livestock distribution and utilization, but potentially decrease the mosaic of grazing pressure and seral stages that would contribute to the predominance of mid seral stages.

Adaptive Options – Decreasing Authorized Use would facilitate shifts towards late seral stages by decreasing the level of grazing and trampling disturbances, with the degree of effect proportional to the decrease in use. Planned or reported use has been appreciably less than Authorized Use during 5 of 6 years, so reductions in Authorized Use would have to approach 40 percent to affect a decrease in actual use.

Temporarily fencing crested wheatgrass stands for early season grazing once every 3 years would have the potential of decreasing native grass utilization during the affected year, with potentially increased plant vigor and production. However, shifts towards late seral stages would continue to be impeded by selective use of the native forage component 2 of every 3 years.

Sharp-tailed Grouse

Initial Actions – The Authorized Use exceeds the initial estimated carrying capacity by 14 percent, accounting for cow size, which would result in limiting the level of residual cover with less potential carryover for grouse nesting needs in the spring. The effectiveness of annually changing the season of use would be limited due to the proposed Authorized Use level and the inadequate regrowth time available after rotating, resulting in limited quantities of carry over. Fencing the reservoirs in pasture 2 could aid in a proposed water management system. Water sources could be used to promote uneven livestock distribution and encourage habitat heterogeneity for grouse but alternative scenarios are not proposed at this time. Further, it is projected that this tool would be limited due to the proposed Authorized Use level.

Adaptive Options – Adjusting the Authorized Use could have a positive impact on grouse nesting and brooding habitat by allowing for higher levels of residual cover to be carried over the winter into the following spring for grouse nesting habitat. Temporarily fencing the crested wheatgrass and grazing early (one out of 3 years) has the potential to improve grouse habitat by increasing the amount of carry over in to the following spring for nesting habitat needs. If the temporary fence were retained for the grazing season, allowing for full potential regrowth, habitat could be improved within the crested wheatgrass for 1 year out of 3. But if the fence is removed after the focused grazing period, then it is expected that some use, patch grazing, and trampling would occur within

the stand(s) and regrowth would not reach its potential and less residual cover would be carried over to the following spring to be available for nesting needs.

Effects of Alternative 3A

The actions both initial and adaptive are the same as Alternative 3; therefore, Alternative 3A would have the same effects as Alternative 3 and will not be repeated here.

Effects of Alternative 4

The effects of the actions in Alternative 4 are the same as Alternative 3 with the exceptions of the following changes; therefore, the analysis below focuses on the effects of those actions.

INITIAL ACTIONS:

- Authorized Use in AUMs is set based on initial estimated carrying capacity.
- Changing season of use between pastures 1 and 2. Temporarily fencing crested wheatgrass areas and grazing early every third year (see Allotment 130).
- Fencing three reservoirs to control access to water in pasture 2. Managing tank and reservoirs to control animal distribution.

ADAPTIVE OPTIONS:

- The adaptive options and effects thereof in Alternative 4 are the same as Alternative 3.

Range

Initial Actions – Authorized Use for this allotment would be 1,051 federal AUMs, which is the initial estimated carrying capacity for the allotment. The existing Authorized Use of 1,044 federal AMs converted to AUMs by adjusting for cow size is 1,201 federal AUMs. The effect of setting Authorized Use at the initial estimated carrying capacity equates to a 12 percent reduction in AUMs from existing Authorized Use. Because AUMs are authorized in Alternative 4, the manager would have to factor in the size of the cow when calculating the number of head and the grazing season duration that can be grazed when planning the rotation for the allotment.

Changing the season of use between pastures 1 and 2 and temporarily fencing and grazing the crested wheatgrass areas early every third year would allow native grasses the opportunity to reach range readiness while the crested wheatgrass is being utilized. Livestock distribution would change when the temporary fence is installed since livestock would be confined to a smaller area. Livestock grazing pressure would be higher within the fenced off area, and in return other undesirable species may be utilized as a result. These actions would also provide opportunities for initial growth and/or regrowth of herbaceous species in each pasture from year to year.

Managing livestock tanks and fenced reservoirs would allow managers to adjust the timing and duration of livestock grazing within areas of the pasture thus reducing livestock grazing pressure within the surrounding areas of the existing water developments. However, this would increase the intensity of permittee management to ensure that no one area was over utilized.

Riparian – The effects would be the same as described previously in Alternative 3.

Woody Draws

Initial Actions – Decreasing Authorized Use by 12 percent according to initial estimated carrying capacity and adjustments for cow size would facilitate increased woody draw conditions by decreasing browsing and trampling disturbances. However, the effect of the reduction would be reduced by the new level of Authorized Use that would range from 45 percent greater to 12 percent less than typically reported use.

Effects of the deferred rotation and fencing crested wheatgrass were discussed under Alternative 3 and would not be appreciably different with the reduction in use. The effects of fencing three reservoirs, as well as managing a water tank, would be similar to the effects discussed under Alternative 3.

Herbaceous Structure

Initial Actions – Balancing the Authorized Use with the initial estimated carrying capacity and accounting for cow size could result in increased levels of residual cover at the end of the year and an improved herbaceous structure distribution. A more balanced Authorized Use could permit the other tools to be more effective.

Seral Stages

Initial Actions – Decreasing Authorized Use by 12 percent according to initial estimated carrying capacity and adjustments for cow size would facilitate shifts towards late seral stages. However, the potential effect would be decreased by the new level of Authorized Use ranging from 45 percent greater to 12 percent less than typically reported use. Combining livestock herds and switching to a deferred rotation from the modified twice-over system, along with delaying turn-in onto native grasses until June 1st, would increase opportunities for plants to complete critical growth periods, increase in vigor, and potentially shift towards late seral stages.

Sharp-tailed Grouse

Initial Actions – Balancing the Authorized Use with the initial estimated carrying capacity and accounting for cow size would result in increased levels of residual cover at the end of the year and improved grouse nesting habitat. A more balanced Authorized Use could permit the other tools to be more effective.

SHORT TERM USE/ LONG TERM PRODUCTIVITY

NEPA requires consideration of "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR 1502.16). As declared by the Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101).

Alternative 1, while not having short-term uses, could result in a downward trend on long-term (>15 years) productivity. Northern Great Plains mixed grass prairie evolved with herbivory and fire as disturbances that promote species diversity. Without herbivory, other disturbances such as mowing or prescribed burning would be required to maintain long-term productivity of plant and wildlife species. Alternative 2 could have long-term loss of productivity relative to the effects of invasive grass species invading and replacing native grass communities. This alternative may also see adverse long-term effects in woody draws and riparian areas, and possible sharp-tailed grouse populations due to the low amount of herbaceous high structure which would likely be maintained under this alternative. Alternatives 3 and 3A propose a series of different management actions to address resource concerns but maintain the current Authorized Use level. These alternatives would provide for some improvement for resources not at Desired Conditions. Alternative 4 utilizes a variety of range management actions plus sets authorize used at initial estimated carrying capacity and adjusts for livestock weight. This alternative over the long term should improve the amount of high herbaceous structure and move adversely affected riparian and woody draws towards desired conditions. It should also slow the advance of invasives grasses.

Alternatives 3, 3A, and 4 are adaptive management based. If implementation of initial actions, associated with the different resources don't produce desired results, as determined by monitoring, then other management tools identified in the adaptive options for each allotment and/or the tool box will be available to address those concerns.

UNAVOIDABLE ADVERSE EFFECTS

There are no completely unavoidable adverse effects from any of the alternatives. The only potentially unavoidable effect is the concern over advancing invasive grasses. The complexities of intermingled management, size of invaded areas, disagreement over techniques to address invasive grasses, etc. makes the effective treatment of invasive grasses difficult. So in the term of this project's 10 to 15 years, a possible unavoidable effect may be increases in the amount of invasive grasses in the project area.

IRREVERSIBLE/IRRETRIEVABLE

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a plant or wildlife species or the removal of oil and gas. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as a power line rights-of-way or road.

Existing invasive grasses are having an irretrievable effect on native plant communities. The alternatives would have varying degrees of potential effects on the spread of these grasses. Alternative 1 would remove livestock grazing in the project area. This may allow for a significant expansion in invasive grasses because livestock grazing is a primary tool that can be used to retard or possibly regress invasive grasses expansion. Alternative 2 would continue current management actions which would maintain or possibly see an expansion of invasive grasses. Alternatives 3 and 3A are projected to see some improvement with the best potential results under Alternative 4. Given enough time and the right conditions existing invasive grasses might affect native communities to a point where their restoration is so difficult that it approaches an irreversible lose of native communities.

OTHER REQUIRED DISCLOSURES

NEPA at 40 CFR 1502.25(a) directs "to the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with …other environmental review laws and executive orders."

The Forest Service has consulted with the North Dakota State Historic Preservation Office to ensure compliance with the National Historic Preservation Act.

The project is consistent with Executive Order 12898, issued in 1994, which ordered federal agencies to identify and address the issues of environmental justice (i.e. adverse human health and environmental effects of agency programs that disproportionately impact minority and low income populations). The environmental justice effects analysis is located in the Project Record.

Index

A

alternative, 73, 97, 112, 132, 145, 623
alternatives, 623, 624
AM, 73, 97, 112, 145
AMs, 35, 73, 74, 112, 132, 155, 169, 203, 212, 284, 296, 307, 323, 366, 382, 398, 496, 528, 551, 602, 607
AUMs, 14, 51, 58, 75, 98, 146, 166, 169, 183, 189, 203, 213, 224, 285, 297, 363, 366, 400, 420, 424, 467, 497, 501, 513, 525, 528, 539, 544, 568, 583, 603, 607, 618

C

carrying capacity, 169, 203, 501, 623
Cross fencing, 362

D

deferred rotation, 97, 189, 249, 323, 362, 375, 567, 603

E

erosion, 44, 68, 190, 358, 393, 406, 414, 488, 489, 577, 608

H

herbaceous structure, 623

I

income, 624
invasive grasses, 623, 624
issues, 624

N

noxious weeds, 393

O

overgrazing, 362

P

perennial stream, 317, 448, 614
perennial streams, 317, 448, 614
PFC, 5, 44, 67, 68, 92, 140, 161, 175, 207, 280, 293, 317, 318, 358, 392, 413, 414, 448, 463, 488, 489, 507, 519, 534, 561, 577, 596, 614
plant composition, 375
prescribed burn, 35, 49, 181, 249, 623

W

wildfire, 488, 497
winter feeding, 254
winter grazing, 73, 97, 112
woody draw, 132, 399, 400, 435, 453, 623
woody draws, 323, 453, 623

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Final Environmental Impact Statement

Volume III

North Billings County Allotment Management Plan Revisions

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North Billings County Allotment Management Plan Revisions
Final Environmental Impact Statement

Volume III

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Abstract: This Final Environmental Impact Statement (FEIS) summarizes the North Billings County Allotment Management Plan Revisions project. It describes the purpose and need for the project, issues related to the project, alternatives considered, and the effects of each alternative on the major resource concerns and issues. The purpose of this project is to continue livestock grazing while meeting or moving toward the goals and objectives of the Dakota Prairie Grasslands Land and Resource Management Plan (Grasslands Plan). Significant issues identified for the project include, riparian conditions, herbaceous structure, woody draws, seral condition, and economics. Alternative 1 proposes the cessation of livestock grazing; Alternative 2 proposes to maintain existing management; Alternative 3 proposes to continue livestock grazing in an environmentally acceptable manner using an adaptive management approach and a variety of structural and nonstructural management practices. Alternative 3A was added to the SDEIS in response to public comment on the DEIS and is now part of the FEIS. It proposes the same adaptive management approach but modifies the proposed action by adding or deleting management actions in response to public comment. Alternative 4 is also adaptive management based but utilizes some initial action nonstructural practices not utilized in the other alternatives. The effects of each alternative are described to compare and contrast the alternatives.

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Table of Contents

VOLUME III 1

TABLE OF CONTENTS I

LIST OF TABLES II

CHAPTER 4 CONSULTATION AND COORDINATION 1

PREPARERS AND CONTRIBUTORS 1
DISTRIBUTION OF THE SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT STATEMENT 2

REFERENCES AND LITERATURE CITED 1

GLOSSARY 1

ACRONYMS 1

APPENDIX A ALTERNATIVES 3 AND 3A 1

INITIAL PERMITTEE MEETINGS 1
GRAZING ASSOCIATION BOARD OF DIRECTOR DISCUSSIONS 2
DEVELOPMENT OF ALTERNATIVE 3A 4
SUMMARY OF FS REVIEW OF MGA'S COMMENT – EXHIBIT 2 18

APPENDIX B ALLOTMENT MAPS 19

APPENDIX C SRT RECOMMENDATIONS 1

APPENDIX D GRAZING MANAGEMENT TOOLBOX 1

DROUGHT STRATEGY 1
ADJUST SEASON OF USE 3
ADJUST AUTHORIZED USE 7
ADJUST FOR COW SIZE 9
UTILIZE NON-NATIVE GRASS PASTURES EARLY TO DEFER GRAZING ON NATIVE GRASSES 10
ALLOW EARLY TURNOUT ON NATIVE PASTURES ONE OUT OF THREE YEARS ON INVENTORY PERMITS 12
DEFER NATIVE PASTURE TURN-IN UNTIL JUNE 1ST OR UNTIL DEVELOPMENT OF THE THREE AND A HALF LEAF STAGE FOR KEY GRAMINOID SPECIES 13
REST FOR ONE OR MORE SEASONS 14
REALLOCATION OF PASTURES (CHANGE ALLOTMENT BOUNDARY) 16
CONSTRUCT TEMPORARY FENCE TO CONTROL LIVESTOCK DISTRIBUTION PATTERNS 18
CONSTRUCT OR REMOVE CROSS FENCES 19
CONSTRUCT LIVESTOCK WATER DEVELOPMENT (WELL, PIPELINE, TANKS, WINDMILL, RESERVOIR, DUGOUT, OR SPRING) 20
REMOVE/RECLAIM WATER DEVELOPMENT (WELL, PIPELINE, TANKS, WINDMILL, RESERVOIR, DUGOUT, OR SPRING) 22
MANAGE WATER AVAILABILITY/ACCESS AT WATER DEVELOPMENTS 23
MAINTAIN EXISTING DEVELOPMENTS TO REESTABLISH USE 24
IMPLEMENT DEFERRED GRAZING SYSTEM 24
IMPLEMENT REST-ROTATION GRAZING SYSTEM 28
IMPLEMENT TWICE-OVER GRAZING SYSTEM 29
INCORPORATE PRIVATE "OFF PERMIT" LAND INTO ROTATION 30
FERTILIZE CRESTED WHEATGRASS AREAS 31
HAY OR CUT-&-LEAVE CRESTED WHEATGRASS AREAS 32
INTERSEED PASTURE WITH NATIVE GRASS SPECIES 34
SCARIFY CLUBMOSS AREAS WITHIN A PASTURE 35
IMPLEMENT PRESCRIBED BURNS 36

Mechanical brush management 38
Incorporate a range rider to disperse livestock throughout a pasture (herding) 39
Manage salt and supplement locations 40
Construct fence to create riparian unit – allow grazing under riparian grazing dates 41
Implement BMPs for riparian pastures 42
Restore/enhance riparian vegetation i.e. willow planting 43
Construct/harden stream crossings 44
Construct water gap to limit livestock access on stream 44
Construct fence to exclude livestock from areas of concern (riparian, wooded draws, springs, wetlands, etc) 44
Move winter feeding areas off of National Forest System lands 46
Utilize biological controls for noxious weed control in woody draws 47

APPENDIX E RESPONSE TO COMMENTS for the Draft Environmental Impact Statement 1

INDEX 1

List of Tables

Table 4.1 — List of Preparers 1
Table 4.2 — People and Organizations Consulted 2
Table 4.3 — Individuals To Whom the SDEIS Was Sent 2
Table 4.4 — Agencies and Organizations to Whom the SDEIS Was Sent 3
Table 4.5 — Agencies to Whom an Executive Summary and URL Were Supplied 3
Allotment 14
Initial Actions highlighted in Exhibit 2 of MGA comments 14
FS Response 14

CHAPTER 4
Consultation and Coordination

PREPARERS AND CONTRIBUTORS

The following table identifies the individuals on the North Billings County Allotment Management Plan Revisions interdisciplinary team.

Table 4.1 — List of Preparers

NAME	TITLE	BACKGROUND	ROLE(s)
Jeff Adams	National Environmental Policy Act Specialist	B.S Wildlife Management/Forestry M.S. Natural Resource Management and Planning 30 Years Experience	Co-IDT leader, ensured NEPA compliance, Writer /Editor, wrote Climate Change Report
Jack Dahl	Range Management Specialist	A.S. Wildlife Management B.S. Animal & Range Science with Range Emphasis M.S. Range Science 11 Years Experience	IDT member, Data Collection, Range Analysis, co-author Range Report
Nickole Dahl	Range Management Specialist	B.S. Animal & Range Science with Science Emphasis 11 years experience	Co-IDT leader, Data Collection, Range Analysis, co-author Range Report
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Tam Frager	Editor	A.A. Communications with Writing Emphasis 11 years experience	Edits and Layout
Mark Gonzalez	Grasslands Hydrologist	B.A. Geology, M.S. Geography, M.S. Land Resources, Ph.D. Earth & Planetary Science, 27 years experience	IDT member, Data Collection, wrote Watershed Report
Keith Stockman	Acting Regional Economist	B.A. Economics, M.S. Environmental Science, Ph.D. Applied Wildland Econ. 14 years experience	Ad hoc IDT member, wrote Economics Report.
Arden Warm	Wildlife Biologist	B.S. Wildlife Biology 20 Years Experience	IDT member, Data Collection, wrote Wildlife Report

NAME	TITLE	BACKGROUND	ROLE(s)
Joe Washington	Botanist	B.S. Geology M.S. Range Science 30 years experience	IDT member, Data Collection, Woody Draw and Seral Stage Analysis, wrote Botany Report

The Forest Service consulted the following people and organizations during the development of this environmental impact statement.

Table 4.2 — People and Organizations Consulted

People consulted	Organization they're with
Billings County Commissioners	Cooperating Agency
Board of Directors	Medora Grazing Association
Jeff Dibenedetto	USDA Forest Service, Custer National Forest
Alexis Duxbury	North Dakota Game & Fish Dept.
Mike Ell	North Dakota Dept. of Health
Amanda Gearhart	North Dakota State University
Grazing permittees and lessors	Medora Grazing Association
Dr. John Hendrickson	USDA Agricultural Research Service.
Jeff Printz	Natural Resource Conservation Service
Arron Robinson	North Dakota Game and Fish
Dr. Kevin Sedivec	North Dakota State University
Dan Uresk	USDA Forest Service, Rocky Mountain Experiment Station

DISTRIBUTION OF THE SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT STATEMENT

The Supplemental Draft Environmental Impact Statement (SDEIS) has been distributed to those who provided comment on the DEIS, grazing permittees, and to individuals or organizations who specifically requested a copy of the document. Notice of Availability was published in the Federal Register and a Notice of Comment in the Bismarck Tribune of Bismarck, North Dakota. The SDEIS has also been placed on the internet at
http://www.fs.fed.us/r1/dakotaprairie/projects/index.shtml

Table 4.3 — Individuals To Whom the SDEIS Was Sent

Jerry Anheluk	Albert & Pat Kessel	Dennis O'Brien
James Arthaud	Kevin Kessel	Tim O'Brien
Dale Baranko	Tony Kessel	Tom Osdachuk

Orest Baranko	Roger Klym	Cody & Julie Reis
Don Basaraba	Kurt Kordon	Clint Ridl
Roy Basaraba	Mark Kordon	Dave Rodakowski
Edwin Egly	Roy Krivoruchka	Les Simnioniw
Johnny Ewoniuk	James Lowman	Don Stigen
Harris & Ron Goldsberry	Kasey Malkowski	Cody Tachenko
Marvin Gregory	Pete Malkowski	Steve Tachenko
JoAnne Gregory	Qwain Malkowski	Troy Tescher
Neal Haverluk	Roger Malkowski	Allan Thompson
Dwight Hecker	Pat Marx	Joe & Emily Vesey
Ken Johnson	William Meyer	Tim Wyse
Larry Johnson	Randy Mosser	Cecilia Yourk
Kevin Kanski	Bill O'Brien	

Table 4.4 — Agencies and Organizations to Whom the SDEIS Was Sent

Billings County Commissioners	North Dakota Parks and Recreation Department
Badlands Conservation Alliance	North Dakota State Land Department
Golden Valley Board of County Commissioners	Slope County Commissioners
Little Missouri Grazing Association	Teddy Roosevelt Group of Sierra Club
Medora Grazing Association	U.S. Environmental Protection Agency, Region 8,Denver, CO
ND Chapter of the Society for Range Management	U.S. Environmental Protection Agency, Washington D.C.
North Dakota Game and Fish Department	USDA, National Agricultural Library
North Dakota Department of Health	Western Watersheds Project

The following agencies were supplied an executive summary of the project and web site address for the location of the SDEIS.

Table 4.5 — Agencies to Whom an Executive Summary and URL Were Supplied

Director, Planning and Review Advisory Council on Historic Preservation, Washington, DC
Division Administrator Federal Highway Administration
Deputy Director USDA APHIS PPD/EAD
USDA Natural Resources Conservation Service National Environmental Coordinator, Washington D.C.
Great Lakes Region Regional Administrator Federal Aviation Administration
NOAA Office of Policy and Strategic Planning, NEPA Coordinator
Rural Utilities Service (RUS)

U.S. Army Engr. Northwestern Division
USDA, National Agricultural Library, Beltsville, MD
USDA Office of Civil Rights
U.S. Coast Guard (USCG) Environmental Management CG-443
U.S. Department of Energy Director, Office of NEPA Policy and Compliance
ND Governor's Office
ND Senator Kent Conrad
ND Senator John Hoeven
ND Representative Rick Berg

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Glossary

Glossary

Action Alternative — Alternatives 3, 3A, and 4.

Actual Use — Is the grazing use made on an area by all classes of forage consumers. Including where, how many, what kind or class of livestock, and how long livestock graze on an allotment, or on a portion or pasture of an allotment. (43 CFR 4100.0-05)

Adaptive Management — A type of natural resource management in which decisions are made as part of an ongoing process. Adaptive management involves testing, monitoring, evaluating, and incorporating new knowledge into management approaches based on scientific findings and the needs of society. Results are used to modify management policy.

Adaptive Management (as defined in this EIS) — Adaptive management is defined as a process where land managers implement management practices that are designed to meet LRMP standards and guidelines, and would likely achieve the desired conditions in a timely manner. If monitoring shows that desired conditions, as described by LRMP Direction, are not being met, then an alternate set of management actions, the effects of which are analyzed in this EA, would be implemented to achieve the desired results.

Adjustment — Change in animal numbers, seasons of use, kinds or classes of animals, or management practices as warranted by specific conditions.

Affected Environment — The biological and physical environment that may be changed by proposed actions and the relationship of people to that environment.

Allocation — The assignment of a land area to a particular use or uses to achieve management goals and objectives.

Allotment — A designated area of land available for livestock grazing upon which a specified number and kind of livestock may be grazed under a range allotment management plan. It is the basic land unit used to facilitate management of the range resource on National Forest System lands, including national grasslands.

Allotment Management Plan (AMP) — The document containing the action program needed to manage the range resource for livestock utilization, and possibly wildlife utilization, while considering the soil, watershed, wildlife, recreation, timber, and other resources in a range allotment.

Alternative — A combination of management prescriptions applied in specific amounts and locations to achieve a desired management emphasis as expressed in goals and objectives. One of several policies, plans, or projects proposed for decision-making. An alternative need not substitute for another in all respects.

Animal Unit Equivalent — A number relating the forage dry matter intake (oven-dry basis) of a particular kind or class of animal relative to one AU. If intake is not known, it can be estimated from the ratio of the metabolic weight of the animal in question to the metabolic weight of one AU (450 kg to the .75 power).

Animal Unit Month — The amount of feed or forage required by an animal-unit for one month.

Animal Month — A month's tenure upon the rangeland by one animal. Must specify kind and class of animal. Note: This term is not synonymous with animal unit month (AUM).

Animal Unit — Considered to be a mature 1,000-pound cow, either dry or with a calf less than six months old, based on an average daily forage consumption of 26 pounds dry matter per day.

Annual (plant) — A plant that completes its life cycle and dies in one year or less.

Aquatic Ecosystem — An ecosystem (biological and physical components and their interactions) in which water is the principal medium. Examples include wetlands, streams, reservoirs, and areas with plants or animals suited to either permanently or seasonally inundated soils.

Aquifer — A geologic formation capable of transmitting water through its pores at a rate sufficient for water-supply purposes. The term water-bearing is sometimes used synonymously with aquifer when a stratum furnishes water for a specific use. Aquifers are usually saturated sands, gravel, fractures, caverns, or vesicular rock (rock with cavities).

Archeological Resource — Any physical remains of past human life or activities.

At-Risk — Woody draws that do not meet LRMP goals and objectives for desired woody draw conditions. Lack of desired woody species regeneration and low population age structure suggests the potential for the woody draw community to regress from the landscape.

Authorized Use — This is the amount of animals and months, expressed in Animal Months (AMs) or Animal Unit Months (AUMs), that the permittee is authorized to utilize though grazing of livestock for a specific grazing season on an allotment.

Available Forage — That portion of the forage production that is accessible for use by a specified kind or class of grazing animal.

Base Property — This is the original property owned or leased by the original permittee on which grazing privileges were issued and grazing association preference was established.

Belt Transect —A strip, typically 1 m wide, that is marked out across a habitat and within which species are then recorded to determine their distribution in the habitat. A long, narrow, rectangular plot that is divided into regular blocks for the purpose of studying the vegetation and its associated biotic and abiotic factors**.**

Best Management Practices — Land management methods, measures or practices intended to minimize or reduce water pollution as well as practices that result in healthy ecosystems. Usually, BMPs are applied as a system of practices rather than a single practice. BMPs are selected based on site-specific conditions that reflect natural background conditions and political, social, economic, and technical feasibility.

Biennial (plant) — A plant that lives for two years, usually flowering and fruiting only in the second year and then dying.

Big Game — Certain wildlife that may be hunted for sport under state laws and regulations, including elk, mule and white-tail deer, turkey, and bighorn sheep.

Biological Control Agents — Natural organisms, such as animals, insects, diseases, parasites and predators, that reduce pest populations of insects, diseases, and noxious weeds.

Biological Control Methods — Use of natural organisms, such as insects, diseases, parasites, and predators to reduce pest populations of insects or weeds or to control diseases. Methods may include importation and release, conservation of native natural-enemy species, and augmentation (supplementation through rearing and release or genetic improvements) of biological control agents.

Biological Diversity — The full variety of life in an area, including the ecosystems, plant and animal communities, species and genes, and the processes through which individual organisms interact with one another and their environments. Emphasis is on the diversity of native or endemic species.

Biologically Capable — Any site classified as one of the following habitat types: western wheatgrass/green needlegrass, western wheatgrass/needle-and-thread grass, needle-and-thread/sedge, silver sage/western wheatgrass, big sage/western wheatgrass or western snowberry. Sites dominated by crested wheatgrass were also considered biologically capable.

Biomass — The total amount of living plants and animals above and below ground in an area at a given time.

Broken Lands — Lands located in the project area that have been cultivated at some point in the past. Most of the lands were seeded to crested wheatgrass during the 1930s as a soil conservation measure.

Browse — Twigs, leaves, and young shoots of trees and shrubs upon which animals feed: in particular, those shrubs that are utilized by some livestock and big game animals for food.

Butte — An isolated hill with relatively steep sides. A mesa.

Cactus — A spiny, succulent plant of the Cactaceae family.

Candidate Species — Species for which the U.S. Fish and Wildlife Service has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list the species for protection under the Endangered Species Act.

Capable Rangeland — The potential of an area of land to produce resources, supply goods and services and allow resource uses under an assumed set of management practices and at given levels of management intensity. Capability depends on current conditions and site conditions such as climate, slope, landform, soils, and geology, as well as the application of management practices such as silviculture or protection from fire, insects, and disease.

Carrying Capacity (as defined in this EIS and by Society for Range Management) — The average number of livestock and/or wildlife that may be sustained on a management unit compatible with management objectives for the unit. In addition to site characteristics, it is a function of management goals and management intensity

Class of Animal — Description of age and/or sex-group for a particular kind of animal. Example: cow, calf, yearling, ewe, doe, fawn, etc.

Class of Livestock — Type of animal permitted to graze e.g. cow/calf pair, bull, yearling, horse, bison.

Common Allotment (commons) — An allotment where two or more operators are permitted to graze livestock.

Community (Biological) — Any assembly of organisms living together.

Community (Social) — The people who reside in one locality and are subject to the same laws or who have common interests, etc.

Community Stability — The capacity of community to absorb and cope with change without major hardship to institutions or groups within the community.

Complementary Pasture — Short-term forage crop (not necessarily annual) planted for use by domestic stock to enhance the management and productivity of the ranch.

Composition Timing Conflict — Poor coordination of grazing periods with invasive grass palatability when these species comprise significant portions of the potential forage resource. Results in an increased potential for excessive utilization of the native forage component.

Conservation — The aggregate of practices and customs to perpetuate sustained yield of renewable resources and prevent waste of nonrenewable resources.

Conservation Practices — Required land use practices on the national grasslands that are imposed upon the persons or organizations holding grazing permits (including grazing agreements) in order to protect, improve, develop, and administer the land and thus assist in furthering the program of land conservation and good land utilization.

Consumptive Uses — Uses of a resource that reduce the supply. Examples include irrigation, domestic and industrial water use, grazing, and timber harvest.

Continuous Grazing — The grazing of a specific unit by livestock throughout a year.

Continuous Stocking — A method of grazing livestock on a specific unit of land where animals have unrestricted and uninterrupted access throughout the time period when grazing is allowed. The length of the grazing period should be defined.

Cool-Season Plant — A plant that generally makes the major portion of its growth during the late fall, winter, and early spring. Cool-season species generally exhibit the C3 photosynthetic pathway.

Cost — The negative or adverse effects or expenditures resulting from an action. Costs may be monetary, social, physical, or environmental in nature.

Cost Efficiency — The usefulness of specified inputs (costs) to produce specified outputs (benefits). In measuring cost efficiency, some outputs, including environmental, economic, or social impacts, are not assigned monetary values but are achieved at specific levels in the least-cost manner. Cost efficiency is usually measured using present net value, although use of benefit-cost ratios and rates of return may be appropriate.

Council on Environmental Quality — An advisory council to the President established by the National Environmental Policy Act of 1969.

Cover Type — The vegetative species that dominates a site. Cover types are named for one plant species or non-vegetative condition presently (not potentially) dominant, using canopy or foliage cover as the measure of dominance. In several cases, sites with more than one dominant species have been lumped together into one cover type. Co-dominance is not necessarily implied.

Cover/Forage Ratio — The ratio of tree cover (usually conifer types) to foraging areas, such as natural openings.

Crested Wheatgrass Pasture — A grazing unit that is composed of at least 70 percent crested wheatgrass.

Cropland — Land primarily used for the production of cultivated crops.

Cross Fence — A fence that divides an allotment or pasture into smaller units.

Cross Fence (as defined in this EIS) — A temporary or permanent fence used to subdivide a pasture.

Cultural Resources — See Heritage Resources.

Cumulative Effect — The impact on the environment that results from the incremental effect of the action when added to other past, present, and reasonably foreseeable future actions regardless of the source (federal or nonfederal agencies, individuals). Cumulative effects can result from individually minor but collectively significant actions taking place over time.

Cured Forage — Forage, either standing or harvested, that has been naturally or artificially dried and preserved for future use.

Daubenmire Plot Frame — Is a 25 x 50 centimeter (10 x 20 inch) internal dimension frame made out of rebar or PVC which can be randomly thrown in a patch of vegetation to be sampled, systematically placed along a transect, or placed in a randomized grid. Visual estimates are then made of the percent cover of desired vegetation components occurring within the Daubenmire Frame.

Diameter at Breast Height — Diameter at breast height of a tree.

Decadent Tree Layer — Old trees declining in health due to old age, disease, effects of the elements, etc.

Deciduous (Plant) — Plant parts, particularly leaves, that are shed at regular intervals or at a given stage of development; that is, a deciduous plant regularly loses or sheds its leaves.

Decision Documents — Documents that provide the criteria and information used in the formulation and evaluation of alternatives and the preferred alternative.

Decreaser (Plant) — Plant species of the original or climax vegetation that will decrease in relative amount with continued disturbance (heavy defoliation, fire, drought) to the norm. Some agencies use this only in relation to response to overgrazing.

Deferment — Delay of livestock grazing on an area for an adequate time to allow plant reproduction, establishment of new plants, or restoration of vigor of existing plants.

Deferred Rotation — To discontinue grazing on various parts of a range in succeeding years, allowing each part of the range to rest successively during the growing season to permit seed production, establishment of seedlings, or restoration of plant vigor. Each rested part of the range is grazed during the year. At least two, but usually three or more, separate grazing units are required.

Defoliation — The removal of plant leaves by grazing or browsing, cutting, chemical defoliant, or natural phenomena, such as hail, fire, or frost.

Demand — The amount of output that users are willing to take at a specified price, time period, and conditions of sale.

Dependent Communities — Communities whose social, economic, or political life would become discernibly different in important respects if market or no market outputs from the national forest or national grasslands were significantly disrupted.

Desired Condition — A portrayal of the land or resource conditions that are expected to result if goals and objectives are fully achieved.

Desired Plant Community — A plant community that produces the kind, proportion, and amount of vegetation necessary for meeting or exceeding the land use plan/activity plan objectives established for an ecological site. The desired plant community must be consistent with the site's capability to produce the desired vegetation through management, land treatment, or a combination of the two.

Desired Plant Species — Species that contribute positively to the management objectives.

Deteriorated Range — Range where vegetation and soils have significantly departed from the natural potential. Corrective management measures, such as seeding, would change the designation from deteriorated range to some other term.

Detrimentally Impacted Soils — An increase in bulk density from the average undisturbed bulk density values and the removal of soil from a continuous area of 100 square feet or more.

Developed Recreation — This type of recreation is dependent on facilities provided to enhance recreational opportunities in concentrated use areas. Examples include campgrounds and picnic areas. Facilities in these areas might include roads, parking lots, picnic tables, toilets, drinking water and buildings.

Developed Recreation Sites — Relatively small, distinctly defined areas where facilities are provided for concentrated public use, such as campgrounds, picnic areas, and swimming beaches.

Direct Effects — Environmental effects caused by an action and that occur at the same time and place.

Dispersal — Leaving an area of birth, origin, or activity for another area.

Dispersed Recreation — This type of recreational use requires few, if any, improvements and may occur over a wide area. This type of recreation involves activities related to roads, trails and

undeveloped waterways, and beaches. The activities do not necessarily take place on or adjacent to a road, trail, or waterway, only in conjunction with them. Activities are often day-use oriented and include hunting, fishing, boating, off-road vehicle use, hiking, and others.

District Ranger — The official responsible for administering the National Forest System lands, including national grasslands, on a ranger district.

Disturbance — A discrete event, either natural or human induced, that causes a change in the existing condition of an ecological system.

Diversity — Diversity refers to the distribution and abundance of different plant and animal communities and species within the area covered by land and resource management plans. This term is derived from the National Forest Management Act (NFMA). This term is not synonymous with biological diversity.

Domestic — Refers to those animals and plants that are under the control of humans throughout their life cycle. Animals whose breeding is controlled by humans.

Draft Environmental Impact Statement — The statement of environmental effects required for major federal action under Section 102 of the National Environmental Policy Act and released to the public and other agencies for comment and review.

Drift Fence — An open-ended fence used to retard or alter the natural movement of livestock. Generally used in connection with natural barriers.

Drought — Any year or sequence of years when annual precipitation amounts are less than 75 percent below average.

Dugout — An artificially constructed depression that collects and stores water and differs from a reservoir in that a dam is not relied upon to impound water.

Early Grazing — Turn out on these pastures will occur in late April or the first of May to take advantage of the crested wheatgrass forage.

Ecological Diversity — The variety of ecosystems occurring within a given landscape.

Ecological Functionality — Interaction and role of the environment, habitat, and species in gathering, storing, and releasing energy components over time, such as nutrient cycling, soil development, water budgets.

Ecology — The study of the interrelationships of organisms with their environment.

Economic Efficiency — The usefulness of inputs (costs) to produce outputs (benefits) and effects when all costs and benefits that can be identified and valued are included in the computations. Economic efficiency is usually measured using present net value, though use of benefit-cost ratios and rates-of-return may sometimes be appropriate.

Ecosystem — 1) A community of living plants and animals interacting with each other and with their physical environment. A geographic area where it is meaningful to address the interrelationships with human social systems, sources of energy, and the ecological processes that

shape change over time. 2) A community of organisms and its environment functioning as an ecological unit in nature.

Ecosystem Health — A condition where the parts and functions of an ecosystem are sustained over time and where the system's capacity for self-repair is maintained, such that goals for uses, values, and services of the ecosystem are met.

Ecosystem Management — Scientifically based land and resource management that integrates ecological capabilities with social values and economic relationships to produce, restore, or sustain ecosystem integrity and desired conditions, uses, products, values, and services over the long term.

Effects — Physical, biological, social, and economic results (expected or experienced) resulting from achievement of outputs. Effects can be direct, indirect, and cumulative.

Effects (Heritage Resources) — Impacts to the characteristics that qualify a heritage resource for the National Register of Historic Places. These can include alterations in location, setting, use design, materials, feeling, and association. Adverse effects include: Physical destruction or damage; Isolation from or alteration of setting; Introduction of visual, audible, or atmospheric elements; Physical deterioration from neglect or from any action; and Transfer, lease, or sale.

Eligible (Heritage Resources) — Indicates that a specific heritage resource qualifies for or is already listed in the National Register of Historic Places.

Endemic — Plants or animals that occur naturally in an area and whose distribution is relatively limited to a particular locality.

Environment — All the conditions, circumstances, and influences surrounding and affecting the development of an organism or group of organisms.

Environmental Analysis — An analysis of alternative actions and their predictable short- and long-term environmental effects, which include physical, biological, economic, social, and environmental design factors and their interactions.

Environmental Impact Statement — A public document, for which a federal agency is responsible, that serves to disclose the effects of a federal action, and alternatives, on the human environment. It is used by federal officials to plan actions and make decisions.

Ephemeral Streams — Streams that flow only as a direct response to rainfall or snowmelt events. They have no base flow.

Erosion — The wearing away of the land surface by running water, wind, ice, gravity, or other geological activities.

Evapotranspiration — Total water loss from the soil, including that by direct evaporation and that by transpiration from the surfaces of plants

Exclosure — An area fenced to exclude livestock grazing.

Executive Order — An order or regulation issued by the President or some administrative authority under presidential direction.

Exotic — Not native to the place where it is found. Often in reference to a specific race or variety of an organism that has been transplanted to a new region.

Exotic Species — An organism that exists in a free state in an area in which it is not native. Also refers to animals from outside the country in which they are held captive or in free-ranging populations.

Extensive Grazing Management — Extensive range management carries the goal to control livestock numbers within the present capacity of the range, but little or no attempt is made to achieve uniform distribution of livestock. Range management investments are minimal and only to the extent needed to maintain stewardship of the range in the presence of grazing. Past resource damage is corrected and resources are protected from natural catastrophes.

Extinction — Disappearance of a taxon of organisms from existence in all regions.

Fair Market Value — The amount or value for which, in all probability, a property would be sold by a knowledgeable owner willing but not obligated to sell to a knowledgeable purchaser who desires but is not obligated to buy.

Family Living Withdrawals — Cash withdrawals paid by the business to cover family living expenses.

Fauna — All vertebrate and invertebrate animal species.

Fertilizer — Mineral nutrients added to the substrate of plants to enhance growth and vitality.

Fire-dependent Systems — Forests, grasslands, and other ecosystems historically composed of species of plants that evolved with and are maintained by fire regimes.

Floodplain — The area adjacent to a stream/river channel effective in carrying flow, within which carrying capacity must be preserved and where the flood hazard is generally highest; that is, where flood depths and velocities are the greatest (FSH 2520).

Flora — All plant species.

Fluvial — Of, relating to, or inhabiting a river or stream.

Forage — Vegetation used for food by wildlife and livestock, particularly ungulate wildlife and domestic livestock.

Forage Production — The weight of forage that is produced within a designated period of time on a given area. The weight may be expressed as green, air dry, or oven dry. The term may also be modified as to time of production such as annual, current year, or seasonal forage production.

Forbs — Any herbaceous plant other than those in the grass, sedge, and rush families. For example, any non grass-like plant that has little or no woody material.

Fragmentation — The breakup of a large land area (such as a grassland) into smaller patches isolated by areas converted to a different land type. The opposite of connectivity.

Free-flowing — Existing or flowing in natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway.

Functional-At Risk — Riparian areas are in a functional condition but one or more properties, i.e., soil, water, or vegetation are impaired which makes the riparian area susceptible to degradation.

Geographic Information System — A spatial type of information management system that provides for the entry, storage, manipulation, retrieval, and display of spatially oriented data.

Goal — A concise statement that describes a desired condition to be achieved sometime in the future. A goal is normally expressed in broad, general terms that are timeless in that there is no specific date by which the goal is to be achieved (36 CFR 219.3). The Region 2 Desk Guide has this to say about goals: "Desired conditions and processes are measurable, have a timeless nature, and describe a resource condition or ecological process. In the first round of (land and resource management) planning, these statements were often termed 'goals.' They describe the conditions or processes we expect to achieve through resource management. Complete accomplishment of desired conditions is not mandatory during the current planning phase, but it is our ultimate intent."

Graminoid — Grass or grass-like plant, such as *Poa*, *Carex*, or *Juncus* species

Grass — A member of the grass family, Poaceae.

Grassland — Any land on which the dominant plants are grasses or on which grasses originally dominated.

Grasslands Plan (Land and Resource Management Plan) — A document that guides natural resource management and establishes standards and guidelines for a national forest or national grassland. Required by the National Forest Management Act.

Grazing — The act of animals consuming plants on range or pasture.

Grazing Agreement — Authorizes livestock grazing on a given area of National Forest System lands for a group of permittees known as a Grazing Association (Region 2).

Grazing Capacity — The maximum number of livestock under management that a given range area is capable of supporting within guidelines found in the allotment management plan.

Grazing Distribution — Dispersion of livestock or wild herbivores grazing within a given area.

Grazing Fee — A charge, usually on a monthly basis, for grazing use by a given kind of animal.

Grazing Land — An area of rangeland, public or private, that is used by animals for grazing.

Grazing Permit — Official, written permission to graze a specified number, kind, and class of livestock for a specific period on a defined range allotment.

Grazing Season — 1) A period of grazing to obtain optimum use of the forage resource. 2) On public lands, an established period for which grazing permits are issued.

Grazing System — A specialization of grazing management that defines systematically recurring periods of grazing and deferment for two or more pastures or management units. Some examples are: deferred grazing, rotation grazing, deferred-rotation grazing, and short-duration grazing.

Grazing Unit — An area of rangeland, public or private, that is grazed as an allotment or pasture.

Grazing, Short-duration — A grazing system in which animals are concentrated on less than one-half of the total land area and the lengths of deferment exceed the lengths of grazing.

Ground Cover — The percentage of material, other than bare ground, covering the land surface. It may include live and standing dead vegetation, litter, cobble, gravel, stones, and bedrock. Ground cover plus bare ground would total 100 percent.

Groundwater — Water in the Earth that supplies wells and springs. Specifically, water in the zone of saturation where all openings in soils and rocks are filled. The upper surface level forms the water table.

Growing Season — In temperate climates, that portion of the year when temperature and moisture permit plant growth.

Guideline — Advisable actions that should be followed to achieve grassland or forest goals and objectives. Deviations from guidelines must be analyzed during project-level analysis and be documented in a project decision document but do not require management plan amendments.

Habitat — The sum total of environmental conditions of a specific place occupied by a wildlife species or a population of such species.

Habitat Capability — The capacity of a vegetative community to support selected wildlife and fish species for all or a part of its life cycle. Habitat capacity is normally expressed as projected populations or densities of animals.

Habitat Effectiveness — As used in this document, habitat effectiveness refers to the capability of an area to support big game based on forage, cover, open roads, and the spatial distribution of the three factors, regardless of the time of year.

Habitat Suitability — A measure of current habitat quality relative to local biological potential of an area to provide habitat for a species. Usually expressed as low, moderate or high or is quantitatively presented as an index value scaled from 0 (unsuitable) to 1.0 (optimum habitat).

Hardened Water Crossings — Livestock watering sites where techniques have been used to protect stream banks and stream beds from sloughing and erosion. For example, livestock may be confined to one short section of a stream where rock, gravel, or concrete has been placed on the banks of the stream.

Hardwood — Pertains to broadleaf trees or shrubs.

Hardwood Draws — Upland drainages containing deciduous trees and shrubs. Synonymous with green ash hardwood draws.

Harvest Efficiency — The total percent of vegetation harvested by a machine or ingested by a grazing animal compared to the total amount of vegetation grown in the area in a given year. For continuous grazing, harvest efficiency usually averages 25 percent on rangeland, 30 percent on pastureland, and 35 percent on grazed cropland.

Hay — Herbage, especially grass and legumes, mowed, cured, and stored for fodder.

Haying — The mowing, baling, and storage of hay to be used as a product.

Headquarters — Is the historic wintering and feeding land. It includes the base property and may include other commensurate property. Originally a headquarters would have included buildings and other improvements.

Headquarters Allotment — This type of allotment has units that are associated with common allotment for eight months of summer grazing and livestock units from the common return to this allotment for the winter months. This type of allotment also designated summer livestock units and summer pastures.

Healthy — Woody draws that meet the LRMP goals and objectives for desired conditions involving thick and brushy understories and multi-story and multi-age structure of the tree canopy as site potentials warrant.

Herb — A plant with one or more stems that dies back to the ground each year.

Herbaceous — Non-woody plant growth.

Herbicide — A chemical substance used for killing plants.

Herbivore — An animal that subsists principally or entirely on plants or plant material.

Herd — An assemblage of animals usually of the same species.

Herding — The handling or tending of a herd.

Heritage Resources — The physical remains and conceptual content or context of an area. Physical remains may include artifacts, structures, landscape modifications, rock art, trails, or roads. Conceptual content/context includes the setting for legendary, historic, or prehistoric events, such as a sacred area for American Indians.

High Structure — Herbaceous structure that averages greater than 3.5 inches along a visual obstruction reading (VOR) transect measured in the autumn.

High Value Woody Draws — Woody draws in a Healthy condition or with a high potential to achieve Healthy conditions with changes in management based on current species composition and the potential for increased regeneration of desired woody species. Maintenance or achievement of Healthy conditions would appreciably add to ecologic conditions within the effected landscape or allotment that would contribute to the achievement of resource objectives.

Historic Property — Any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the National Register. This term includes artifacts, records, and remains related to and located within such properties.

Home Range — The geographic area within which an animal restricts its activities.

Human Environment — Includes the natural and physical environment and the relationship of people within that environment.

Hydrologic Cycle — The ecological cycle that moves water from the air, by precipitation, to the earth and back to the atmosphere. A variety of processes are involved, including evaporation, runoff, infiltration, percolation, storage, and transpiration.

Implementation — Those activities necessary to initiate the actions in the approved land and resource management plan.

Inaccessible Range — Rangeland that is not grazed by livestock because of barriers, distance to water or steep slopes.

Increaser (Plant) — Plant species of the original vegetation that increase in relative amount, at least for a time, under continued disturbance (heavy defoliation, fire, drought) to the norm.

Indigenous Species — Animals or plants that originated in the area in which they are found; for example, animals or plants that were not introduced after frontier settlement of the Northern Great Plains and that naturally occur on the Northern Great Plains.

Indirect Effects — Environmental effects caused by an action but resulting later in time or farther away in place, yet which are still reasonably foreseeable.

- Informing the public of Forest Service activities, plans, and decisions.

Induced Economic Impacts — Impacts of household expenditures, from the income earned in a directly or indirectly affected industry. The spending and re-spending of these dollars in the local and state economies.

Instream Flows — The minimum water volume (cubic feet per second) in each stream necessary to meet seasonal stream flow requirements for maintaining aquatic ecosystems, visual quality, recreational opportunities, and other uses.

Intensity (Fire Management) — A measure (in BTUs per foot per second) of the energy released per unit of time in an area of actively burning fire; the amount of heat released per foot of fire front per second.

Intensive Grazing Management — Grazing management that attempts to increase production or utilization per unit area or production per animal through a relative increase in stocking rates, forage utilization, labor, resources, or capital. Intensive grazing management is not synonymous with rotation grazing. Grazing management can be intensified by using any one or more of a number of grazing methods that use relatively more labor or capital resources.

Interdisciplinary Team — A group of people with different specialized training assembled to solve a problem or perform a task. The team is assembled out of recognition that no one discipline is sufficiently broad to adequately solve the problem. Through interaction, participants bring different points of view and a broader range of expertise to bear on the problem.

Intermittent Stream — 1) A stream that flows only 50 to 90 percent of the year when it receives water from some surface source, such as melting snow. 2) A stream that does not flow continuously, as when water losses from evaporation or seepage exceed the available stream flow.

Introduced Species — A species not a part of the original fauna or flora of the area in question.

Invaded Grass State — Plant community where invasive grass species comprise more than 30% of the total plant production when all species are measured, or less than 40% of the total grass composition when only grasses and select species are measured.

Invader (Plant) — Plant species that were absent in undisturbed portions of the original vegetation of a specific range site and will invade or increase following disturbance or continued heavy grazing.

Invasive Plant — A species that displays rapid growth and spread, free from natural controls and enhanced by abundant seed production and germination.

Inventory Allotment — An allotment with private and National Grassland land on which the total number of animals is limited by the grazing permit.

Inventory Permit — A permit that has eight months of summer grazing (May 1st to December 31st), two months of winter grazing (January and February), and two months of winter feeding (March and April). Under this type of permit, livestock are located within the allotment twelve months out of the year. Typically, there are intermingled land ownerships, and wintering on NFS lands may occur.

Irretrievable Commitments — Applies to losses of production or use of renewable natural resources for a period of time. For example, road construction leads to an irretrievable loss of the productivity of the land under which the road is located. If the road is later obliterated, the land may eventually become productive again. The production lost is irretrievable, but the action is not irreversible.

Irreversible Commitments — Decisions causing changes that cannot be reversed. For example, if an area is mined, that area cannot, at a later date, be allocated to some other resource activities, such as Wilderness. Once mined, the ability of that area to meet Wilderness criteria, for instance, has been irreversibly lost. Irreversible commitments often apply to some non-renewable resource, such as minerals and heritage resources.

Landowner — Person who has title to land recognized by the prevailing legal system.

Landscape — The landforms of a region in aggregate.

Lek — A lek is an area of varying size where male sharp-tailed grouse gather for the purposes of competitive mating display. The term “dancing ground” is synonymous with a lek.

Lentic —A Lentic Ecosystem has still waters. Examples include: ponds, basin marshes, ditches, reservoirs, seeps, lakes, and vernal / ephemeral pools.

Linear Stringer — Woodys occurring in a narrow line generally following a drainage.

Listed Species — Any species of fish, wildlife, or plant officially designated as endangered or threatened by the Secretary of the Interior or Commerce.

Litter — A surface layer of loose organic debris consisting of freshly fallen or slightly decomposed organic materials.

Livestock — Any animal raised for food or pleasure including, but not limited to, beef and dairy cattle, sheep, swine, poultry, and horses. The definition also includes fur animals raised for their pelts.

Livestock Use Permit — Used to document specific animal numbers, class, and seasons of use under a specified management plan for a given period (10 years).

Lotic — A Lotic Ecosystem has flowing waters. Examples include: creeks, streams, runs, rivers, springs, brooks and channels.

Low Structure — Herbaceous structure that averages less than 1.5 inches along a visual obstruction reading (VOR) transect measured in the autumn.

Management — The organization of actions designed to reach a given set of objectives.

Management Area — Area of the grassland that are managed for a particular emphasis. These areas have common management direction and may be non contiguous on the national forest or national grassland.

Management Indicator Species — A plant or animal species selected because their status is believed to (1) be indicative of the status of a larger functional group of species, (2) be reflective of the status of a key habitat type, or (3) act as an early warning of an anticipated stressor to ecological integrity. The key characteristic of a MIS species is that its status and trend provide insights to the integrity of the larger ecological system to which it belongs.

Management Indicators (Fish and Wildlife) — Plant or animal species or habitat components selected in a planning process used to monitor the effects of planned management activities on populations of wildlife and fish, including those that are socially or economically important.

Marginal Land — Land of questionable physical or economic capabilities for sustaining a specific use.

Market Value — The unit price of an output normally exchanged in a market after at least one stage of production, expressed in terms of what people are willing to pay as evidenced by market transactions.

Memorandum of Understanding — A legal agreement between the Forest Service, other agencies, private parties, or individuals resulting from consultation between them that states specific measures they will follow to accomplish a project. A memorandum of understanding is not a fund-obligating document.

Migration — The movement of genotypes (as individuals) into or out of a population.

Mitigate — To lessen the severity.

Mitigation — Includes avoiding an impact by not taking certain actions; minimizing impacts by limiting the degree or magnitude of the action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and compensating for the impact by replacing or providing substitute resources or environments.

Mitigation (Heritage Resources) — Actions taken to reduce or eliminate adverse effects caused to heritage resources. Avoidance is not considered a mitigation measure.

Moderate Structure — Herbaceous structure that averages 1.5 inches to 3.5 inches along a visual obstruction reading (VOR) transect measured in the autumn.

Monitoring and Evaluation — The sample collection and analysis of information regarding LRMP management practices to determine how well objectives have been met, as well as the effects of those management practices on the land and environment.

Monoculture — The cultivation of a single crop to the exclusion of other land uses.

Mowing — The cutting of hay to be left on the ground.

Multiple Use — According to the Multiple Use Sustained Yield Act of 1960, multiple use is the management of all the various renewable surface resources of the National Forest System, including national grasslands, so that they are utilized in the combination that will best meet the needs of the American people. Such management makes the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions. Some lands will be used for less than all of the resources. Harmonious and coordinated management of the various resources is employed, each with the other, without impairment of the productivity of the land. Consideration is given to the relative values of the various resources and not necessarily the combination of uses that gives the greatest dollar return or the greatest unit output.

National Environmental Policy Act of 1969 — An act declaring a national policy to encourage productive harmony between people and their environment, to promote efforts that will prevent or eliminate damage to the environment and the biosphere and stimulate the health and welfare of people and to enrich the understanding of the ecological systems and natural resources important to the nation and to establish a Council on Environmental Quality.

National Forest Management Act — A 1976 law that amended the Forest and Rangeland Renewable Resources Planning Act and requires the preparation of Regional and Forest Plans and regulations to guide forest plan development.

National Forest System Lands — Federal lands designated by Executive Order or statute as national forests, national grasslands, or purchase units, or other lands under the administration of the U.S. Forest Service.

Native — A plant or animal indigenous to a particular locality.

Native Invaded — This state is very similar to the reference state. The invasion of introduced cool season sodgrasses has altered the natural range of variability for this ecological site. This state is still dominated by native cool season grasses, but invasive introduced cool season sodgrasses are now present in all community phases of this state. The primary disturbance mechanisms for this state include grazing by domestic livestock and infrequent fires. Timing and duration of grazing coupled with weather events dictate the dynamics that occur within this state. The cool season native grass can decline and an increase in introduced sod grasses will occur. Many times, this state appears as a mosaic of community phases caused primarily by continuous season-long grazing.

Native-Invaded State — Plant community at any seral stage largely dominated by native grass species with subordinate amounts of invasive grasses. Invasive grass species comprise less than 30% of the total plant production when all species were measured, or less than 40% of the total grass production when only key or primary species were measured.

Native Pasture — A pasture primarily composed of native grass, sedges, forbs, and shrubs.

Native Seed — Seeds of plants considered indigenous to the Northern Great Plains.

Natural — Occurring in conformity with the ordinary course of nature. An area having undergone no, or at least minimal, disturbance by anthropogenic forces.

Natural Barrier — A natural feature that will restrict livestock movements, such as a dense stand of trees or downfall, or a feature that will stop the spread of fire, such as a talus slope, water course, or areas otherwise devoid of fuel.

NEPA Process — Means all measures necessary for compliance with the requirements of Section 2 and Title I of NEPA.

No Action Alternative — An alternative that maintains established trends or management direction.

Non-consumptive Use — Those resources that do not reduce the supply. Non-consumptive uses of water include hydroelectric power generation, boating, swimming, etc.

Nonfunctional — The riparian area is not functioning properly. Typically, nonfunctioning riparian areas do not provide adequate vegetation, channel properties, or woody debris to dissipate stream energy associated with high flows and thus do not reduce erosion, improve water quality, capture sediment, etc.

Non-point Source Pollution — Pollution whose source is not specific in location. The sources of the pollutant discharge are dispersed, not well-defined or constant. Examples include sediments from logging activities and runoff from agricultural chemicals.

Noxious Weeds — Those plant species designated as weeds by federal or state laws. Noxious weeds generally possess one or more of the following characteristics: aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host for serious insects or diseases, and generally non-native.

Nutrient Cycling — Is the movement of those materials that are essential to organisms.

Objective — A concise, time-specific statement of measurable, planned results that respond to pre-established goals. An objective forms the basis for further planning to define the precise steps to be taken and resources to be used in achieving identified goals.

Other Grass State — Used to reference areas of broken land that were seeded to crested wheatgrass and generally now contain a mixture of crested wheatgrass, other invasive grasses, and native grasses.

Overgrazing — Continued heavy grazing that exceeds the recovery capacity of the community and creates a deteriorated range.

Overstocking — Placing a number of animals on a given area that will result in overuse if continued to the end of the planned grazing period.

Overstory — The portion of vegetation in a forest that forms the uppermost foliage layer.

Pasture — A land area consisting of grass or other growing plants used as food by grazing animals. Also an area used for grazing, often enclosed and separated from other areas by fences, hedges, ditches, or walls.

Perennial (plant) — A plant that lives for two or more years.

Perennial Streams — Streams that flow continuously throughout most years.

Permitted Grazing — Use of a National Forest System range allotment under the terms of a grazing permit.

Permitted Use — This is the historical total amount of animals and months, expressed in Animal Months (AMs), that the permittee can utilize through grazing of livestock on an allotment.

Permittee (Grazing) — One who holds a permit to graze livestock on state, federal, or certain privately owned lands.

Pioneer Species — The first species or community to colonize or recolonize a barren or disturbed area in primary or secondary succession.

Plant Communities — Assemblages of plant species living in an area. A plant community is an organized unit to the extent that it has characteristics in addition to the individuals and populations and functions as a unit.

Preference — Refers to the historical, maximum number of head of livestock for a given number of months on an allotment.

Preference Number — The annual grazing association grazing permit provides a Preference number that is the maximum number of livestock for a given amount of time allocated to that allotment.

Preferred Alternative — The alternative recommended for implementation in the Forest Plan based on the evaluation completed in the planning process.

Prehistoric Site — Archeology sites associated with American Indians and usually occurring before contact with Europeans.

Prescribed Burning — Controlled application of fire to wild land fuels in either their natural or modified state, under specified environmental conditions, that allows the fire to be confined to a predetermined area and, at the same time, to produce the fire line intensity and rate of spread required to attain planned resource management objectives.

Prescribed Fire — A fire burning with prescription, resulting from planned or unplanned ignition.

Proper Functioning Condition — Riparian/wetland areas achieve proper functioning condition when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high water flows. This reduces erosion; improves water quality; filters sediment;

captures bed load; aids floodplain development; improves floodwater retention and groundwater recharge; develops root masses that stabilize stream banks against cutting action; develops diverse ponding and channel characteristics to provide habitat and water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and supports greater biodiversity. The functioning condition of riparian/wetland areas is a result of the interaction among geology, soil, water, and vegetation.

Properly Functioning — The stream has adequate streambank vegetation, proper stream morphology (structure), or instream structures (i.e. woody debris, rock, etc.) present to dissipate stream energy, during high flows. This results in benefits including, but not limited to, reduced erosion, sediment and bedload capture, floodplain development, improved water quality, ground-water recharge, and development of streambank root masses.

Proposed Action — In terms of the National Environmental Policy Act, the project, activity, or action that a federal agency intends to implement or undertake and which is the subject of an environmental analysis.

Proposed Species — Any species of fish, wildlife, or plant that is proposed by the Fish and

Public — The people of an area, state, or nation that can be grouped together by a commonality of interests, values, beliefs, or life-style.

Public Involvement — A Forest Service process designed to broaden the information base upon which agency decisions are made. It includes the following steps:

Quality Habitat — Habitat that is highly suitable for a plant or animal species or community based on the local biological site potential.

Range — Any land supporting vegetation suitable for grazing including rangeland, grazeable woodland, and shrubland.

Range Allotment — A designated area of land available for livestock grazing upon which a specified number and kind of livestock may be grazed under a range allotment management plan. It is the basic land unit used to facilitate management of the range resource on National Forest System lands, including national grasslands, and other associated lands administered by the Forest Service.

Range Analysis — Systematic acquisition and evaluation of rangeland resources data needed for allotment management planning and overall land management.

Range Condition — 1) A rangeland is considered to be in satisfactory condition when the desired condition is being met or short-term vegetative objectives are being achieved to move the rangeland toward the desired condition or trend. Unsatisfactory condition is when the desired condition is not being met and short-term vegetative objectives are not being achieved to move the rangeland toward the desired condition or trend. 2) Historically, range condition usually has been defined in one of two ways: (a) a generic term relating to present status of a unit of range in terms of specific values or potentials. Specific values or potentials must be stated or (b) the present state of vegetation of a range site in relation to the climax (natural potential) plant community for that site.

It is an expression of the relative degree to which the kinds, proportions and amounts of plants in a plant community resemble that of the climax plant for the site.

Range Development, Nonstructural — Any practice designed to improve range condition or facilitate more efficient utilization of the range.

Range Development, Structural — Any structure or excavation to facilitate management of range or livestock.

Range Management — A distinct discipline founded on ecological principles and dealing with the use of rangelands and range resources for a variety of purposes. These purposes include use as watersheds, wildlife habitat, grazing by livestock, recreation, and aesthetics, as well as associated uses. Two kinds of range management can be described:

Range Pipeline — Generally a one to two inch pipeline used to convey water from a range well to stock tanks.

Range Readiness — Indicators used to determine rangeland readiness are soils and vegetation conditions. Rangelands are generally ready for grazing when soils have become firm after winter and spring precipitation, and when plants have reached the defined stage of growth at which grazing many begin under the specific management plan without long-lasting damage

Range Well — Water well developed to provide water for livestock use.

Rangeland — Lands on which the native vegetation is predominately grasses, grass-like plants, forbs, or shrubs suitable for grazing or browsing usage. Includes lands revegetated naturally or artificially to provide a forage cover that is managed like native vegetation.

Rangeland Health — The degree to which the integrity of the soil, the vegetation, the water, and air as well as the ecological processes of the rangeland ecosystem is balanced and sustained. Integrity is defined as: Maintenance of the structure and functional attributes characteristic of a particular locale, including normal variability.

Ranger District — Administrative subdivision of the national forest or national grassland supervised by a district ranger who reports to a forest supervisor.

Reclamation — Returning disturbed lands to a form and productivity that will be ecologically balanced, often in conformity with a predetermined reclamation plan.

Reference Plant Community — The expected plant community under natural disturbance regimes in pre-settlement times.

Reference State — Is the state where the functional capacities represented by soil/site stability, hydrologic function, and biotic integrity are performing at an optimum level under natural disturbance regime. This state usually includes, but is not limited to, what is often referred potential natural plant community (PNC).

Regeneration — The renewal of a tree crop, whether by natural or artificial means. This term may also refer to the crop itself.

Relative Frequency — The frequency of one species as a percentage of total plant frequency.

Research Natural Area — A physical or biological unit in which current natural conditions are maintained insofar as possible. However, in the RPA program, the term is used to describe those matters within the scope of the responsibilities and authorities of the Forest Service as required by the Forest And Rangeland Resource Renewable Resources Planning Act of 1074. Consequently, the renewable resources include: timber, range, minerals, wildlife and fish, water, recreation, and Wilderness.

Reservoir — Water storage facility generally created by erecting an earthen dam across a drainage for the purpose of catching and storing water for livestock.

Residual Cover — Standing or lodged herbaceous vegetation left after livestock grazing and killing frost.

Resource Values — The tangible and intangible worth of forest and grassland resources.

Response Coefficient — The estimate of employment and labor income responses in an economy based on a specified amount of economic activity in a given economic sector.

Responsible Official — The Forest Service employee who has the delegated authority to make a specific decision.

Rest — To leave an area of rangeland ungrazed by livestock or unharvested by mechanical methods for at least one year (12 consecutive months).

Rest Rotation (Livestock Grazing) — An intensive system of management where grazing is deferred on various parts of the range during succeeding years, allowing the deferred part complete rest for one year. At least two, but usually three or more, separate grazing units are required.

Restoration — Holistic actions taken to modify an ecosystem to achieve desired, healthy, and functioning conditions and processes. Generally refers to the process of enabling the system to resume its resiliency to disturbances.

Revegetation — The reestablishment and development of plant cover. This may take place naturally through the reproductive processes of the existing flora or artificially through reforestation or reseeding.

Riparian — The bands and adjacent areas of water bodies, water courses, seeps, and springs whose waters provide soil moisture in excess of what is locally available. This results in a moister habitat than that found on the contiguous flood plains and uplands. Refers to land bordering a stream, lake, or tidewater, and generally implies a particular type of habitat physiognomy often characterized by an over story of trees or other large woody plants with a complex under story of other woody and/or herbaceous species.

Riparian Area — Areas of the aquatic and riparian ecosystems with distinctive resource values and characteristics that are geographically delineated (FSM 2526). Ecological units with distinctive vegetation, landform, soil, and water regimes consisting of the aquatic ecosystem and wet-to-moist areas located between aquatic ecosystems and adjacent terrestrial ecosystems. Includes floodplains and wetlands. Riparian ecosystems are distinguished by soil characteristics and distinctive existing

or potential vegetation communities that are adapted to soils with consistently high levels of moisture.

Riparian Communities — Repeating, classified, defined and recognizable assemblages of plant or animal communities associated with riparian areas.

Riparian Ecosystem — A transition between the aquatic ecosystem and the adjacent upland terrestrial ecosystem. It is identified by soil characteristics and by distinctive vegetative communities that require free or unbounded water.

Ripping — The mechanical penetration and shearing of range soils to depths of 8 to 18 inches for the purpose of breaking hardpan layers to facilitate penetration of plant roots, water, organic matter, and nutrients. A range improvement practice used where native grasses of a rhizomatous nature can be spread into the ripped soil.

Risk Assessment — Process of gathering data and making assumptions to estimate short- and long-term effects on human health or the environment from particular products or activities.

Road — A general term denoting a way with at least two-wheel tracks for purposes of travel by vehicles greater than 50 inches in width.

Robel Pole — A device consisting of a 1 meter vertical pole possessing alternating horizontal bands and a 4 m line of rope or cord. It is used by range ecologists, field biologists and other scientists to measure the density of vegetation and to quantify the volume of ground cover in a particular habitat using the visual obstruction (VO) measurement method. The Robel pole is named for Dr. Robert J. Robel, the scientist who developed the device and technique. Modifications of Robel's original design have been developed and published, but all utilize the VO method.

Rotation — The planned number of years between the formation or regeneration of a crop or stand and its final cutting at a specified stage of maturity.

Rotation Grazing — A grazing scheme where animals are moved from one grazing unit (paddock) in the same group of grazing units to another without regard to specific graze/rest periods or levels or plant defoliation.

Runoff — The total stream discharge of water, including both surface and subsurface flow, usually expressed in acre-feet of water yield.

Rural Development — A partnership or program designed to enrich the cultural life, enhance the environment, provide employment, and improve living conditions in rural America.

Scenery — General appearance of a place, a landscape, or features of a landscape.

Scenic Area — A unit of land with outstanding natural beauty that requires special management to preserve this beauty.

Scoping Process — An early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to the proposed action. Identifying the significant environmental issues deserving of study and de-emphasizing insignificant issues, narrows the scope of the environmental impact statement accordingly.

Seasonlong Grazing (Livestock Grazing) — Allowing livestock to graze a single pasture throughout one growing season.

Secondary Range — Range that is lightly used or unused by livestock under minimal management and will ordinarily not be fully used until the primary range has been overused.

Sediment — Material suspended in water or deposited in streams and lakes.

Sediment Load — The solid material transported by a stream and expressed as the dry weight of all sediment that passes a given point in a given period of time.

Sediment Yield — Amount of sediment leaving an analysis area and entering a channel.

Seeps — A spot where water or petroleum flows from the earth, often forming the source of a small stream.

Self-sustaining Fish Population — A reproducing fish population that does not require supplemental hatchery stocking.

Sensitive Species — Those plant and animal species identified by Regional Foresters for which population viability is a concern, as evidenced by the following:

Seral (Ecology) — A biotic community that is in a developmental, transitory stage in an ecological succession.

Seral Stages (Ecology) — The sequence of a plant community's successional stages to potential natural vegetation.

Sere — The series of stages that follow one another in an ecologic succession. A series of biotic communities that follow one another in time on any given area of the earth's surface.

Shortgrass — Grasses which normally are only a few inches tall, including blue and hairy grama and buffalograss.

Shortgrass Prairie — Native grasslands which are dominated by shortgrasses.

Significant Archeological Sites — Sites eligible for inclusion in the National Register of Historic Places as determined by the Forest Service in consultation with the State Historic Preservation Officer.

- Significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.
- Significant current or predicted downward trends in population numbers or density.

Site Productivity — Production capability of specific areas of land.

Social Analysis — An analysis of the social (as distinct from the economic and environmental) effects of a given plan or proposal for action. Social analysis includes identification and evaluation of all pertinent desirable and undesirable consequences to all segments of society.

Soil Compaction — A physical change in soil properties that results in a decrease in porosity and an increase in soil bulk density and strength.

Soil Erosion — The detachment and movement of soil from the land surface by water or wind. Soil erosion and sediment are not the same.

Soil Productivity — The inherent capacity of a soil to support the growth of specified plants, plant communities, or a sequence of plant communities. Soil productivity may be expressed in terms of volume or weight/unit area/year, percent plant cover, or other measures of biomass accumulation.

Soil Profile — A vertical section of the soil from the surface down through all of its layers into the parent material.

Soil Survey — A general term for the systematic examination of soils in the field and in laboratories; their description and classification; the mapping of soil types; the interpretation of soils according to their adaptability for various crops, grasses, and trees; their response to treatment for plant production or for other purposes; and their productivity under different management systems.

Species — A group of potentially interbreeding populations that is reproductively isolated from other such groups.

Species Composition — The proportions of various plant species in relation to the total on a given area. It may be expressed in terms of cover, density, weight, etc.

Species Diversity — A measurement that relates the density of individuals of a species in a habitat to the number of different species present in the habitat. The number of different species in a given habitat.

Species Viability — A species consisting of self-sustaining and interacting populations that are well distributed through the species' range. Self-sustaining populations are those that are sufficiently abundant and have sufficient diversity to display the array of life history strategies and forms to provide for their long-term persistence and adaptability over time.

Standard — Actions that must be followed or are required limits to activities in order to achieve grassland or forest goals and objectives. Site-specific deviations from standards must be analyzed and documented in management plan amendments.

State Historic Preservation Officer — A person appointed by a state's governor to administer the State Historic Preservation Program.

Static — Staying the same.

Stocking Rate (Livestock Management) — The actual number of animals, expressed in either animal units or animal unit months, on a specific area for a specific time.

Stream Bank Alteration — Stream bank alteration consists of physical alteration of the bank by trampling that exposes bare soil.

Stream Bank Stability — Stream bank stability refers to long-term bank structure, expressed as a percentage of the stream bank in one of six stability classes (Cowley and Burton 2005b). It is intended for long-term trend monitoring and is read on 3-5 year intervals. This method includes damage from natural processes, such as floods, and human caused impacts, such as mining or recreation vehicle crossings, as well as from livestock.

Stream Health — The condition of a stream, relative to robust health, for that stream type and landscape, considering indicators such as channel pattern, slope, particle size, pool frequency and depth, bank vegetation, and woody debris, which reflect the stability and habitat quality of the stream.

Stream Order — A classification of the relative position of streams in a channel network. Each non-branching channel segment is designated as a first-order stream. The channel segment below the confluence of the two first-order tributaries. The channel segment below the confluence of two second-order streams is designated a third-order stream, etc.

Stream Type — A class of stream reach having a discrete combination of valley geomorphology and climate, flow regime, stream size, and channel morphology, which differs from other stream types in its ability to support biota and respond to management.

Structure — See Vegetation Structure.

Succession — The progress of vegetation development where different plant communities successively occupy an area.

Successional Stages (Seral Stages) — The relatively transitory communities that replace one another during development toward a potential natural community.

Suitable Lands — Lands that are appropriate for the application of certain resource management practices as determined by an analysis of the economic and environmental consequences and the alternative uses foregone.

Suitable Rangeland — The appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses forgone. A unit of land may be suitable for a variety of individual or combined management practices.

Summer Use — Livestock grazing that occurs between May 1st and December 31st.

Supplemental Draft Environmental Impact Statement — Supplemental information that is added to a Draft Environmental Impact Statement and released to the public and other agencies for comment and review.

Suspended Sediment — The very fine soil particles that remain suspended in water for a considerable period of time without contact with the bottom of the channel.

Sustainability — Continuation of a desired level of productivity, quality, or variability, generally of organisms.

Sustained Yield — The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources on National Forest System lands, including national grasslands, without impairment of the productivity of the land.

Tallgrass — Grasses that normally grow over 23 inches tall, as in big bluestem.

Tallgrass Prairie — Native prairie grassland characterized by tall and midgrasses, located primarily in the eastern Great Plains; synonymous with true prairie.

Ten-Point Pin Frame — This is a sampling frame 18 in long X 6 in wide.

Term Debt — A debt due to paid over a period of time, as opposed to one due to be paid entirely at one time in one lump sum.

Terrestrial — A land-based ecosystem. (See ecosystem). An interacting system of soil, geology, and topography with plant and animal communities.

Tiering — Refers to the elimination of repetitive discussions of the same issue by referencing the general discussion in an environmental impact statement of broader scope. For example, a project environmental assessment could be tiered to the Forest Plan EIS.

Timing Limitation (Seasonal Restriction) — Prohibits surface use during specified time periods to protect identified resource values. The stipulation does not apply to the operation or maintenance of production facilities unless the finding analysis demonstrates the continued need for such mitigation and the insufficiency of less stringent, project-specific mitigation measures.

Topography — The configuration of a land surface including its relief, elevation, and the position of its natural and human-made features.

Traditional Use Areas — An area that is significant to a living community because of its association with cultural practices or beliefs that are rooted in the community's history and are important in maintaining the continuing cultural identity of the community.

Trampling — Treading underfoot. The damage to plants or soil brought about by movements or congestion of animals.

Treated Area — An area on which management, like timber harvesting or prescribed burning occurs.

Tree Regeneration — Refers to the amount of trees reproduction present in a woody draw as evidence by seedlings and saplings.

Turn In Allotment — An Allotment that is fenced separately from the Ranch Headquarters on which a permit to graze is issued.

Turn In Permit — A permit issued by a grazing association that the grazing season can be no longer than eight months (May 1st to December 31st), has no wintering on NFS lands, and the allotment consists typically of solely NFS lands, meaning that adjacent private lands are normally fenced out. Private and or state lands may be included within the allotment if they are not conducive to fencing out or the permittee chooses not to fence them out. Turn-in permits allow for a certain number of Animal Months (AMs) providing for some flexibility in management, such as an increased number of livestock for a shorter grazing season.

Turn out — Act of turning livestock out on the range at the beginning of the grazing season.

Understory — Herbaceous and tall and short shrub layers

Understory (Vegetation) — The lowest layer of vegetation in a forest or shrub community composed of grass, forbs, shrubs and trees less than 10 feet tall. Vegetation growing under the tree canopy.

Undesirable Species — 1) Species that conflict with or do not contribute to the management objectives. 2) Species that are not readily eaten by animals.

Ungulate — A hoofed animal, including ruminants (cattle, but also horses, tapirs, elephants, rhinoceroses, and swine).

Unhealthy — Woody draws that exhibits undesired characteristics of At Risk woody draws to a greater degree and with an increased potential or trend of regressing from the landscape. Decreased hydrologic function of the woody draw drainage can contribute to a rating of Unhealthy.

Unpalatable Species (Range Management) — Plant species that are not readily eaten by an ungulate animal.

Utilization Levels (Livestock Grazing) — The portion of the current year's forage production by weight consumed or trampled by livestock. Utilization levels are usually expressed as a percentage.

Vegetation Filter Strips — Riparian vegetation that grows adjacent to a stream.

Vegetation Structure — The vertical characteristics of vegetation.

Vegetation Treatment — Any activities undertaken to modify the existing condition of the vegetation.

Vegetative Buffer Zones — Strips of grass or other erosion-resisting vegetation between areas of ground disturbance and areas needing protection from sedimentation.

Vegetative Management — Any activities undertaken to modify the existing condition of the vegetation.

Viable Population — A group of individuals of a particular species that produces enough offspring for long-term persistence and adaptation of the species or population in a given place. For planning purposes, 36 CFR 219.19 defines a viable population as one that has the estimated numbers and distribution of reproductive individuals to ensure that a continued viable population is well-distributed in the planning area. A planning area is further defined by 36 CFR 219.3 as the "area of the National Forest System covered by a regional guide or forest plan." Direction estimated numbers and distribution of reproductive individuals to ensure the continued existence of the species throughout its existing range (or range required to meet recovery for listed species) within the planning area.

Visual Obstruction Reading — A measurement of the height that herbaceous vegetation completely obscures a round pole placed vertically in grassland vegetation.

Warm Season Plant — A plant that makes most or all its growth during the spring, summer, or fall and is usually dormant in winter. A plant that usually exhibits the C4 photosynthetic pathway.

Water Development — A facility constructed or placed to hold water for livestock use.

Water Gap — An opening or fenced area providing access to a developed or natural water supply permitting one watering facility to serve two or more pastures.

Water Influence Zone — The water influence zone includes the geomorphic floodplain, riparian ecosystem, and inner gorge. Its minimum horizontal width (from top of each bank) is the greater of 100 feet or the mean height of mature dominant late-seral vegetation. It includes adjacent unstable and highly-erodible soils. The water influence zone protects interacting aquatic, riparian, and upland functions by maintaining natural processes and resilience of soil, water, and vegetation systems.

Water Table — The upper surface of the ground water or that level below which the soil is saturated with water.

Watershed — The area of land, bounded by a divide, that drains water, sediment, and dissolved materials to a common outlet at some point along a stream channel (Dunne and Leopold, 1978), or to a lake, reservoir, or other body of water. Also called drainage basin or catchment.

Weed — Any plant growing where unwanted and having a negative value.

Wet Meadow — A meadow where the surface remains wet or moist throughout the growing season, usually characterized by sedges and rushes.

Wetland Communities — Plant communities that occur on sites with soils typically saturated with or covered with water most of the growing season.

Wetlands — Those areas that are inundated by surface water or groundwater with a frequency sufficient to support, and under normal circumstances do or would support, a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mudflats, and natural ponds.

Wildfire — Any wild land fire not designated and managed as a prescribed fire within an approved prescription. An appropriate suppression action will be applied to all wildfires.

Wildlife — Collectively the no domesticated vertebrate animals, except fishes. The natural community of animals.

Wildlife Service or the National Marine Fisheries Service for listing as threatened or endangered.

Winter Feeding — Providing supplemental feed for livestock on National Forest System lands during the winter.

Winter Range — Rangeland that is grazed during the winter months.

Winter Use — Livestock grazing and feeding that occurs between January 1st and April 30th.

Xeric — Having very little moisture. Tolerating or adapted to dry conditions.

Acronyms

Acronyms

AM — Animal Month

AMP — Allotment Management Plan

AOI — Annual Operating Instructions

AU — Animal Unit

AUE — Animal Unit Equivalent

AUM — Animal Unit Month

BE — Biological Evaluation

BMP — Best Management Practice

BTU — British Thermal Unit

CEQ — Council on Environmental Quality

CFR — Code of Federal Regulations

DBH –Diameter at Breast Height

DEIS — Draft Environment Impact Statement

DPG — Dakota Prairie Grasslands

DSD — Detrimental Soil Disturbance

EIS — Environmental Impact Statement

FAR-D — Functional-At Risk-Downward Trend

FAR-NA — Functional-At Risk-Trend Not Apparent

FAR-U — Functional-At Risk-Upward Trend

FEIS — Final Environmental Impact Statement

FSH — Forest Service Handbook

FSM — Forest Service Manual

GA — Geographic Area

GIS — Geographic Information System

IDT — Interdisciplinary Team

LRMP — Land and Resource Management Plan

LUP — Land Utilization Program

MGA — Medora Grazing Association

MIS — Management Indicator Species

MLRA — Major Land Resource Area

MOU — Memorandum of Understanding

NB-FEIS — North Billings Final Environmental Impact Statement

NDSU — North Dakota State University

NEPA — National Environmental Policy Act

NF — Nonfunctional

NFMA — National Forest Management Act

NFS — National Forest System

NFSR — National Forest System Road

NGP — Northern Great Plains

PFC — Proper Functioning Condition

RNA — Research Natural Area

ROD — Record of Decision

SDEIS — Supplemental Draft Environmental Impact Statement

SHPO — State Historic Preservation Officer

SIA — Special Interest Area

SRT — Scientific Review Team

T&E — Threatened and Endangered

USDA — United States Department of Agriculture

USFS — (USDA) Forest Service

VOR — Visual Obstruction Reading

WIZ — Water Influence Zone

Appendix A
Alternatives 3 and 3A

Appendix A
Alternatives 3 and 3A

DEVELOPMENT OF ALTERNATIVE 3

The Demonstration Project is a supplement that was added to and made part of the 2006 Grasslands Plan Grazing ROD. The Demonstration project states that "...the Forest Service and the grazing association and their members proposals would be carried forward in the national Environmental Policy Act (NEPA) process as the Forest Service's proposed action for the AMP and any related amendments, provided they are consistent with existing law". The following reviews the process used to create Alternative 3.

This North Billings EIS analysis was under way when the DPG 2006 Grazing ROD was signed implementing the Demonstration Project. Previous to the signing of the ROD the district range staff had been meeting with individual permittees and their directors to review their individual allotments and discuss different management options that could be used to address resource concerns.

Initial Permittee Meetings

Initial permittee meetings were scheduled and performed during the fall of 2005. At these meetings, the Medora Ranger District Range staff explained the expected process for revising an individual's AMP, discussed some of the applicable goals and objectives stated within the Grasslands Plan, and reviewed allotment range development maps, distribution maps, and any other notes with the effected permittee and their MGA district director. The FS Range staff also took notes on permittee's comments, concerns, and requests for their particular allotment.

A second round of permittee meetings was held the summer of 2006. The effected permittee, their MGA district director, and Medora Ranger District Range staff attended these meetings. During these meetings the FS Range staff identified the issues for a particular allotment, went over the IDT's initial proposals to address these issues, discussed the pros and cons of these proposals, and took any additional input from the permittee and/or director to address the identified issues. A permittee also had the opportunity to challenge an identified issue, if he felt that his allotment was meeting Grassland Plan goals and objectives for that issue. A review by the IDT would then need to be performed on that particular allotment to address the challenge. Several permittees did issue challenges which were reviewed in the field by the IDT and the permittee. These challenges all involved herbaceous structure and the results of those reviews are discussed in the herbaceous structure section of the FEIS. The Range staff also shared the concepts of adaptive management, a range tool box, and how the future AMPs would be written adaptively to allow for flexibility within the NEPA decision. Information from the Allotment Summary Sheets (DEIS, Appendix A) sheets was used in developing the different alternatives.

In December of 2006, the District Ranger and several members of the North Billings Range Project interdisciplinary team (IDT) met with the MGA Board of Directors. At the meeting, several IDT members presented information to the board about the recently signed Grazing ROD and the Demonstration Project. At this point the Forest Service hadn't formally created the proposed action for the project but had been considering an adaptive management based proposed action. Several members of the IDT presented information about the concept of adaptive management to the board

and proposed that it be carried forward as the basis of the proposed action for this project analysis. At the January 10, 2007 MGA meeting, the board identified that they were in agreement with pursuing an adaptive management based proposed action.

A third round of permittee meetings was held the winter of 2007. Since the last round of permittee meetings the Medora Ranger District Range staff had completed an initial estimated carrying capacity analysis, and this information was explained and shared with the permittees and their MGA district director. A tool within the grazing management toolbox, adjust AUMs based on average cow size, was explained to the permittee, and the Range staff also indicated that this information would be displayed in the Allotment Summary Sheet for their allotments (see DEIS Appendix A). The Range staff also reviewed the Allotment Summary Sheet that now included adaptive options. Once again any concerns, comments, or suggestions that the permittee had were received and discussed.

The notes associated with all of the above meetings are located in the Project Record.

At the March 5, 2008, MGA board meeting, members of the IDT met with the board to update them on the proposed action and inform them that the Forest Service was close to sending out a scoping letter on the proposed North Billings County Allotment Management Plan Revision Project Range (North Billings) project. An example of what the proposed action would look like in the scoping letter was given to the board and discussed. The team again briefed the board on the adaptive management based proposed action, as the board president and some of the directors had changed. The Forest Service asked if the board still agreed with using the adaptive management proposed action. On April 3, 2008, the president of the MGA sent a short e-mail to the Medora Ranger District range staff saying the board still agreed with the adaptive management based proposed action.

Grazing Association Board of Director Discussions

Discussions with MGA's Board of Directors took place all throughout the process of gathering information for the allotments and Medora Ranger District Range staff analyses. Allotment meetings were generally conducted with the District director and the affected permittee, however, all directors were invited to join in. At monthly MGA Board of Director meetings updates were given as far as data collection being done by Medora Ranger District staff and what was going on with the IDT at the time.

The 2006 Livestock Grazing Record of Decision (ROD) identified that it was the ".. Forest Service intent to implement the SRT's recommendations consistent with our [FS] final response" to the SRT Report (Grasslands Plan 2006 ROD, p.6). One of the SRT recommendations(V-2) was to *"Redefine the Animal Unit to reflect current cow size along with older, larger calves and recalculate the corresponding authorized livestock numbers on allotments".* A discussion of cow size was held at the January 2007 board meeting to address this SRT recommendation. Medora Ranger District Range staff reviewed how other Ranger District offices were addressing this issue, some information from the Dickinson Research & Extension Center's CHAPS program that provided area cow weights, and how this would be treated as a tool in the adaptive management toolbox. Upon being asked what the Board of Directors felt was the average cow size in their grazing association, a range of 1,100 to 1,300 pounds with the median being 1,200 pounds was provided. Appendix C of the Grasslands Plan provides three different calculations to address cow size in determining animal unit equivalents (AUE). After discussion of the three methods of

calculation, the MGA Board of Directors chose method number 3, a metabolic weight formula, utilizing the 1,200 pound average size of a cow if this tool would be applied in the AMP. The animal unit equivalency factor would equate to 1.15 AUEs as the median within the above stated weight range.

Upon request, the MGA provided three years (2005 to 2007) of grazing association grazing permits within the project area to help the FS describe current management of the allotments. After inspection of the permitted numbers on the grazing permits a question came up as to what the label for the grazing association's Preference should be (see FEIS glossary). The grazing permit displays the Preference as so many Animal Units for so many months on the allotment as a whole, which includes NFS, private, and state lands. To determine the portion of preference attributed to NFS lands in an allotment, the land record contained on the grazing permit was reviewed. However, the Federal portion of the preference is labeled as AUMs. It is believed by the Medora Ranger District Range staff that this label is not accounting for the true definition of an AUM, i.e., a 1,000 pound cow. After discussion at the March 2008 board meeting, an e-mail, and a telephone visit with the grazing association President, the FS was provided with this definition of grazing association Preference, "so many number of head for so many number of months on the allotment" (Clint Schneider personal communication, 2008). Upon receiving this definition of Preference, the Medora Ranger District Range staff determined that the label for current management permitted and or authorized use should be Animal Months (AMs) not AUMs since the grazing association Preference number did not account for the size of a cow. Animal Months was used for Alternative 2, 3, and 3A.

DEVELOPMENT OF ALTERNATIVE 3A

The Medora Grazing Association comment on the DEIS states that the association wants Alternative 3 revised to reflect all of MGA's recommendations. They provided Exhibit 2 in their comment which compares Alternative 3, Appendix A (DEIS) to the notes taken for each permittee meeting regarding the initial recommendations. In Exhibit 2 they specifically highlighted recommendations that they felt the Forest Service dropped from consideration, and also highlighted Forest Service additions to Alternative 3 which the MGA claims the MGA members did not agree to.

In response to this comment, the responsible official decided to include a new alternative in the SDEIS. The new alternative is identified as Alternative 3A. Alternative 3A was created by adding actions identified in MGA Exhibit 2 that MGA recommended be added to Alternative 3 (Table 1) and not including some actions identified in Alternative 3 that MGA did not agree with (Table 2). Tables 1 and 2 summarize the changes made.

Tables 3 and 4 discuss each individual item highlighted in Exhibit 2 of MGA's comment. Some of the items highlighted by MGA did not provide recommendations, and some of the highlighted items had already been addressed or included/excluded in Alternative 3, therefore Alternative 3A did not incorporate these highlighted items from MGA recommended proposal.

Table 1. Recommendations incorporated into Alternative 3A.

Allotment #	MGA Association/Member Recommendations Added to Alternative
127	Construct a water lot around the existing spring development to allow access to both pastures 2 and 3 in the northeast quarter of the southwest quarter of Section 17, T144N, R101W.
129	Extend range water pipeline from well in allotment 131 pasture 3 into allotment 129 pasture 2 in Section 11, T144N, R101W.
135	Construct a range water pipeline from pasture 8 to pasture 10 and add one stock tank in Section 28, T143, R101W.
142	Construct an electric cross fence running east/west in pasture one.
243	Develop a spring in pasture 1 in the southwest quarter of Section 3, T143N, R99W.
258	Allow a permittee to turn livestock onto native pastures the middle to third week of May.
272	Develop a spring in pasture 2 in the northwest quarter of the southwest quarter of Section 30, T143N, R99W.
287	Construct an extension to the existing range water pipeline in pasture 3 into the northwest quarter of Section 26, T143N, R101W.

Table 2. Actions not included in Alternative 3A

Allotment #	Forest Service Actions in Alternative 3 but not included in Alternative 3A
126	Reclaim existing spring developments in pastures 4 and 6.
240	Reclaim reservoir(s) in pasture 1.
244	Cross fence pasture 2, north to south. Cross fencing will create a crested wheatgrass pasture on the east side of pasture 2, which will be grazed early. The additional pasture, created through the cross fence allows the implementation of a two pasture deferred grazing rotation between the remaining pastures.
272	• Fence woody draw located in the southwest quarter of Section 30 with temporary electric fence. • After construction of the pipeline is complete reclaim the dugout located in the

	southeast quarter of Section 29 pasture 1 and the reservoir located in the northwest quarter of the southeast quarter of Section 30 pasture 2.
278	Reclaim reservoir in pasture 2.
300	Once well is developed reclaim spring in the southeast quarter of Section 28.
301	Fence out spring areas, install check valve to dump water back into riparian areas once stock tanks are full.

Table 3. Assessment of Comment M – MGA recommendations that were dropped from consideration in Alternative 3 by the Forest Service.

Allotment	Recommendations highlighted in Exhibit 2 of MGA comments	FS Response
126	various water tanks in 128 to draw cattle	Comment is proposed in first two bullets of Allotment 128 Alternative 3 Initial Actions which is managed together with Allotment 126.
	Develop new water up out of bottoms	Comment is proposed in first two bullets of Allotment 126 Alternative 3 Initial Actions & last bullet of Adaptive Options.
	Potentially burn juniper	Comment is proposed in second bullet of Allotment 128 Alternative 3 Adaptive Options which is managed together with Allotment 126.
127	potential water lot of spring to water Pastures 2 & 3 possibly limit access in water draws	Comment has been addressed in Alternative 3A.
133	133-1 Water is an issue in full	Comment is a statement provided as information, no recommendation was made.
	133-02 Reservoir, Water freezes, well private	Comment is a statement provided as information, no recommendation was made.
	Has the county spray Burdock and Circan	Comment is a statement provided as information, no recommendation was made.
134	no fence between 134-04 and 134-03,	Comment is a map correction, and was addressed in the creation of the allotment map in Appendix B of the DEIS.
135	Pasture 8 - missing artesian well, it is natural spring on creek, used most because of artesian well	Comment is a map correction, and was addressed in the creation of the allotment map in Appendix B of the DEIS.
	Pasture 10 - dam silted in,	Comment is a statement provided as information, no

Allotment	Recommendations highlighted in Exhibit 2 of MGA comments	FS Response
		recommendation was made.
	electric, propose run pipeline from Pasture 8 to Pasture 10	Comment has been addressed in Alternative 3A.
	Pasture 9 - dugout silted in,	Comment is a statement provided as information, no recommendation was made.
	fence between Pasture 9 & 10 does not work because of natural barriers and creek	Comment is a statement provided as information, no recommendation was made.
	Pasture 7 - tank doesn't exist	Comment is a map correction, and was addressed in the creation of the allotment map in Appendix B of the DEIS.
	Pasture 6 - dam washed out	Comment is a statement provided as information, no recommendation was made.
	No fence between Pasture 3 & 6.	Comment is a map correction, and was addressed in the creation of the allotment map in Appendix B of the DEIS.
	There is no pasture 5.	Comment is a map correction, and was addressed in the creation of the allotment map in Appendix B of the DEIS.
	adjust dates a bit for weaning.	Under Adaptive Management, Alternative 3 would not specify this type of detailed information, but doesn't preclude it. This kind of management would be addressed in the AOI.
136/139	proposing cross fence in 139-01 80/80,	Permittee requested to drop proposal at the third permittee meeting (see Project Record, Process Documentation – Permittee Meeting Notes).
	Proposed fence to split 139-01	Permittee requested to drop proposal at the third permittee meeting (see Project Record, Process Documentation – Permittee Meeting Notes).
136/139	139 - no structure, just woody draws	Comment is a statement provided as information, no recommendation was made.
140	140-05 Dugout in South fence is NF - other	Comment is a statement provided

Allotment	Recommendations highlighted in Exhibit 2 of MGA comments	FS Response
	reservoir is breached. The only water is on private land. Fence line in need of repair.	as information, no recommendation was made.
	140-04 has no water, use private.	Comment is a statement provided as information, no recommendation was made.
	Fence between Private and NFS using water tank in Fence line.	Comment is a statement provided as information, no recommendation was made.
	Fence between 140-05 and 140 HQ	Comment is not a recommendation by the permittee. This was a comment made by the Forest Service to get the existing fence functional between the two pastures, which is the responsibility of the permittee as identified in the MGA Grazing Agreement and Rules of Management.
	Putting fence between 142-01 & -02 Maybe	At the time of this recommendation the permittee was unsure of its feasibility as indicated by the "Maybe" in the note. Alternative 3 does not preclude private landowners from fencing out their private land from NFS lands, as would be the case here.
141	Add water lot that feeds both pastures	Comment is a map correction, and was addressed in the creation of the allotment map in Appendix B of the DEIS.
	22 for 8 - shorten season & increased	Under Adaptive Management, Alternative 3 would not specify this type of detailed information, but doesn't preclude it. This kind of management would be addressed in the AOI.
141	22 for a few weeks and then add #s	Under Adaptive Management, Alternative 3 would not specify this type of detailed information, but doesn't preclude it. This kind of management would be addressed in the AOI.
	Would like to stay with 40 to June 1st then 22 +	Under Adaptive Management,

Allotment	Recommendations highlighted in Exhibit 2 of MGA comments	FS Response
	other #'s.	Alternative 3 would not specify this type of detailed information, but doesn't preclude it. This kind of management would be addressed in the AOI.
	June 1 - defer	Comment is addressed in the Design Criteria common to all action alternatives.
	Carrying capacities	Comment is not a recommendation made by permittee, just Forest Service information that we would be looking at carrying capacity.
	Change season of use - is already doing - 1st pasture used is the last pasture ended fro year before	Comment is proposed in first bullet of Allotment 141 Alternative 3 Initial Actions.
	Might consider fewer #s, longer season and use of crop after hay	Under Adaptive Management, Alternative 3 would not specify this type of detailed information, but doesn't preclude it. This kind of management would be addressed in the AOI.
142	Would like to add electric fence to cross fence	Comment has been addressed in Alternative 3A.
158	Concern about lack of water in Pasture 14, well may not be keeping up and a couple of reservoirs have dried up already.	Forest Service notes of the first permittee meeting proposed extending a pipeline from a private well (which the permittee was planning for the summer of 2006). Per permittee consideration, the proposed pipeline extension into pasture 14 was dropped due to the feasibility of the project. Maintenance authorization letters were provided to permittee, and maintenance of the 2 reservoirs was completed.
220	Flexibility in rotation	Under Adaptive Management, Alternative 3 would not specify this type of detailed information, but doesn't preclude it. This kind of management would be

Allotment	Recommendations highlighted in Exhibit 2 of MGA comments	FS Response
		addressed in the AOI.
	Dam in 220-02 is not good, in dry years not reliable	Comment is a statement provided as information, no recommendation was made.
	Changes in season of use	Comment is proposed in first bullet of Allotment 220 Alternative 3 Initial Actions.
	- increased #'s, shorten season Would like to keep May 15th	Under Adaptive Management, Alternative 3 would not specify this type of detailed information, but doesn't preclude it. This kind of management would be addressed in the AOI.
221	221-02 - dugout	Comment is a statement provided as information, no recommendation was made.
	221-03 - dugout was fixed, small, dry op seasonal	Comment is a statement provided as information, no recommendation was made.
	221-06 - dugout half	Comment is a statement provided as information, no recommendation was made.
221	Spoke about utilizing 221-04 in Spring and Fall,	Comment is about a private pasture. Alternative 3 does not preclude the permittee from managing private pastures as he chooses.
	also opening gates between 2 & 3	Comment would be addressed on an "as needed" basis in the AOI.
230	230-01 - Would like to fence out Federal Section 32,	Alternative 3 does not preclude private landowners from fencing out their private land from NFS lands, as would be the case here.
230	Would like to add on pipeline & tank to existing line, well feeds five tanks,	Alternative 3 does not preclude development of water on private land, but the water source for this pipeline system is on NFS lands. It was discussed at the permittee meeting that the system may not be able to handle additional tanks as indicated by the note that the well already feeds five tanks (see Project Record, Process

Allotment	Recommendations highlighted in Exhibit 2 of MGA comments	FS Response
		Documentation – Permittee Meeting Notes).
	would like to reclaim spring on NW corner of NFS	Proposal to reclaim the spring was dropped by the permittee at the third meeting. Phone call to permittee was made on 2/5/2010 to reconfirm this action (see Project Record, Correspondence Permittee).
237	237-02 - Dugouts, the dugout in the SW is not good, sandy bottom, spring isn't in good are for livestock,	Comment is a statement provided as information, no recommendation was made.
	planned a pipeline on private to water livestock when in 237-03	Comment is not a recommendation for NFS lands.
239	Two reservoirs, SW corner has old dugout, NE reservoir doesn't hold much water, maybe a clean out	Comment is a statement provided as information, no recommendation was made. Maintenance authorization letters were provided to permittee, and maintenance of 1 reservoir was completed.
	Change distribution down in the SE corners from heavy to moderate	Comment is a distribution map correction, and was addressed on the distribution map at the time of the permittee meeting (see Project Record, Process Documentation – Permittee Meeting Notes).
	Water backs up into NFS from Private - Seasonal	Comment is a statement provided as information, no recommendation was made.
	Burdock weeds	Weeds are addressed cooperatively through Billings County and the Forest Service Noxious Weed Management Project FEIS.
240	Pasture 1 water is an issue.	Comment is proposed in second bullet of Allotment 240 Alternative 3 Initial Actions.
	Would still like to use 240-04 earlier	Alternative 3 Initial Actions is still allowing early winter use of pasture 4 from January 1st to March 15th in conjunction with other winter pastures.

Allotment	Recommendations highlighted in Exhibit 2 of MGA comments	FS Response
243	Section 3 dugout not very good	Comment is a statement provided as information, no recommendation was made.
	- Add well and tank on Fence line on 243-01	Comment is a map correction, and was addressed in the creation of the allotment map in Appendix B of the DEIS.
	- Couple dam with private	Comment is a statement provided as information, no recommendation was made.
	Take pipeline from the tank south	Comment is proposed in second bullet of Allotment 243 Alternative 3 Initial Actions.
243	Doesn't like to be tied down to exact #s	Under Adaptive Management, Alternative 3 would not specify this type of detailed information, but doesn't preclude it. This kind of management would be addressed in the AOI.
	Possible spring development	Comment has been addressed in Alternative 3A.
244	Woody draws - not a very good proposed action	The proposed initial action was very vague at the second permittee meeting, as indicated by the note made by the Forest Service; this was addressed by the third permittee meeting (see Project Record, Process Documentation – Permittee Meeting Notes).
	Dam fence on reservoir, already sent letter	Comment was a request for maintenance of the reservoir. A maintenance authorization letter has been provided to the permittee, and maintenance of the reservoir has been completed (see 2210 file).
256	Pasture 2 - Dam in Section 25 only 1 foot deep, split pasture, add tanks especially	Comment is proposed in first & second bullets of Allotment 256 Alternative 3 Initial Actions.
	No developed water, livestock goes to creek, need developed water	Comment is proposed in second bullet of Allotment 256 Alternative 3 Initial Actions.
258	Add tanks in North pasture off of existing supply	Comment is proposed in second

Allotment	Recommendations highlighted in Exhibit 2 of MGA comments	FS Response
	and tie in to proposed well and add tanks in U. N	bullet of Allotment 258 Alternative 3 Initial Actions & last bullet of Adaptive Options.
	Utilize water tank and lick tubs to move livestock around.	Comment is proposed in first bullet of Allotment 258 Alternative 3 Initial Actions.
	Request to fence out 60acres and not run in common	Comment was made by one member of this common allotment and was not agreed to by all members of the allotment. Comment cannot be proposed without agreement from all members of the allotment which was not noted in the permittee meeting notes (see Project Record, Process Documentation – Permittee Meeting Notes).
	Continuing effort with noxious weeds	Weeds are addressed cooperatively through Billings County and the Forest Service Noxious Weed Management Project FEIS.
	June 1st turnout could be difficult	Comment has been addressed in Alternative 3A.
272	Develop natural spring.	Comment has been addressed in Alternative 3A.
	Re-drill well in 272-01?	Comment was completed in 2007 as replacement water; therefore not proposed in Alternative 3.
277	Asked about proposed tank,	Comment is proposed in first bullet of Allotment 277 Alternative 3 Initial Actions.
	rehabbed dam in SE 23 just N of large woody draw, suggested nearby trail in SESE 23	Comment is request for the rehabbed dam to be released which is addressed through the Forest Service minerals department, and is not a recommendation for the AMP revision.
277	Wants to fix a drift fence by North Creek	Comment is a request for maintenance. The permittee was provided verbal information that this type of request typically doesn't require written

Allotment	Recommendations highlighted in Exhibit 2 of MGA comments	FS Response
		authorization, but is just expected to be done on an as needed basis (see Project Record, Process Documentation – Permittee Meeting Notes).
278	Re-drill existing well in Pastures 1 & 4 if the existing well fails.	Alternative 3 does not preclude replacement water projects if they are necessary in the future.
281	Concerns with club moss growing,	Comment is proposed in third bullet of Allotment 281 Alternative 3 Adaptive Options.
	burdock	Weeds are addressed cooperatively through Billings County and the Forest Service Noxious Weed Management Project FEIS.
286	No water on the North portion of 286-01 except for a few holes along Betsy Creek	Comment is proposed in second bullet of Allotment 286 Alternative 3 Initial Actions.
287	Would like to extend pipeline into NW 26, Pasture 3 proposed to add tank in NW Pasture 3 and permittee agrees that this would be good to draw cattle up into that area	Comment has been addressed in Alternative 3A.
	Increased #s and shorten season - keep with this	Under Adaptive Management, Alternative 3 would not specify this type of detailed information, but doesn't preclude it. This kind of management would be addressed in the AOI.
289	prefers June 1st turnout	Comment is addressed in the Design Criteria common to all action alternatives.
301	Would like to see additional water in 129-02 Section 11	Comment is not applicable for this allotment but for Allotment 129. Comment has been addressed in Alternative 3A.

Tables 3 and 4 only display those comments highlighted in MGA Comments Exhibit 2 ("MGA recommendations that were dropped from consideration by the Forest Service and Forest Service additions to which the MGA member did not agree"). Comments highlighted in Allotments 218, 224, and 285 will not be specifically addressed due to these allotments being conveyed to full private ownership in 2008; therefore, the allotments are no longer part of the project area.

Table 4. Assessment of Comment M – Forest Service additions to Alternative 3 which MGA member did not agree to

Allotment	Initial Actions highlighted in Exhibit 2 of MGA comments	FS Response

Allotment	Initial Actions highlighted in Exhibit 2 of MGA comments	FS Response
126	Reclaim existing spring developments in pastures 4 and 6.	Alternative 3A does not include this action.
127	Implement a two pasture rotation between pastures 2 and 3.	Alternative 3 does not propose a change from the current management.
240	Complete grazing in pasture 4 by March 15.	Alternative 3 Initial Actions is still allowing early winter use of pasture 4 from January 1st to March 15th in conjunction with other winter pastures.
	Reclaim reservoir(s) in pasture 1.	Alternative 3A does not include this action.
244	Cross fence pasture 2, north to south. Cross fencing will create a crested wheatgrass pasture on the east side of pasture 2, which will be grazed early. The additional pasture, created through the cross fence, allows the implementation of a two pasture deferred grazing rotation between remaining pastures.	Alternative 3A does not include this action.
249	Change season of use – Alternate turn-in dates over a three year period. First year turn in starts in June, second July, third August.	Alternative 3 Initial Action was acceptable to MGA member as indicated in 2006 permittee meeting note "Season of use acceptable" (see Project Record, Process Documentation – Permittee Meeting Notes).
256	Create a four pasture deferred rotation utilizing allotments 230 pasture 1, allotment 288 pasture 2, allotment 256 pasture 2, and the proposed riparian pasture in allotment 256.	Alternative 3 Initial Action was proposed by MGA members as indicated in 2006 permittee meeting note "What about keeping present pasture assignments but rotating HQ pastures so there is no SL grazing" (see Project Record, Process Documentation – Permittee Meeting Notes).
	Fence existing reservoir and portion of adjacent woody draw in section 25 in pasture 2.	Alternative 3 Initial Action was proposed by MGA members as indicated in 2007 permittee meeting note "Should not reclaim dam along road, just fence and control use" (see Project Record, Process Documentation – Permittee Meeting

Allotment	Initial Actions highlighted in Exhibit 2 of MGA comments	FS Response
		Notes).
272	Fence woody draw located in the southwest quarter of Section 30 with temporary electric fence.	Alternative 3A does not include this action.
	After construction of the pipeline is complete reclaim the dugout located in the southeast quarter of Section 29 pasture 1 and the reservoir located in the northwest quarter of the southeast quarter of Section 30 pasture 2.	Alternative 3A does not include this action.
277	Fence dam in southeast quarter of the southwest quarter of Section 24 to control livestock access to water.	Alternative 3 Initial Action was proposed by MGA member as indicated in 2005 permittee meeting note "Possible rehab of dam in S Central Section 24" (see Project Record, Process Documentation – Permittee Meeting Notes). After permittee discussion during the second permittee meeting which provided potential initial actions, the proposal was changed to initial action provided in DEIS.
278	Reclaim reservoir in pasture 2.	Alternative 3A does not include this action.
288	Create a four pasture deferred rotation utilizing allotment 230 pasture 1, allotment 288 pasture 2, allotment 256 pasture 2, and the proposed riparian pasture in allotment 256.	Alternative 3 Initial Action was proposed by MGA member as indicated in 2006 permittee meeting note for Allotment 256 "What about keeping present pasture assignments but rotating HQ pastures so there is no SL grazing" (see Project Record, Process Documentation – Permittee Meeting Notes).
	Manage stock tanks to control livestock distribution.	Alternative 3 does not propose a change from the current management.
300	Once well is developed reclaim spring in the southeast quarter of Section 28.	Alternative 3A does not include this action.
	Rehabilitate entrenched livestock trails inside the water lot located in the northeast corner of the allotment.	This action included in Alternative 3 Initial Actions is considered a "Best Management Practice" which doesn't affect the livestock grazing system or livestock numbers. The

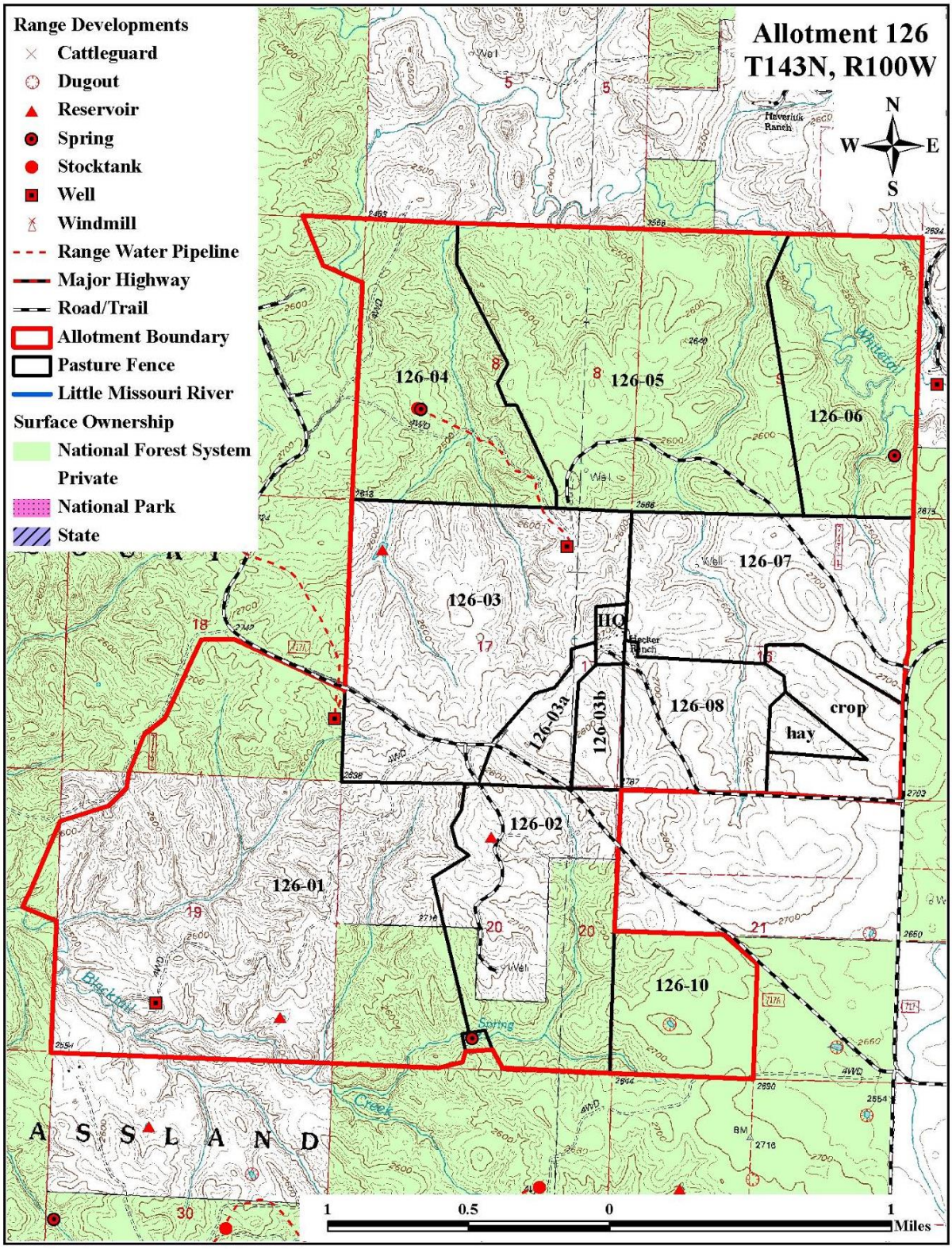
Allotment	Initial Actions highlighted in Exhibit 2 of MGA comments	FS Response
		action does address resource damage/conditions which the Forest Service is obligated to do.
301	Fence out spring areas, install check valve to dump water back into riparian areas once stock tanks are full.	Alternative 3A does not include this action.

SUMMARY OF FS REVIEW OF MGA'S COMMENT – EXHIBIT 2

The Forest Service reviewed Exhibit 2 of the Medora Grazing Association and Billings County comment letters. Exhibit 2 consisted of 101 highlighted actions which MGA felt were recommendations that had not been added to the proposed action or where actions that the Forest Service had added without MGA approval. The following is a summary of the Forest Service review of the highlighted items in Exhibit 2.

- Comment is proposed in Alternative 3 Initial Actions/Adaptive Options or Design Criteria common to all action alternatives. (18 highlighted items)
- Comment has been addressed in Alternative 3A. (16 highlighted items)
- Comment is a statement provided as information, no recommendation was made. (20 highlighted items)
- Comment is a map correction, and was addressed in the creation of the allotment map in Appendix B of the DEIS. (8 highlighted items)
- Under Adaptive Management, Alternative 3 would not specify this type of detailed information, but doesn't preclude it. This kind of management would be addressed in the Annual Operating Instructions. (10 highlighted items)
- Permittee requested to drop/change proposal. (4 highlighted items)
- Comment was made by the Forest Service not a recommendation made by the MGA member. (2 highlighted items)
- Alternative 3 does not preclude private landowners from choosing to manage their private land as requested. (3 highlighted items)
- Comment is recommendation for private land not NFS lands. (2 highlighted items)
- Comment is about weeds which are addressed cooperatively through Billings County and the Forest Service Noxious Weed Management Project FEIS. (3 highlighted items)
- Comment on action was further developed between the second and third permittee meeting. (1 highlighted item)
- Comment is request for maintenance of a range development. (2 highlighted items)
- Comment not agreed to by all common members of the allotment. (1 highlighted item)
- Comment is about a project request that has been completed outside of the AMP revision process. (1 highlighted item)
- Comment not applicable to AMP revision process. (2 highlighted items)
- Comment is not a change from current management. (2 highlighted items)
- Comment on action that was agreed to by permittee. (5 highlighted items)
- Comment on action that is considered a Best Management Practice that is addressing resource damage which the Forest Service is obligated to address. (1 highlighted item)

Appendix B
Allotment Maps


Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
Allotment 126
T143N, R100W
N
W
E
S
126-01
126-02
126-03
126-03a
126-03b
126-04
126-05
126-06
126-07
126-08
126-10
HQ
crop
hay
Whitetail
Blacktail
Creek
Spring
Well
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0.5
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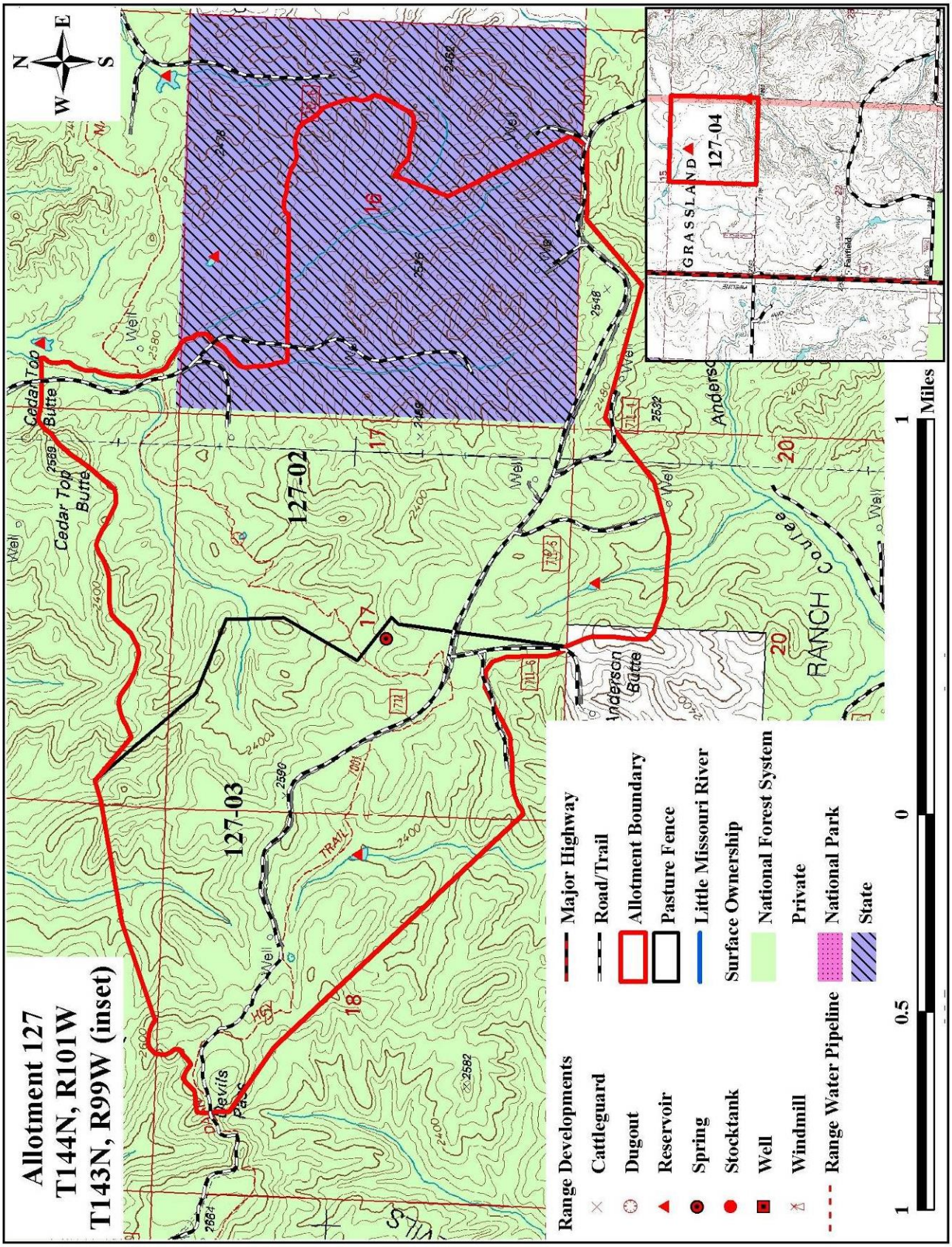
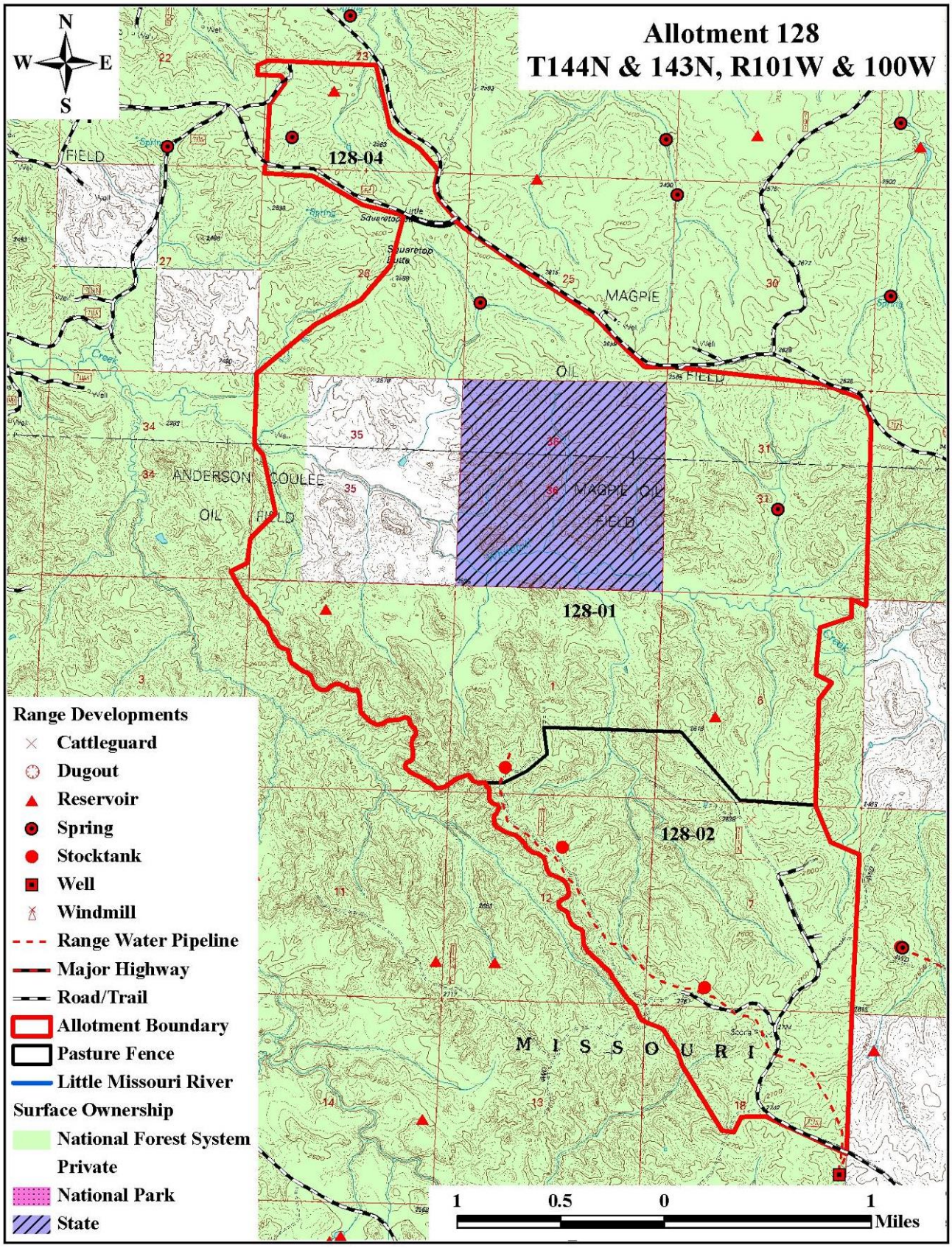
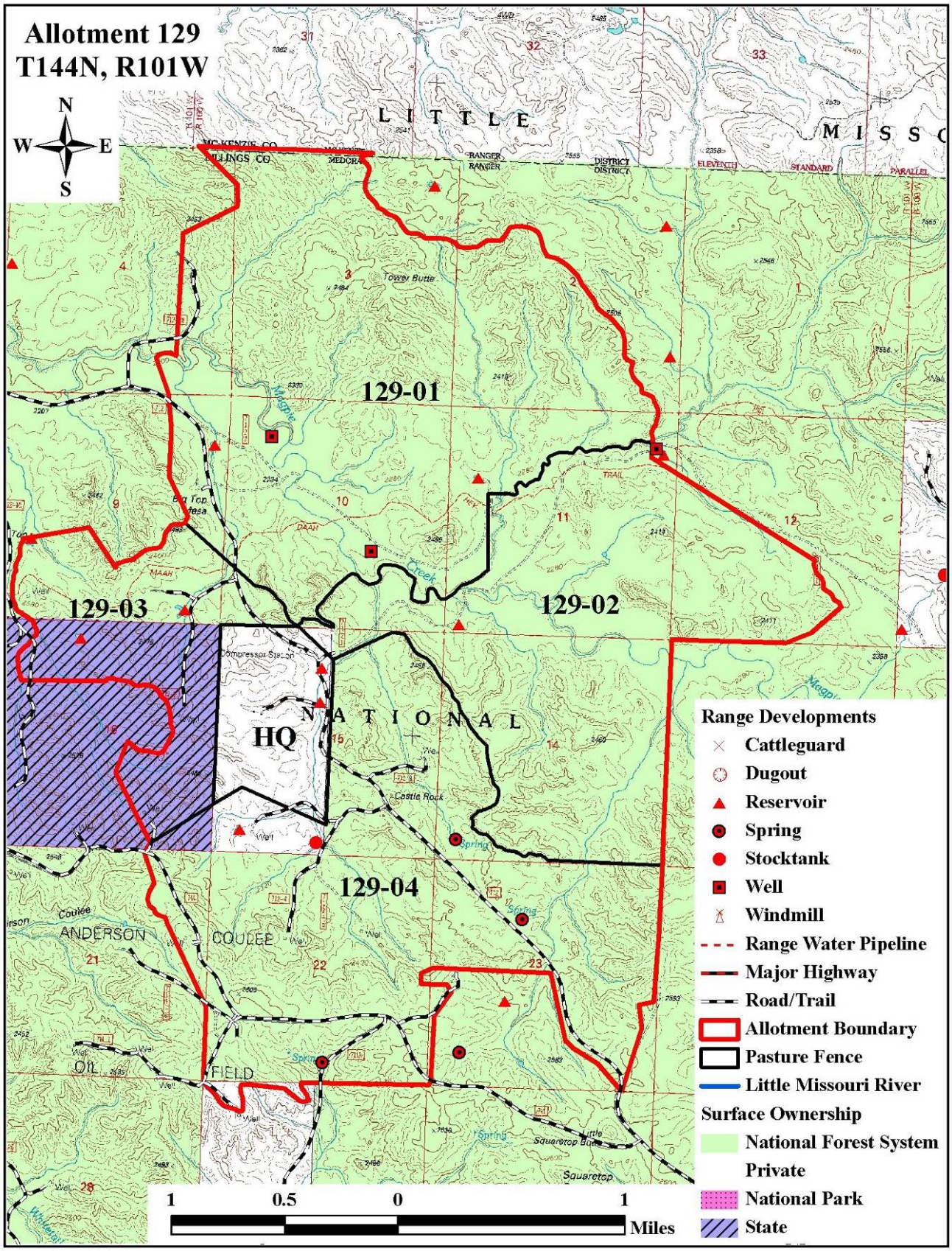
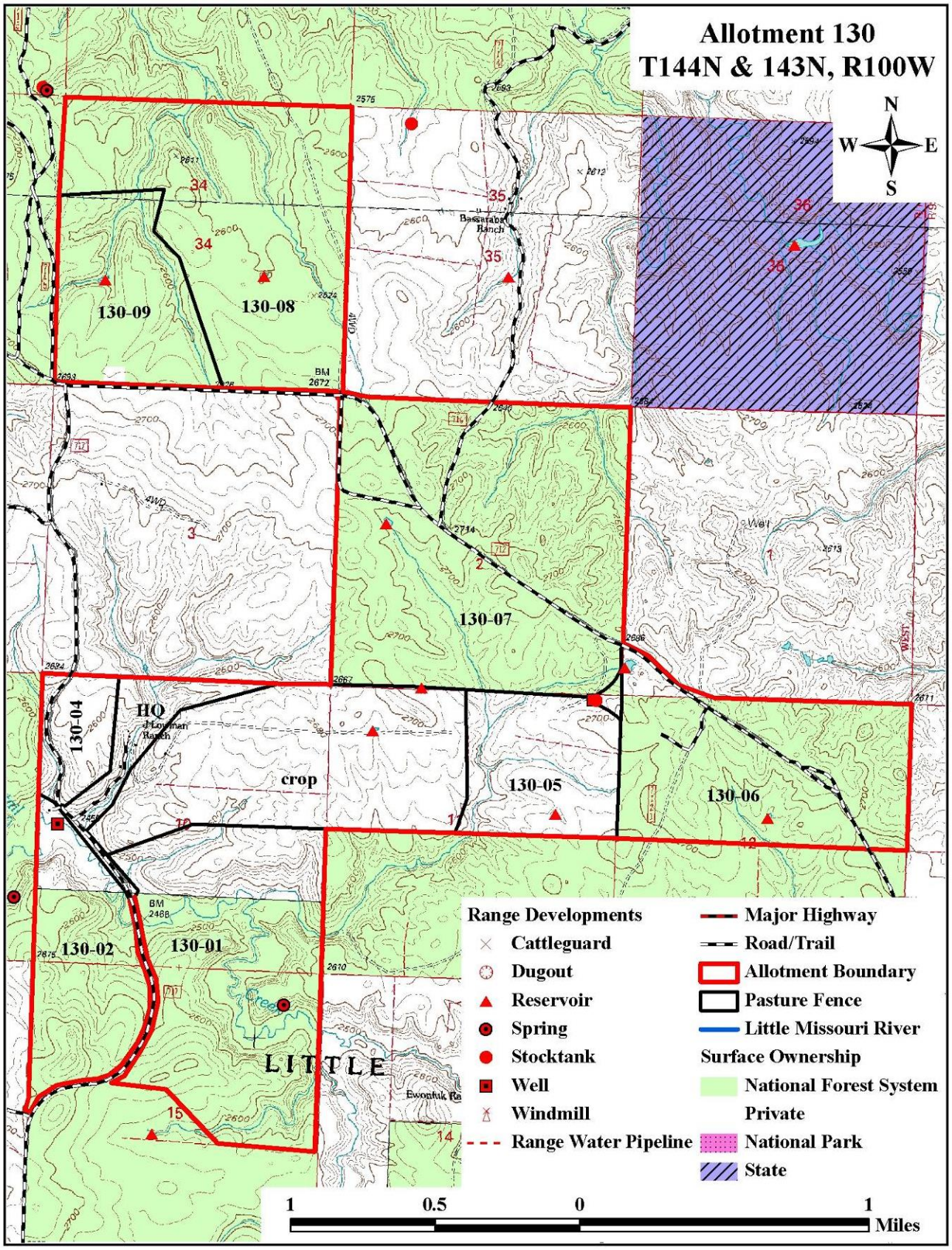
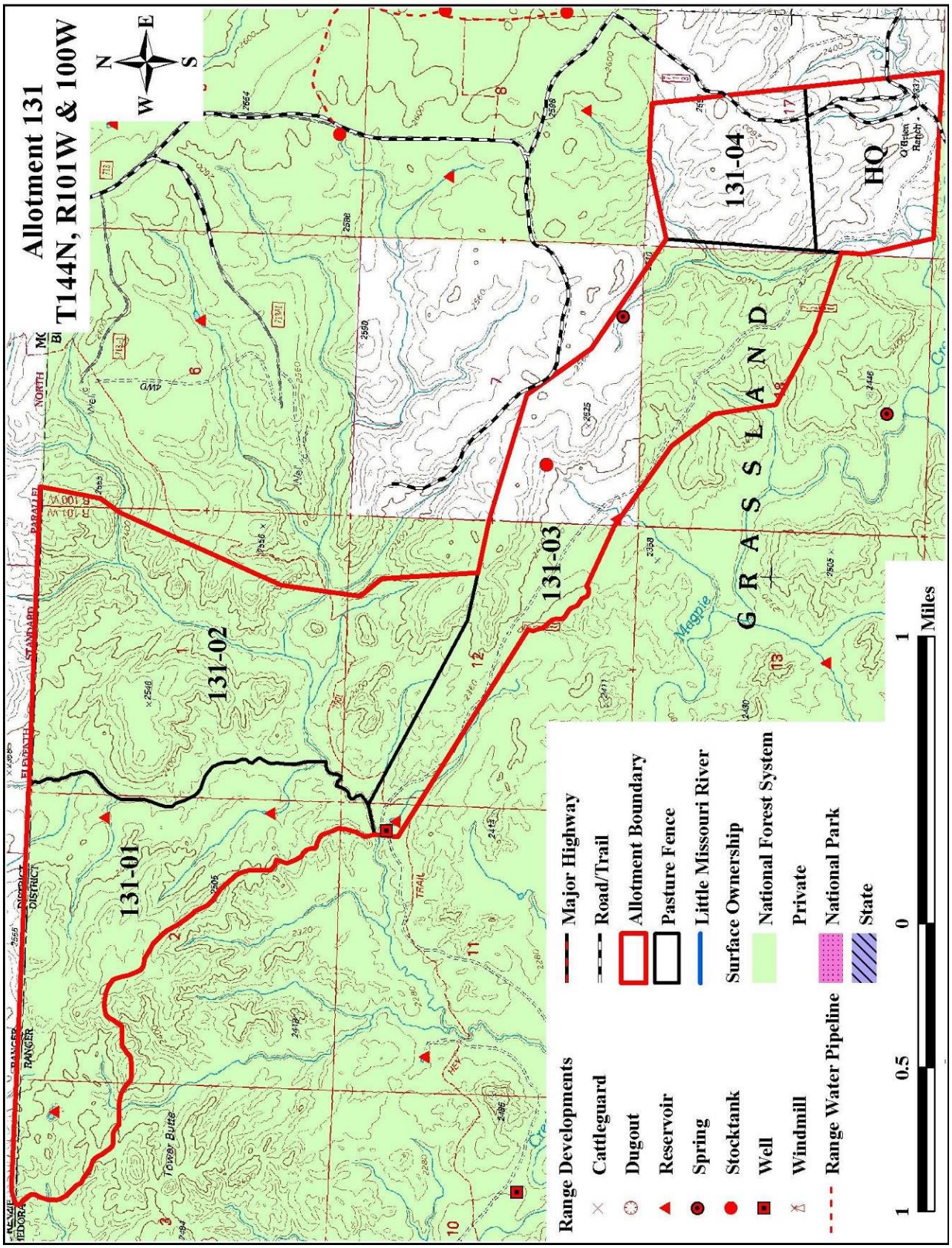
1
Miles

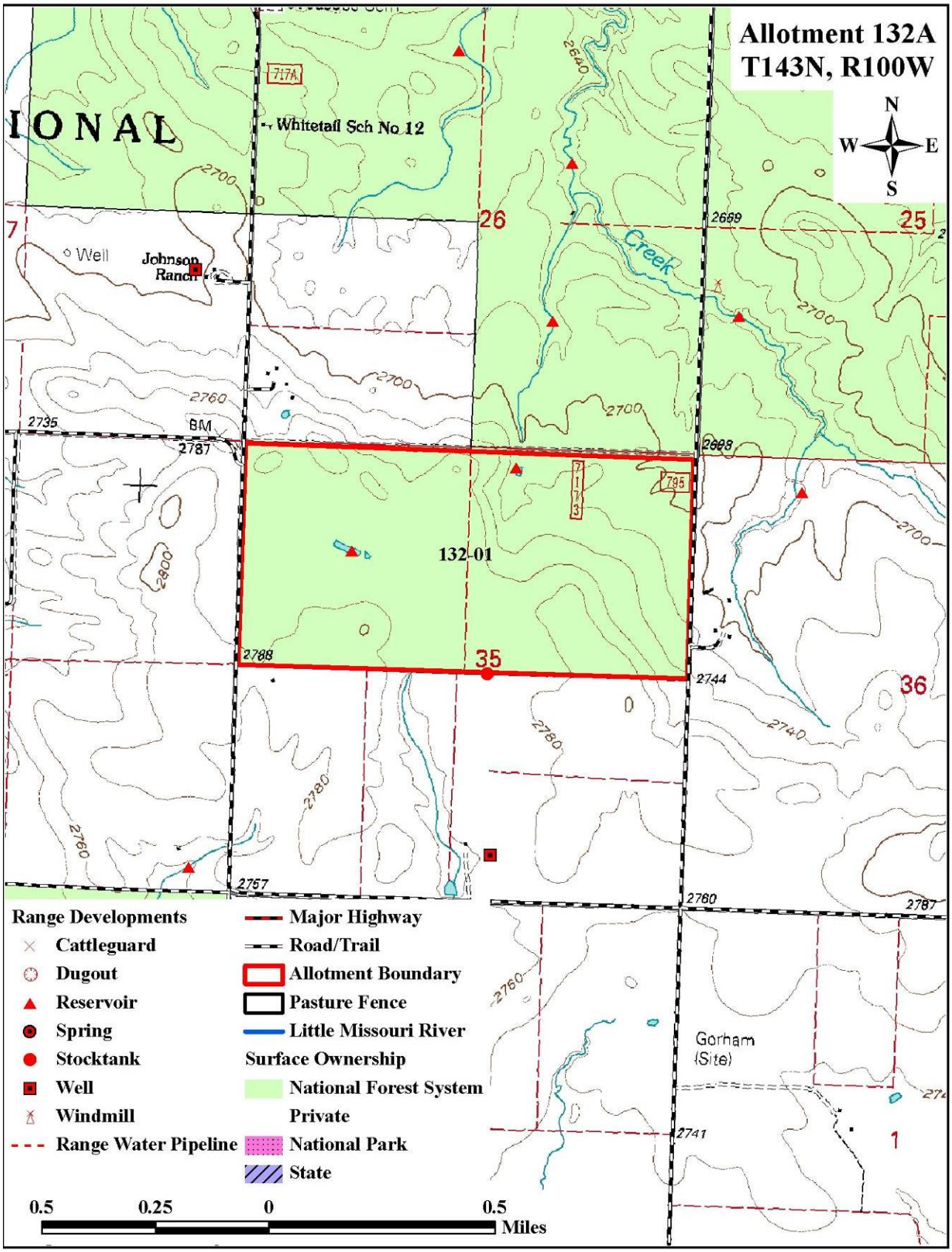

Allotment 127
T144N, R101W
T143N, R99W (inset)
127-03
127-02
127-04
GRASSLAND
Cedar Top Butte
Anderson Butte
RANCH
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
1 0.5 0 1 Miles

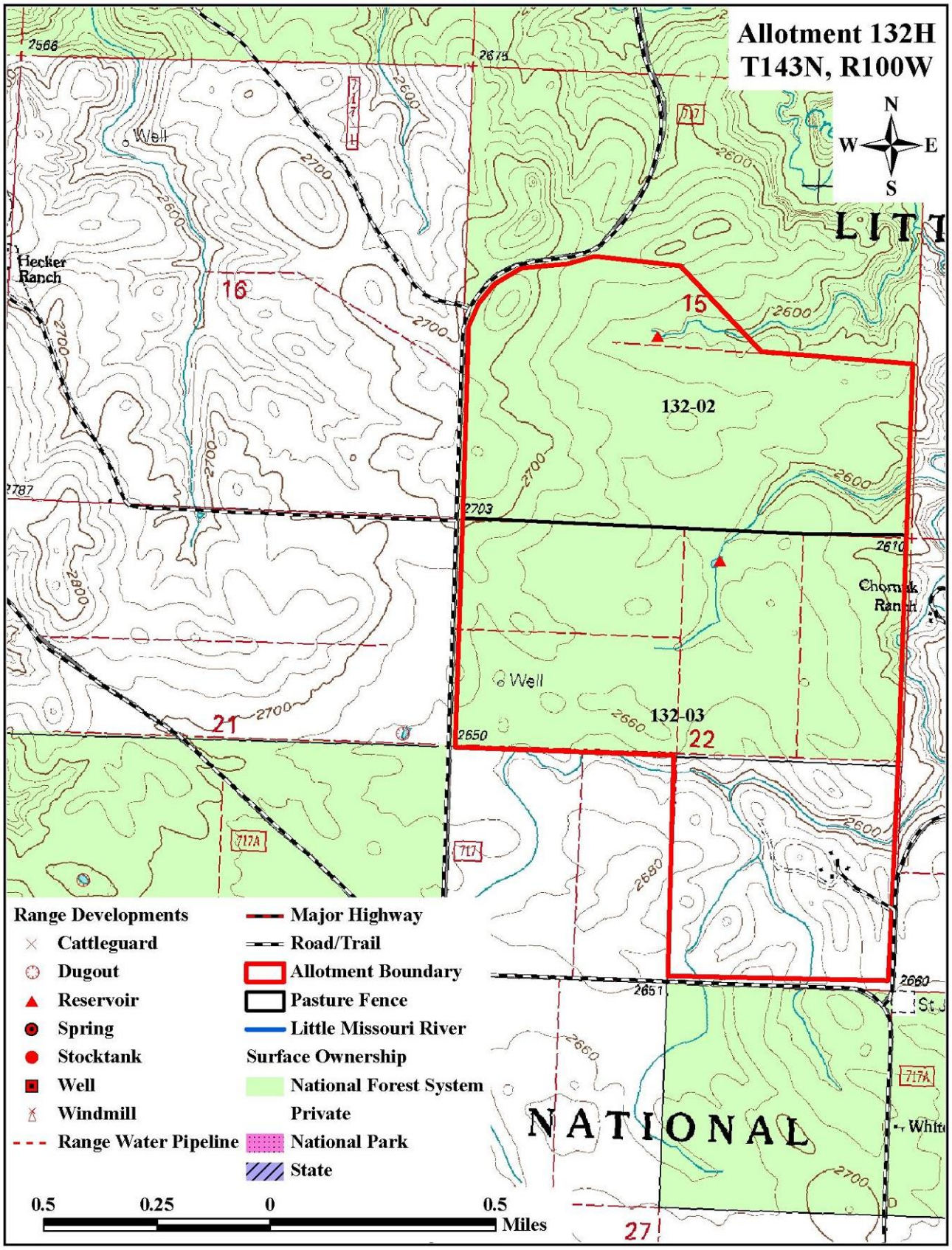

Allotment 128
T144N & 143N, R101W & 100W
N
W
E
S
128-04
128-01
128-02
MAGPIE OIL FIELD
ANDERSON COULEE OIL FIELD
MISSOURI
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
1 0.5 0 1
Miles

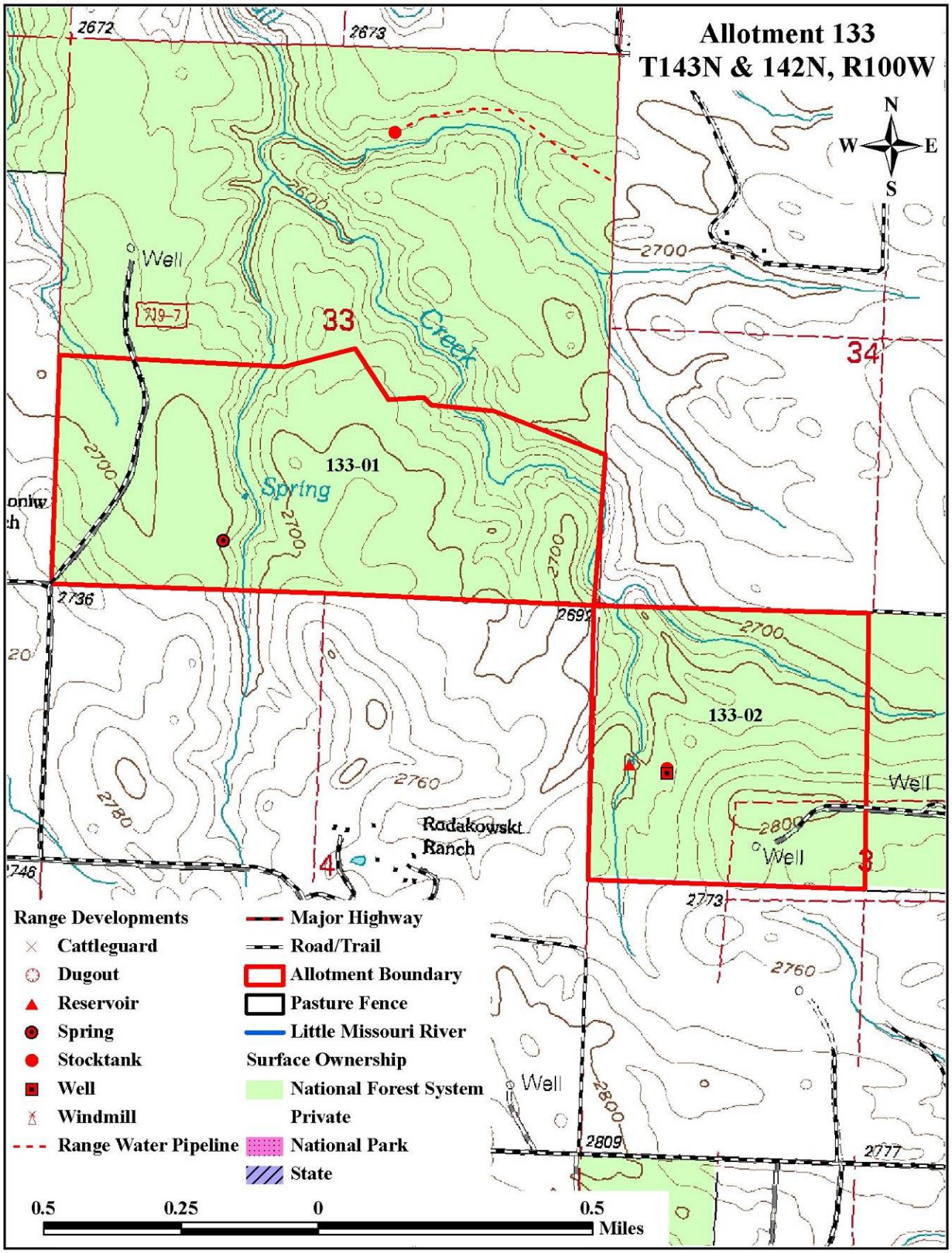

Allotment 129
T144N, R101W
N
W
E
S
129-01
129-02
129-03
129-04
HQ
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
1 0.5 0 1
Miles

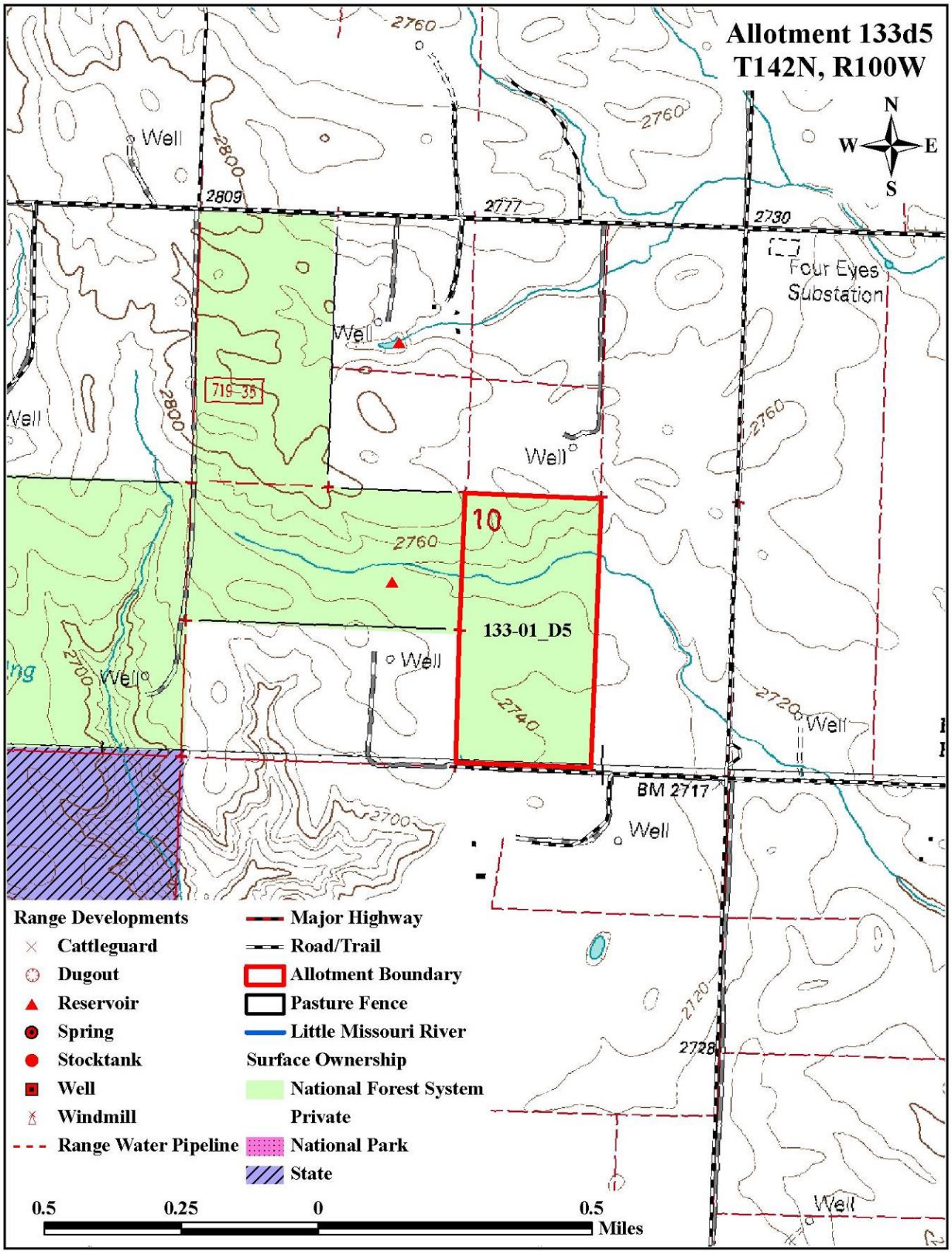

Allotment 130
T144N & 143N, R100W
N
W
E
S
130-09
130-08
130-07
130-04
130-05
130-06
130-02
130-01
HQ
crop
LITTLE
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
1
0.5
0
1
Miles

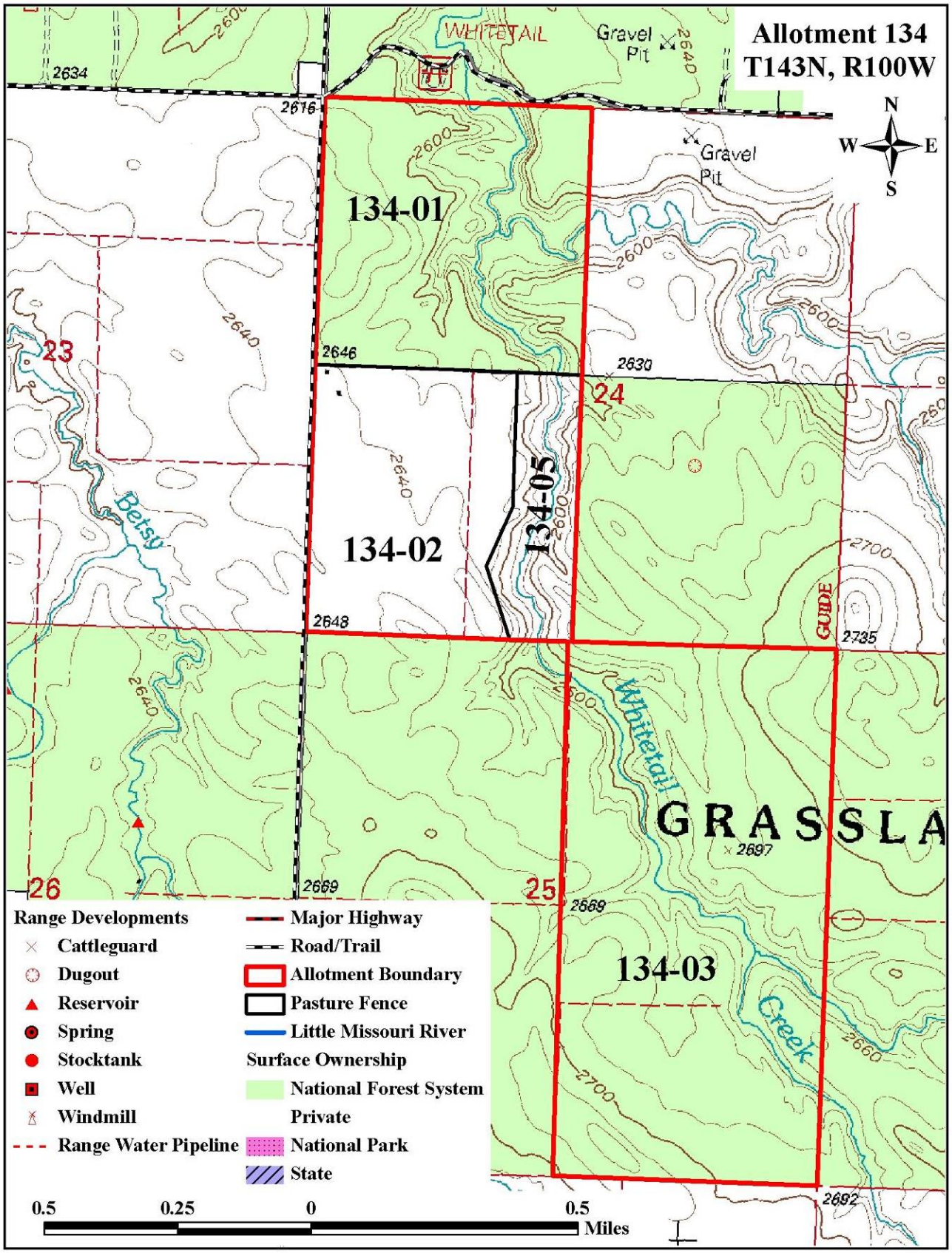

Allotment 131
T144N, R101W & 100W
N
E
S
W
131-01
131-02
131-03
131-04
HQ
GRASSLAND
Magpie
Tower Butte
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
1
0.5
0
1
Miles

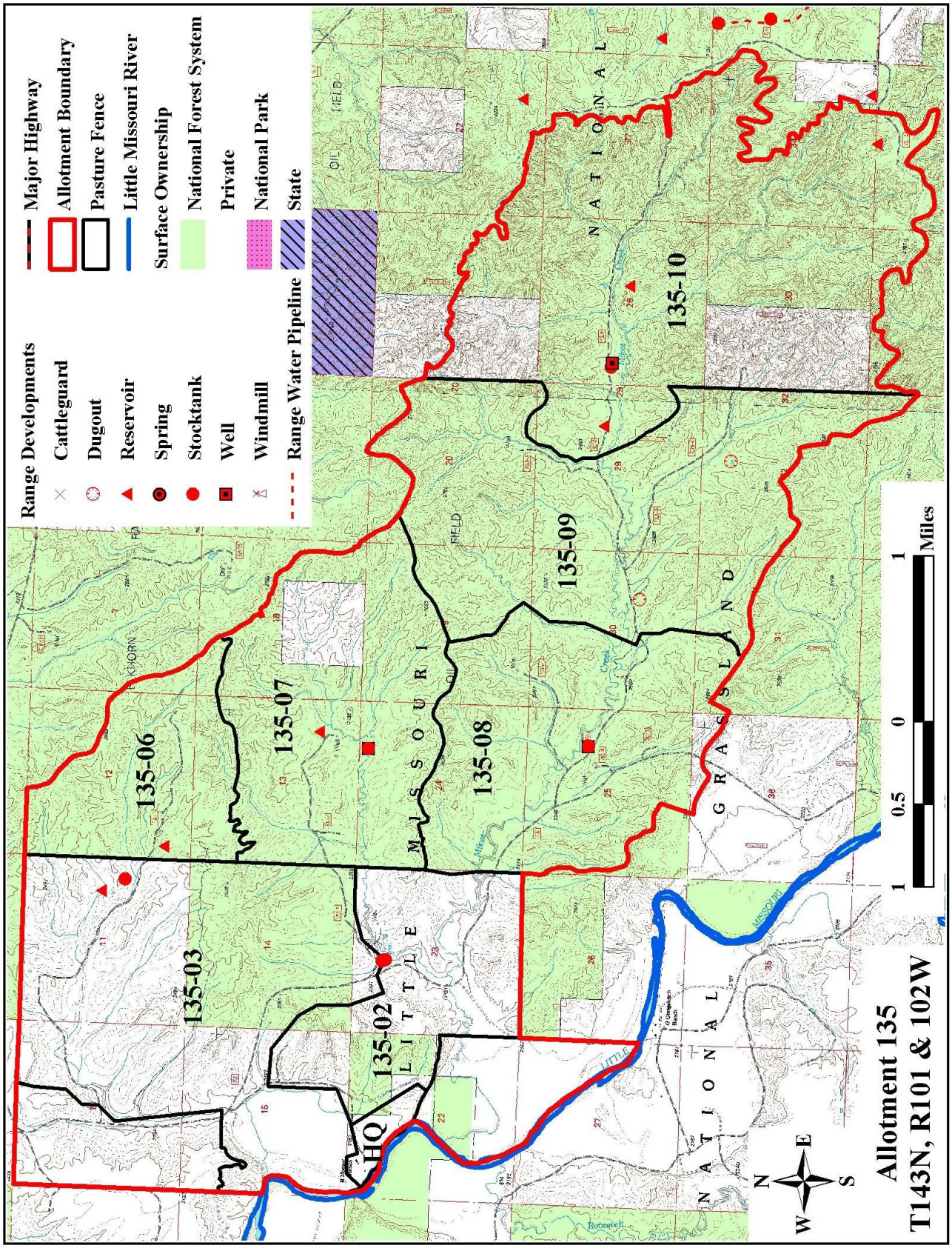

Allotment 132A
T143N, R100W
N
W
E
S
IONAL
Whitetail Sch No 12
717A
Well
Johnson Ranch
Creek
26
25
7
35
36
1
132-01
795
BM
2640
2700
2760
2735
2787
2689
2688
2800
2788
2744
2740
2780
2757
2741
Gorham (Site)
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
0.5
0.25
0
0.5
Miles

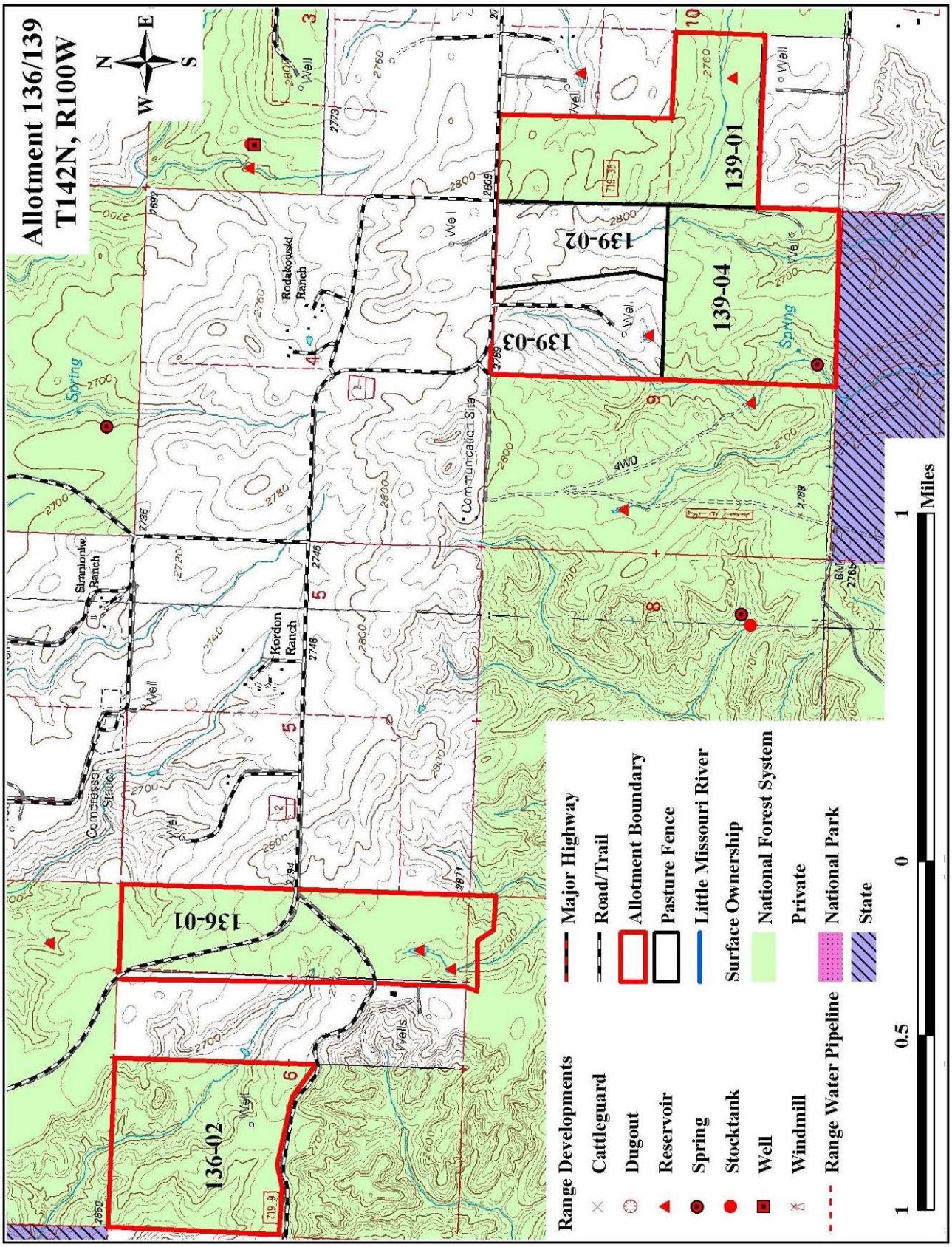

Allotment 132H
T143N, R100W
N
W
E
S
Hecker Ranch
Well
16
15
132-02
132-03
22
21
27
717
717A
Chomak Ranch
LITT
NATIONAL
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
0.5 0.25 0 0.5
Miles

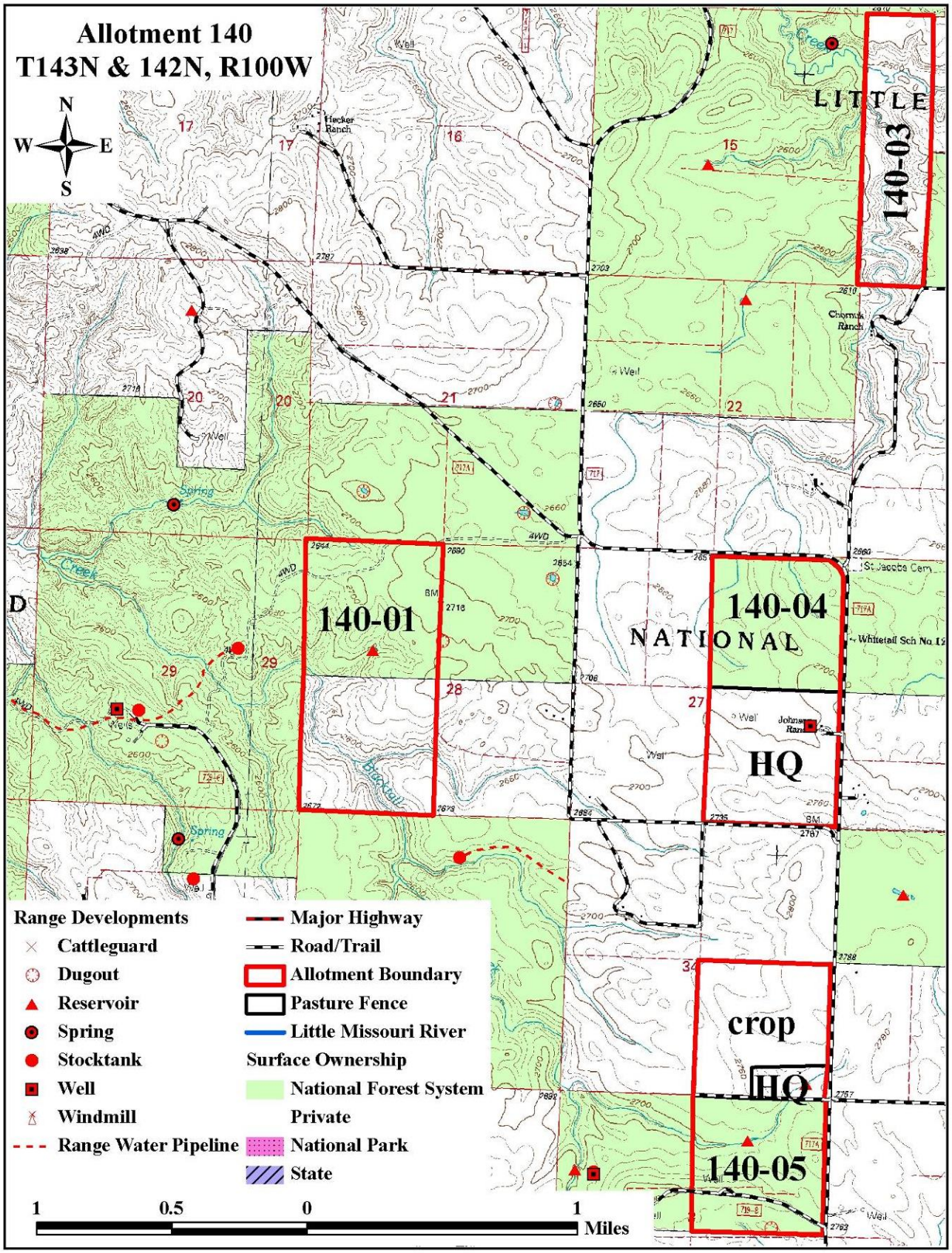

Allotment 133
T143N & 142N, R100W
N
W
E
S
2672
2673
2600
2700
Well
719-7
33
Creek
34
133-01
Spring
2700
2736
2692
2700
133-02
Well
2760
2780
Rodakowski
Ranch
4
2800
Well
3
2773
2760
Well
2800
2809
2777
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
0.5
0.25
0
0.5
Miles

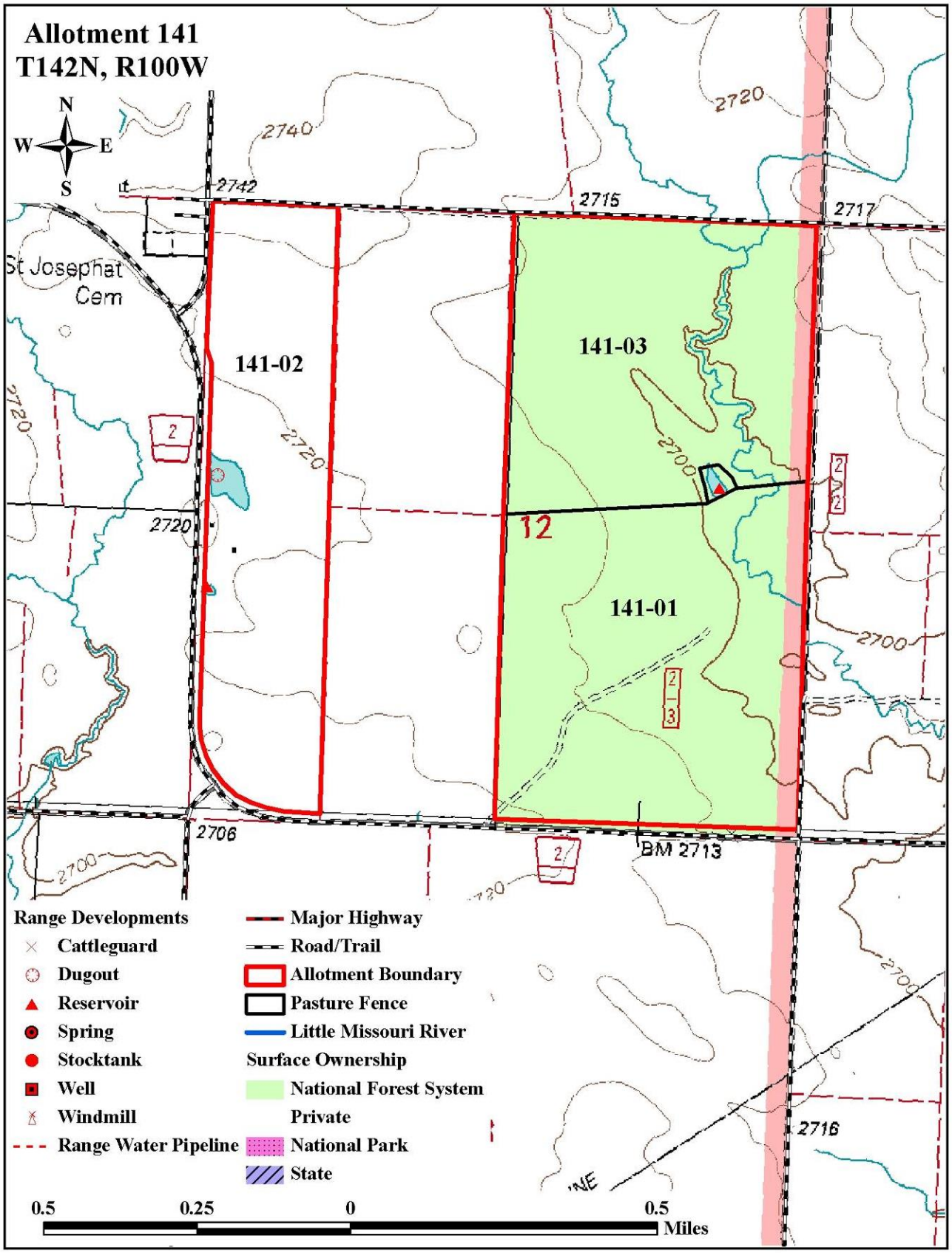

Allotment 133d5
T142N, R100W
N
W
E
S
Well
2760
2800
2809
2777
2730
Four Eyes Substation
719-35
10
133-01_D5
2740
2720
2700
BM 2717
2728
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
0.5
0.25
0
0.5
Miles

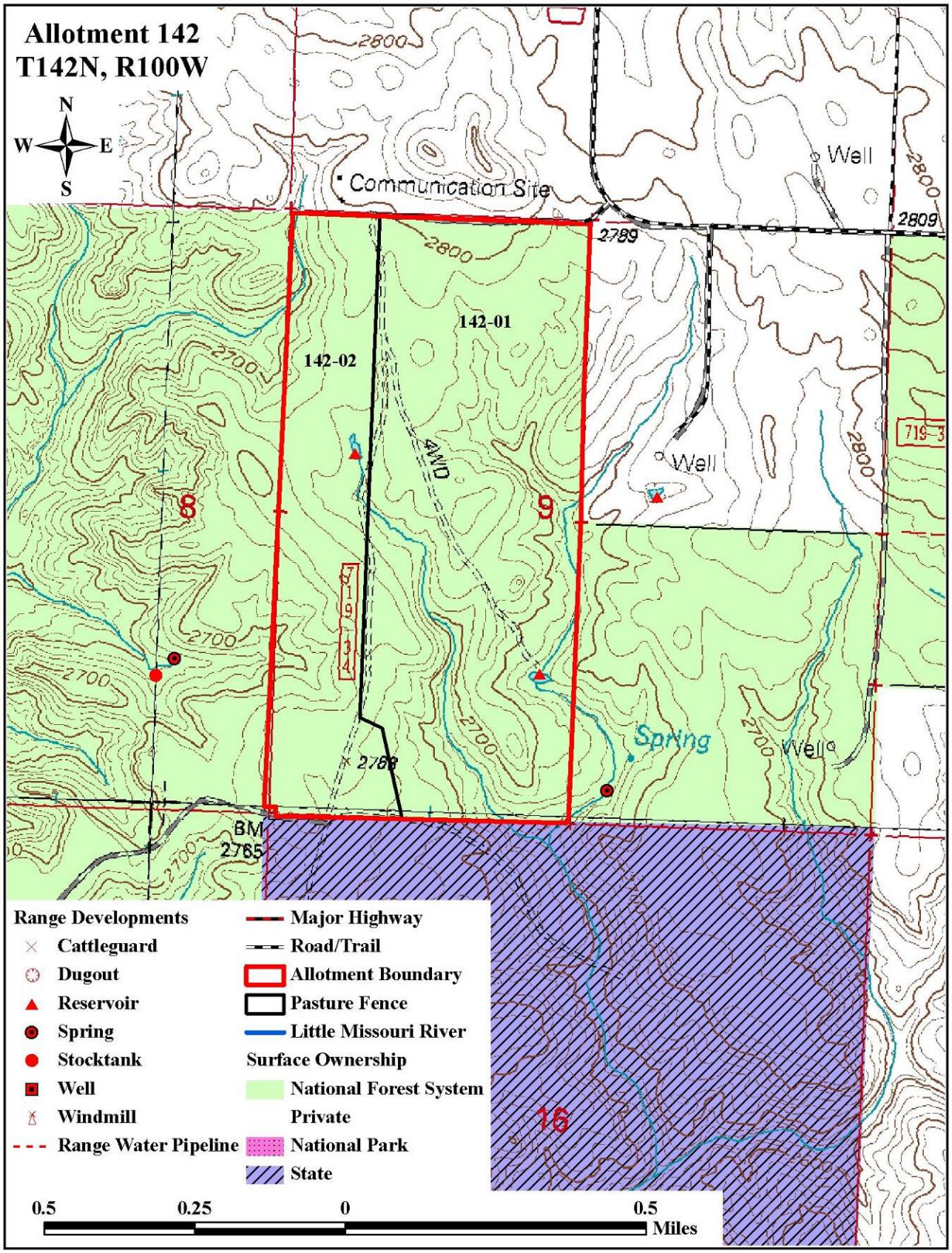

Allotment 134
T143N, R100W
N
W
E
S
134-01
134-02
134-05
134-03
23
24
25
26
WHITETAIL
Gravel Pit
Gravel Pit
Betsy
Whitetail
Creek
GUIDE
GRASSLA
2634
2616
2600
2640
2646
2630
2648
2669
2669
2697
2700
2735
2660
2692
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
0.5
0.25
0
0.5
Miles

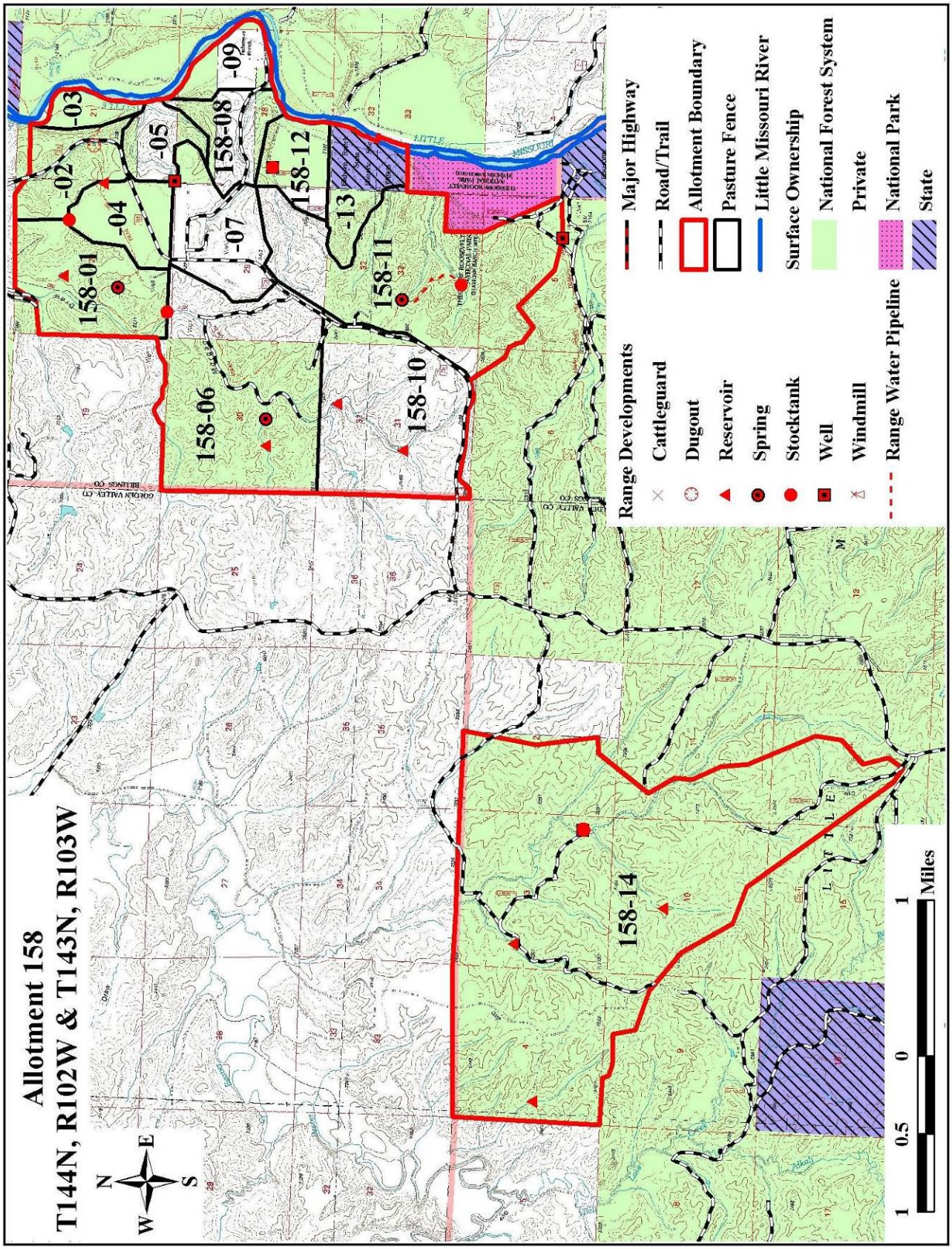

Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
135-03
135-06
135-07
135-08
135-09
135-10
135-02
HQ
LITTLE MISSOURI NATIONAL GRASSLAND
NATIONAL
Miles
Allotment 135
T143N, R101 & 102W

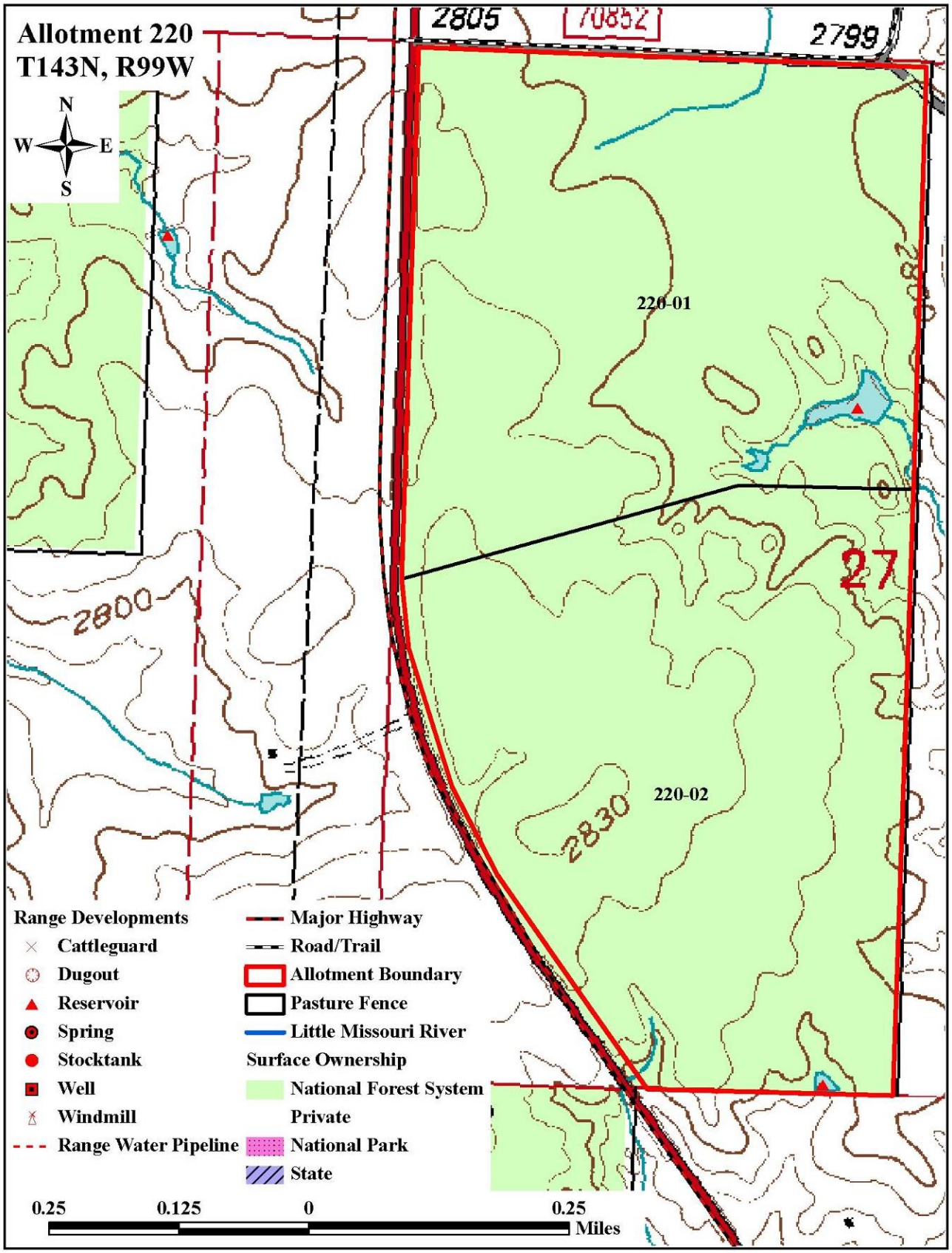

Allotment 136/139
T142N, R100W
N
E
S
W
136-01
136-02
139-01
139-02
139-03
139-04
Rodakowski Ranch
Simmonds Ranch
Kordon Ranch
Comcesso Station
Communication Site
Spring
Well
Wells
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
1
0.5
0
1
Miles

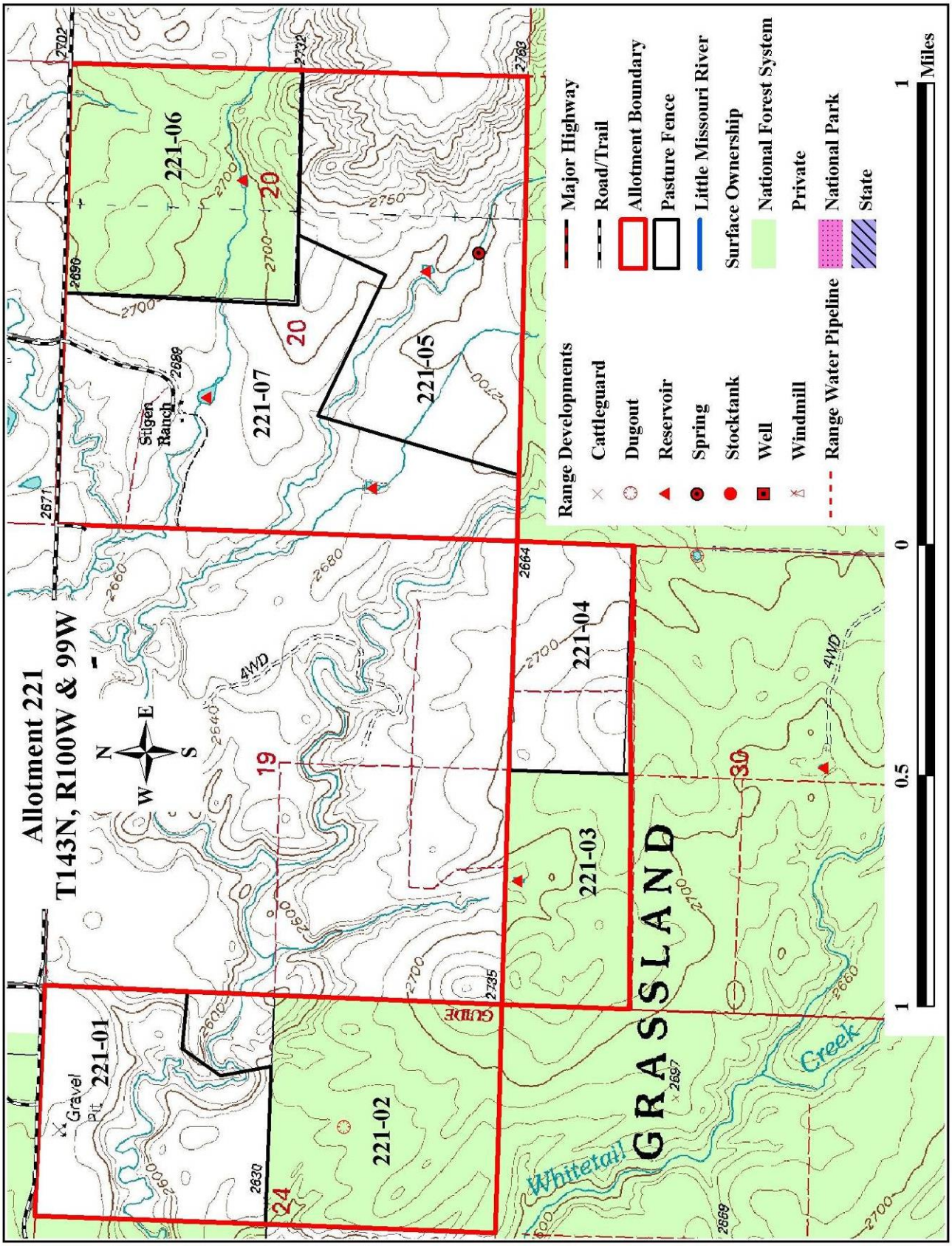

Allotment 140
T143N & 142N, R100W
N
W
E
S
LITTLE
140-03
140-01
140-04
NATIONAL
HQ
crop
HQ
140-05
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
1 0.5 0 1 Miles

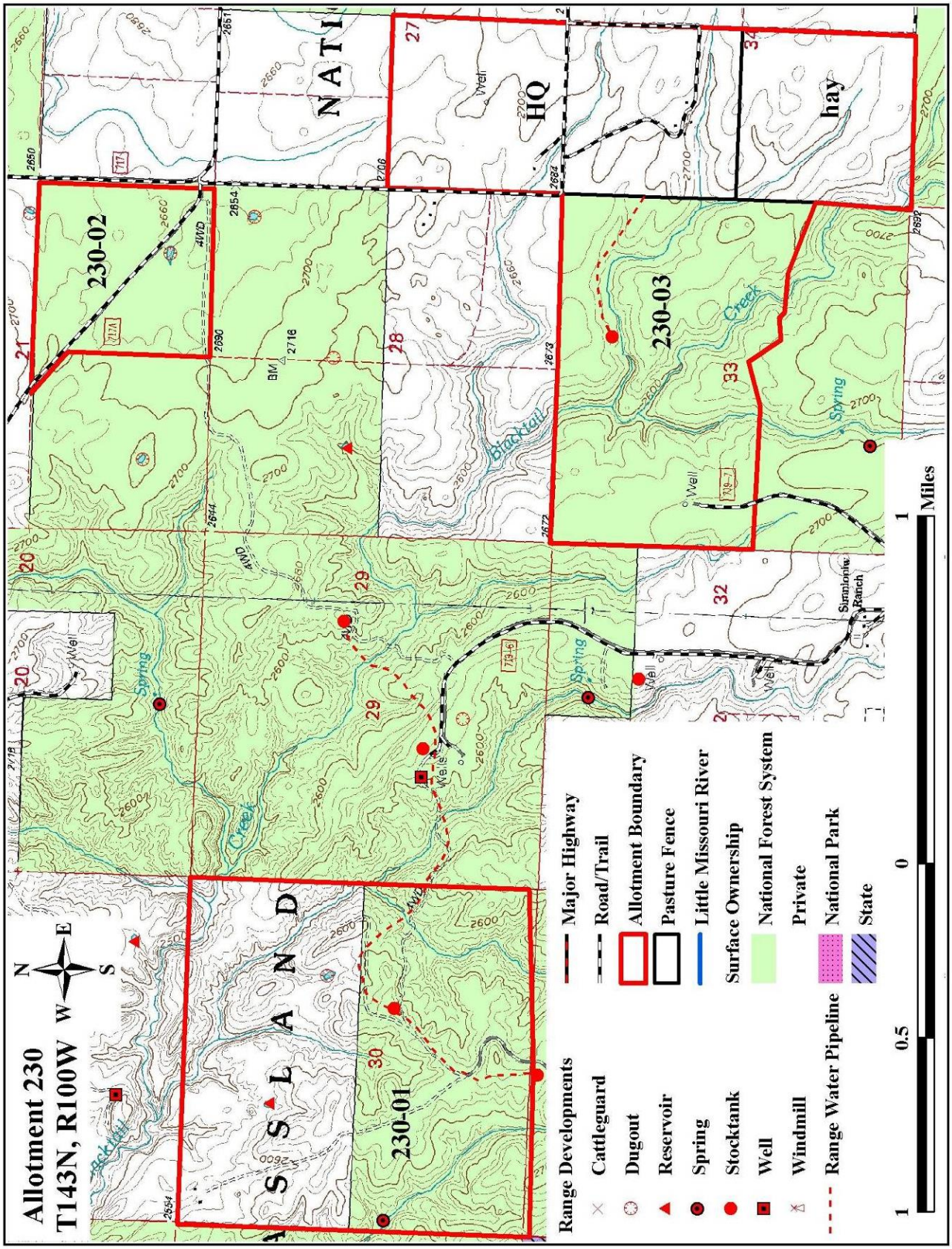

Allotment 141
T142N, R100W
N
W
E
S
2740
2720
2742
2715
2717
St Josephat Cem
141-02
141-03
141-01
12
2720
2700
2706
BM 2713
2716
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
0.5
0.25
0
0.5
Miles

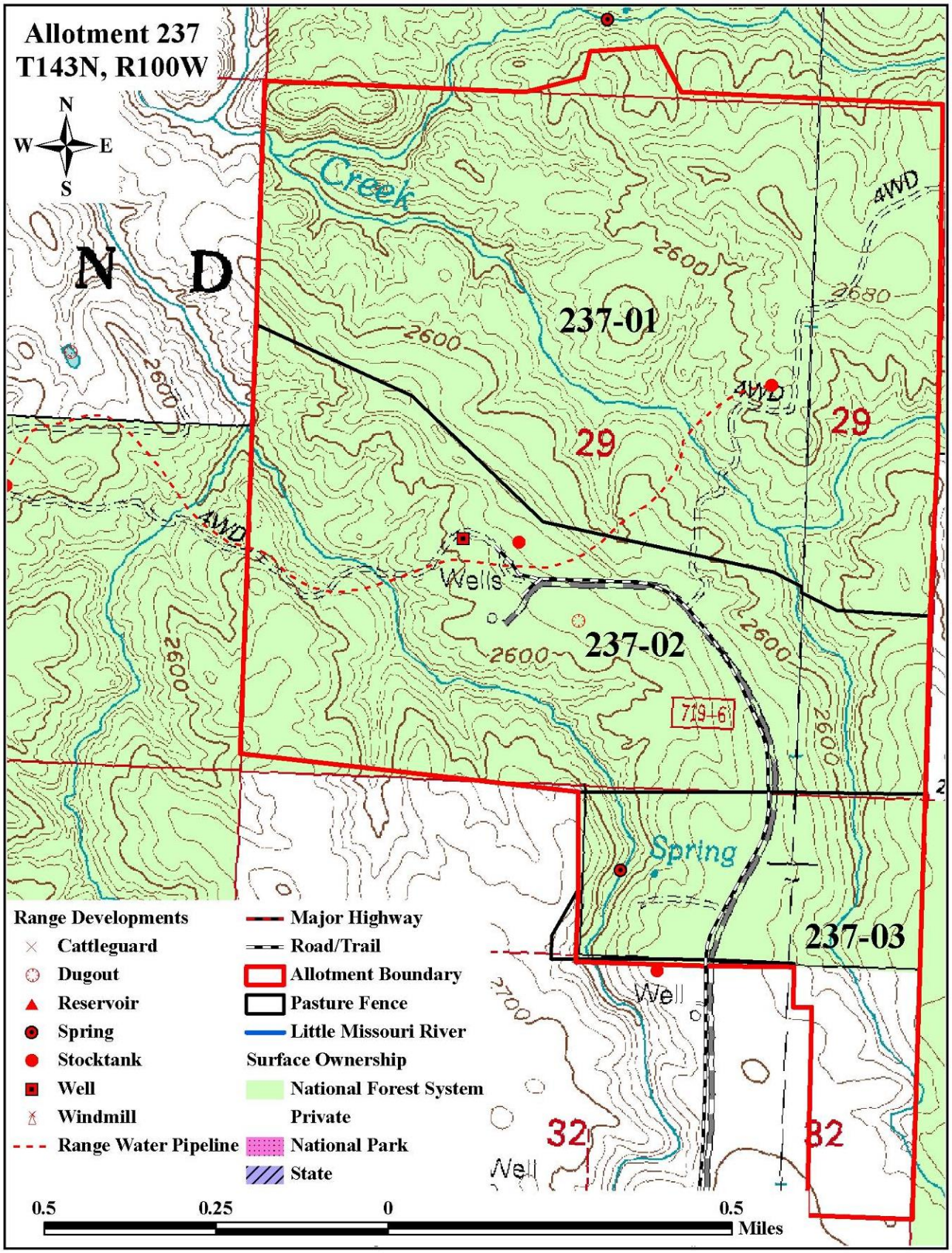

Allotment 142
T142N, R100W
N
W
E
S
Communication Site
Well
2800
2809
2789
142-01
142-02
4WD
8
9
16
Spring
BM
2765
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
0.5
0.25
0
0.5
Miles

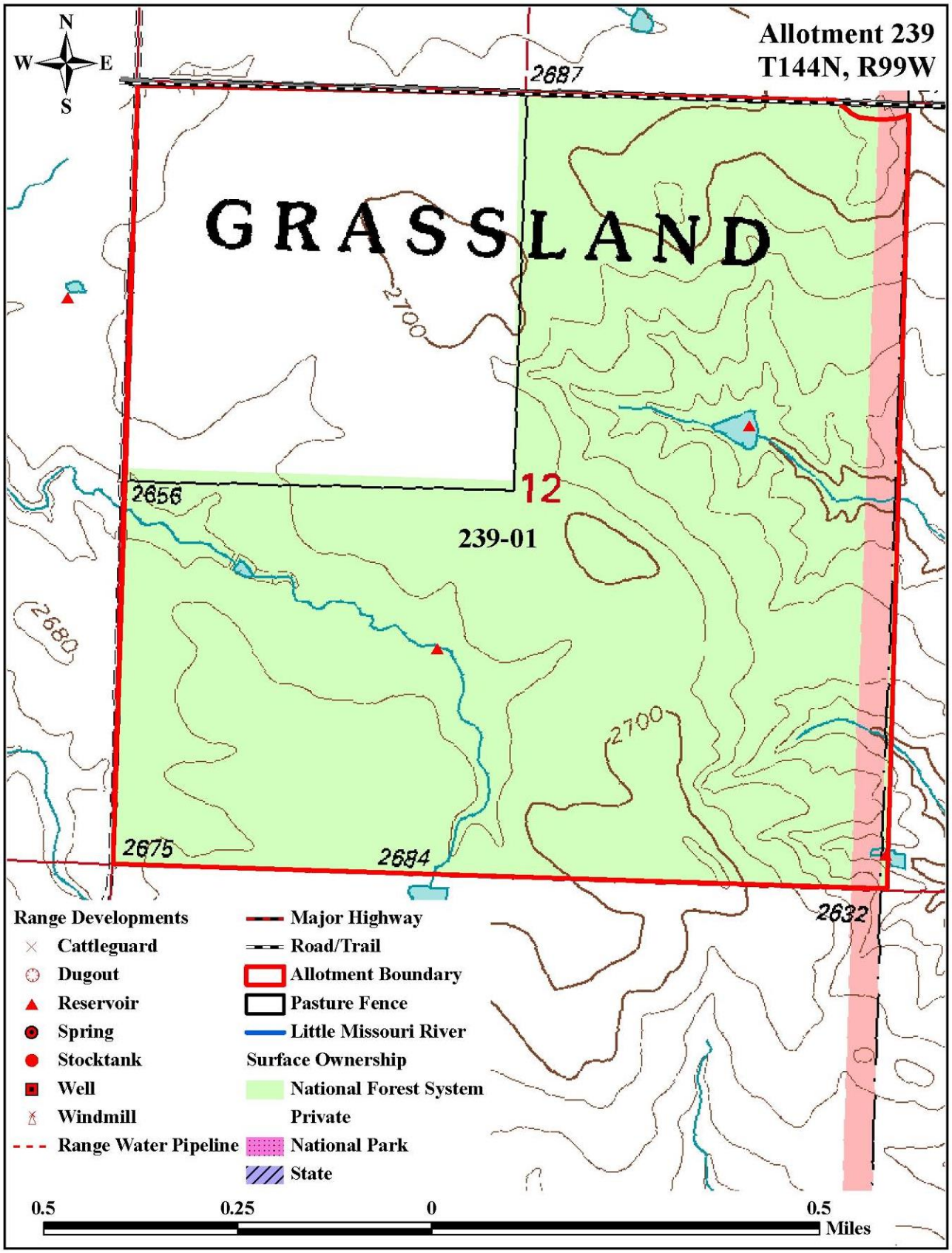

Allotment 158
T144N, R102W & T143N, R103W
N
E
S
W
158-01
-02
-03
-04
-05
-07
158-06
158-08
-09
158-10
158-11
-13
158-12
158-14
LITTLE MISSOURI
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
1
0.5
0
1
Miles

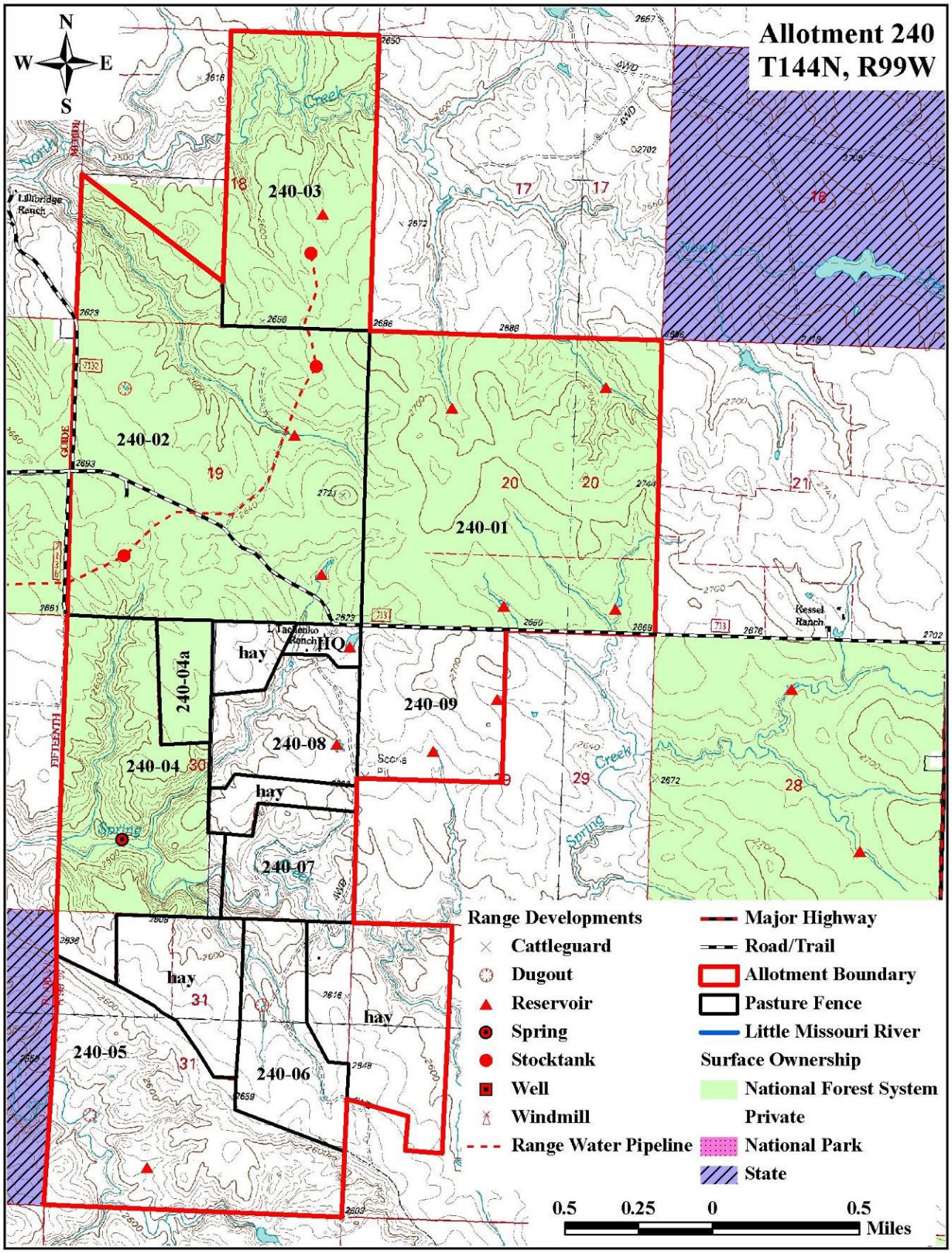

Allotment 220
T143N, R99W
N
W
E
S
2805
70852
2799
220-01
27
2800
2830
220-02
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
0.25
0.125
0
0.25
Miles

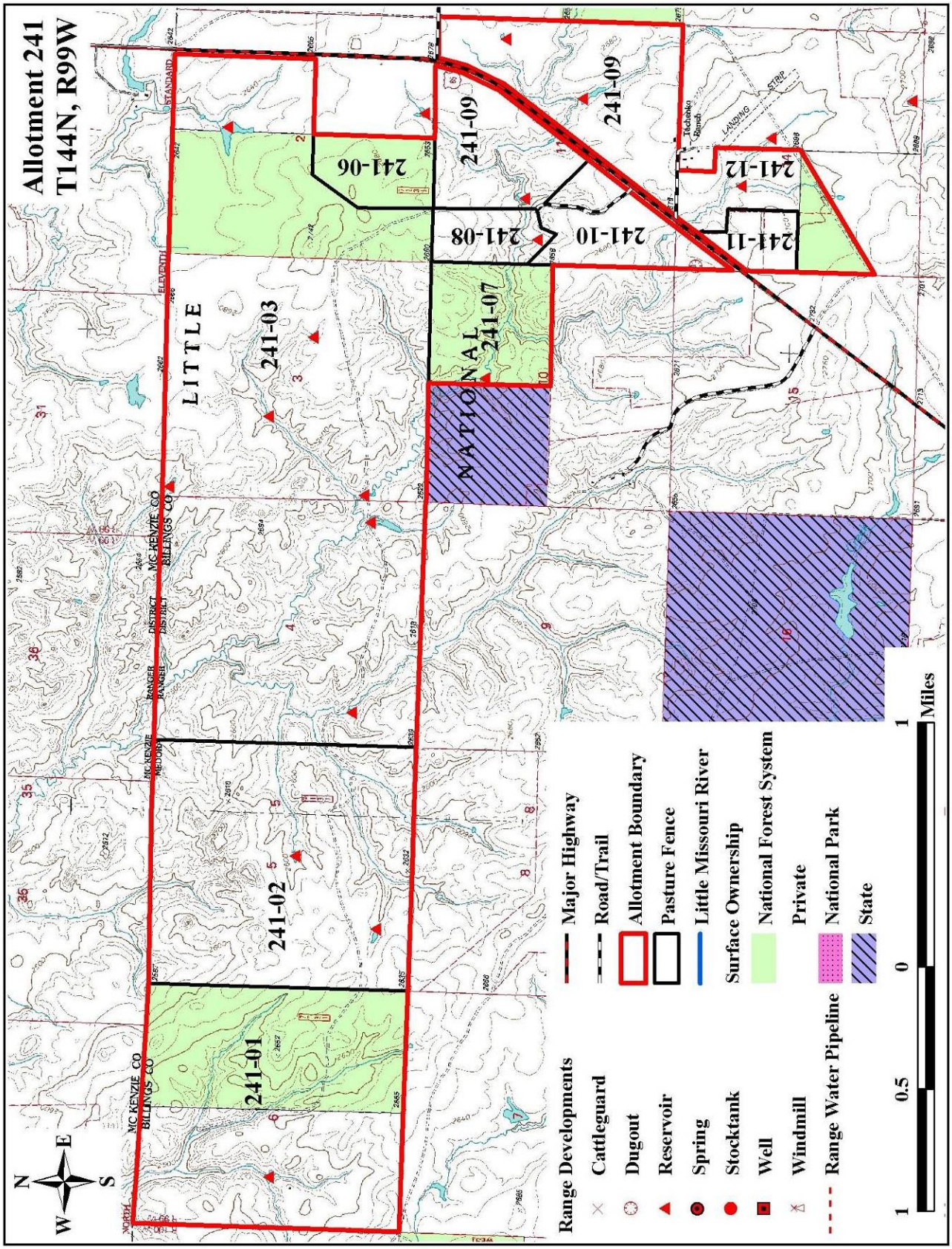

Allotment 221
T143N, R100W & 99W
N
E
S
W
221-01
221-02
221-03
221-04
221-05
221-06
221-07
Gravel Pit
Stigen Ranch
GRASSLAND
Whitetail
Creek
GUIDE
4WD
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
1
0.5
0
1
Miles

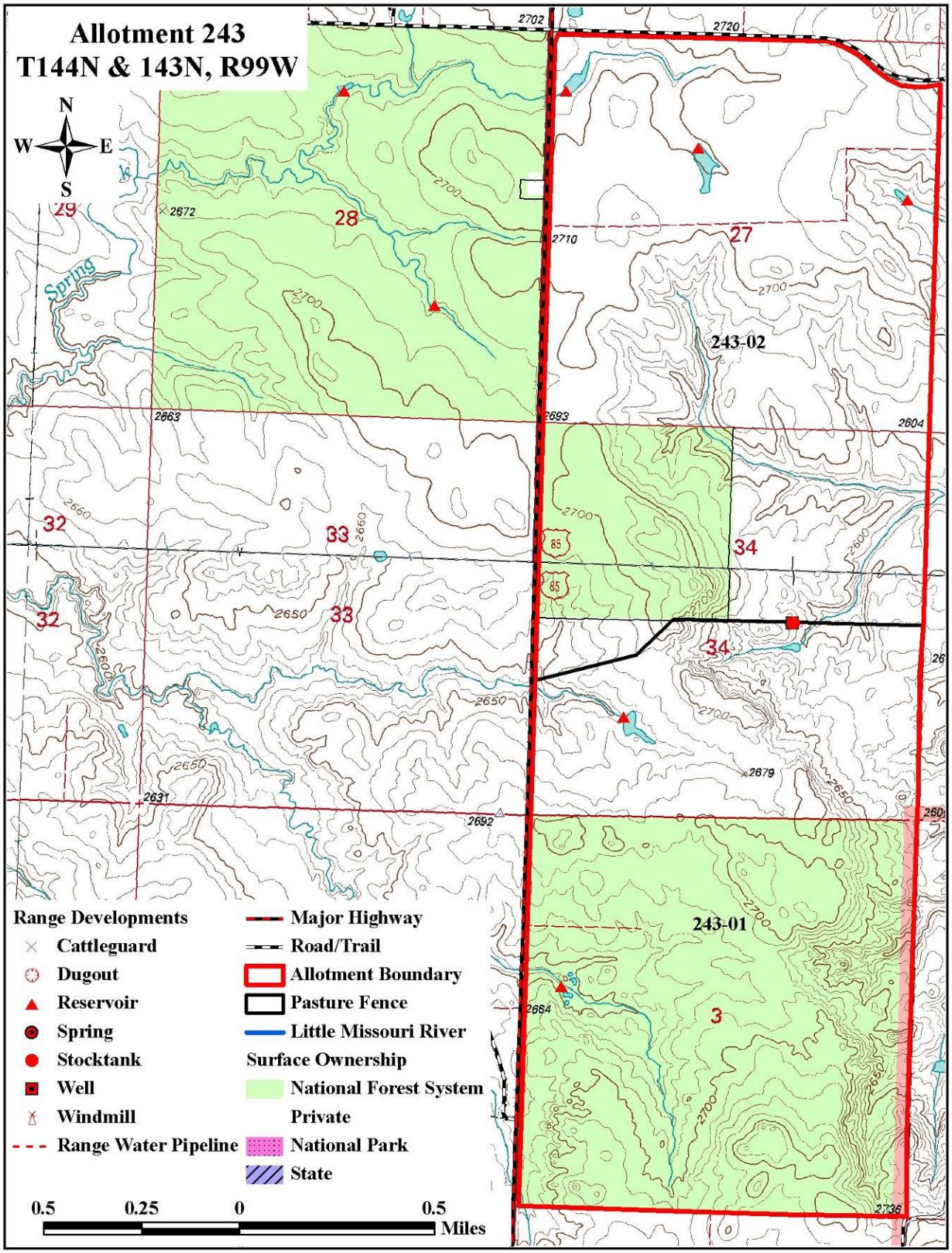

Allotment 230
T143N, R100W
N
W
E
S
230-01
230-02
230-03
HQ
hay
Blacktail
Creek
Spring
Well
Summons Ranch
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
1
0.5
0
1
Miles

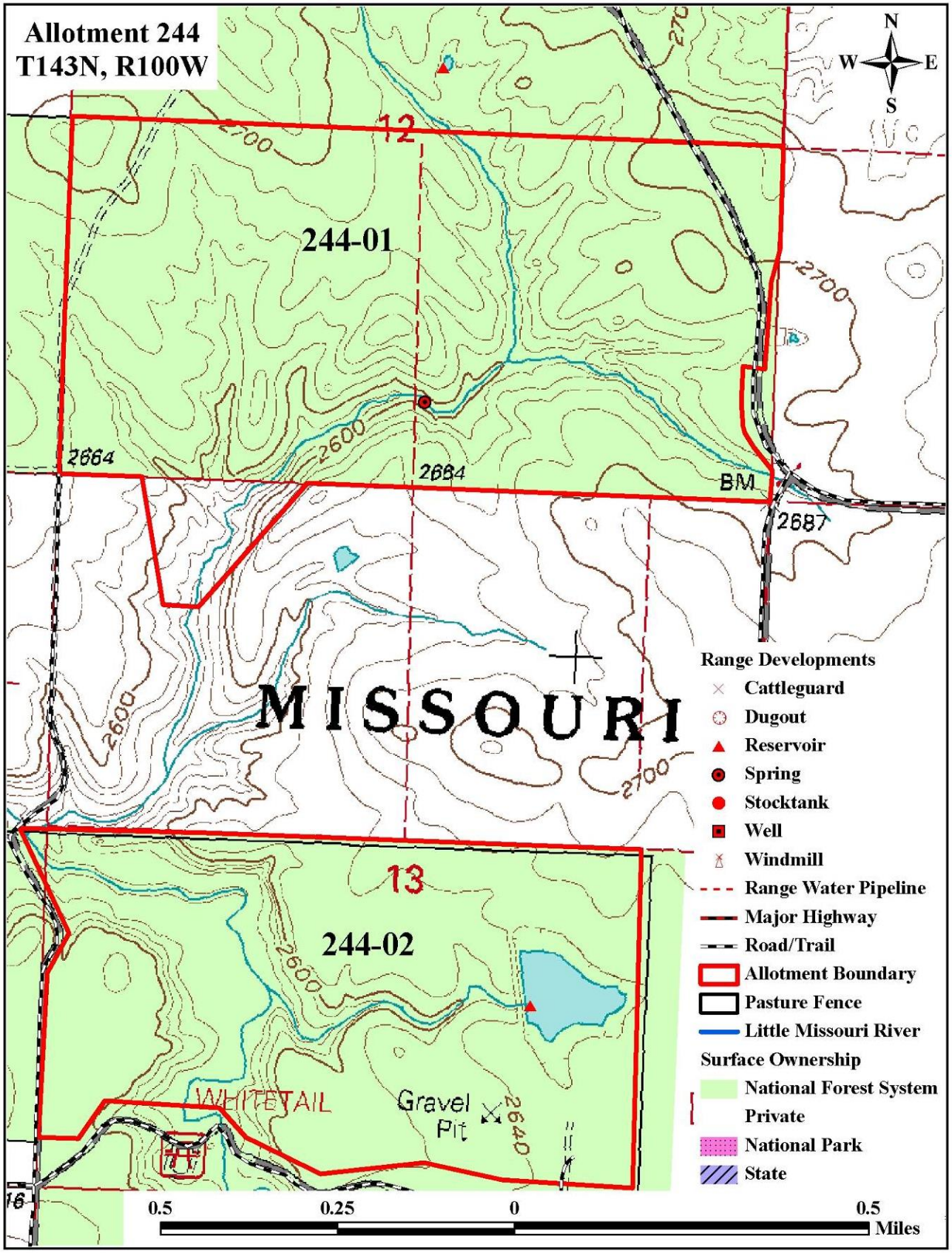

Allotment 237
T143N, R100W
N
W
E
S
N D
Creek
237-01
237-02
237-03
29
29
32
32
Wells
Spring
Well
Well
4WD
4WD
4WD
2600
2680
2700
719-6
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
0.5
0.25
0
0.5
Miles

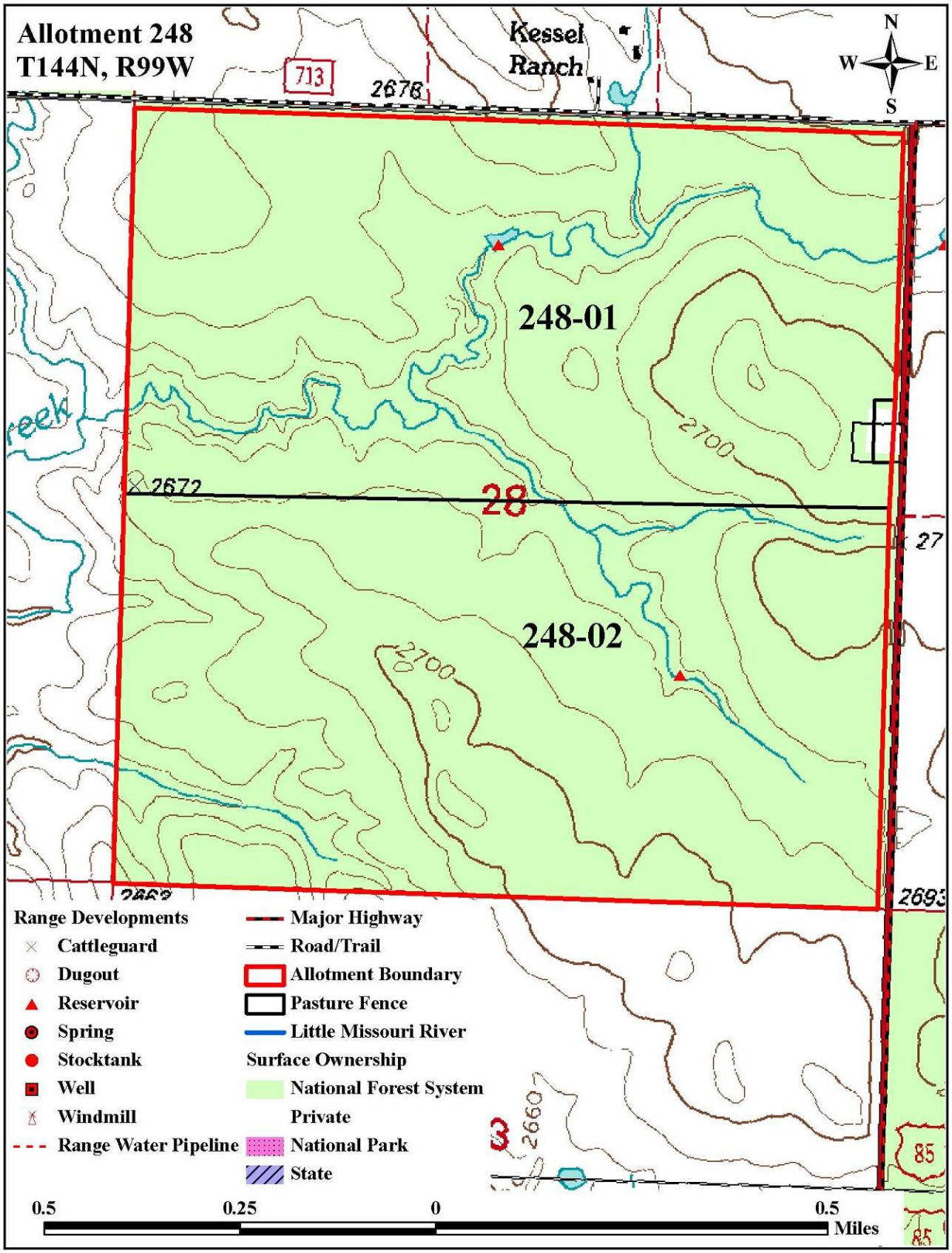

Allotment 239
T144N, R99W
N
W
E
S
GRASSLAND
2687
2700
2656
12
239-01
2680
2700
2675
2684
2632
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
0.5
0.25
0
0.5
Miles


Allotment 240
T144N, R99W
N
W
E
S
240-03
240-02
240-01
240-04a
240-04
240-09
240-08
240-07
240-05
240-06
hay
HQ
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
0.5 0.25 0 0.5
Miles


Allotment 241
T144N, R99W
241-01
241-02
241-03
241-06
241-07
241-08
241-09
241-09
241-10
241-11
241-12
LITTLE
NATIONAL
MC KENZIE CO
BILLINGS CO
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
1 0.5 0 1 Miles


Allotment 243
T144N & 143N, R99W
N
W
E
S
29
28
27
243-02
32
33
34
243-01
3
Spring
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
0.5
0.25
0
0.5
Miles


Allotment 244
T143N, R100W
N
W
E
S
12
244-01
2700
2600
2664
2684
BM
2687
MISSOURI
13
244-02
WHITETAIL
Gravel Pit
2640
16
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
0.5
0.25
0
0.5
Miles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Kessel Ranch
713
2676
N
W
E
S
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248-02
28
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2672
2660
85
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
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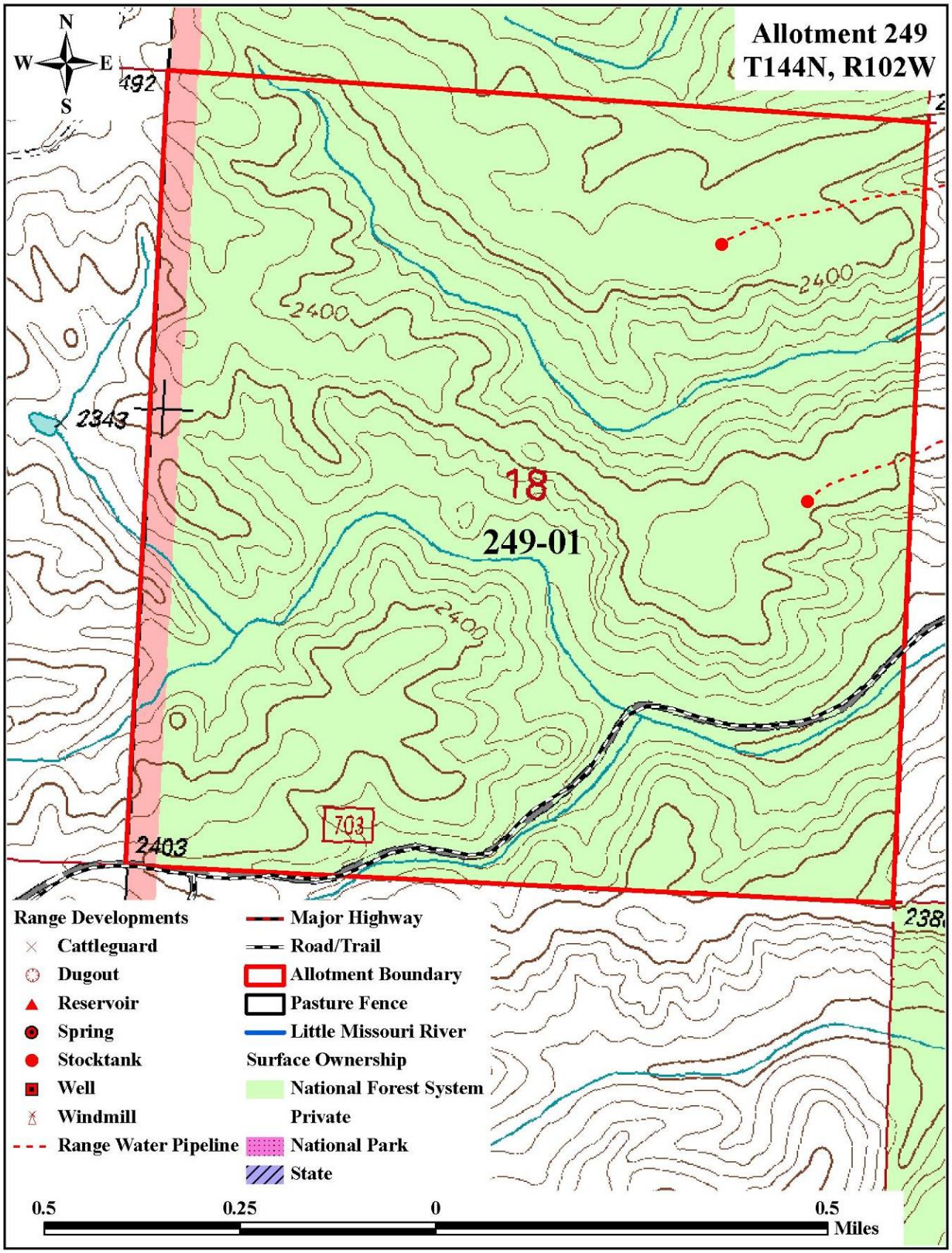
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2343
18
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2400
703
2403
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
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Surface Ownership
National Forest System
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National Park
State
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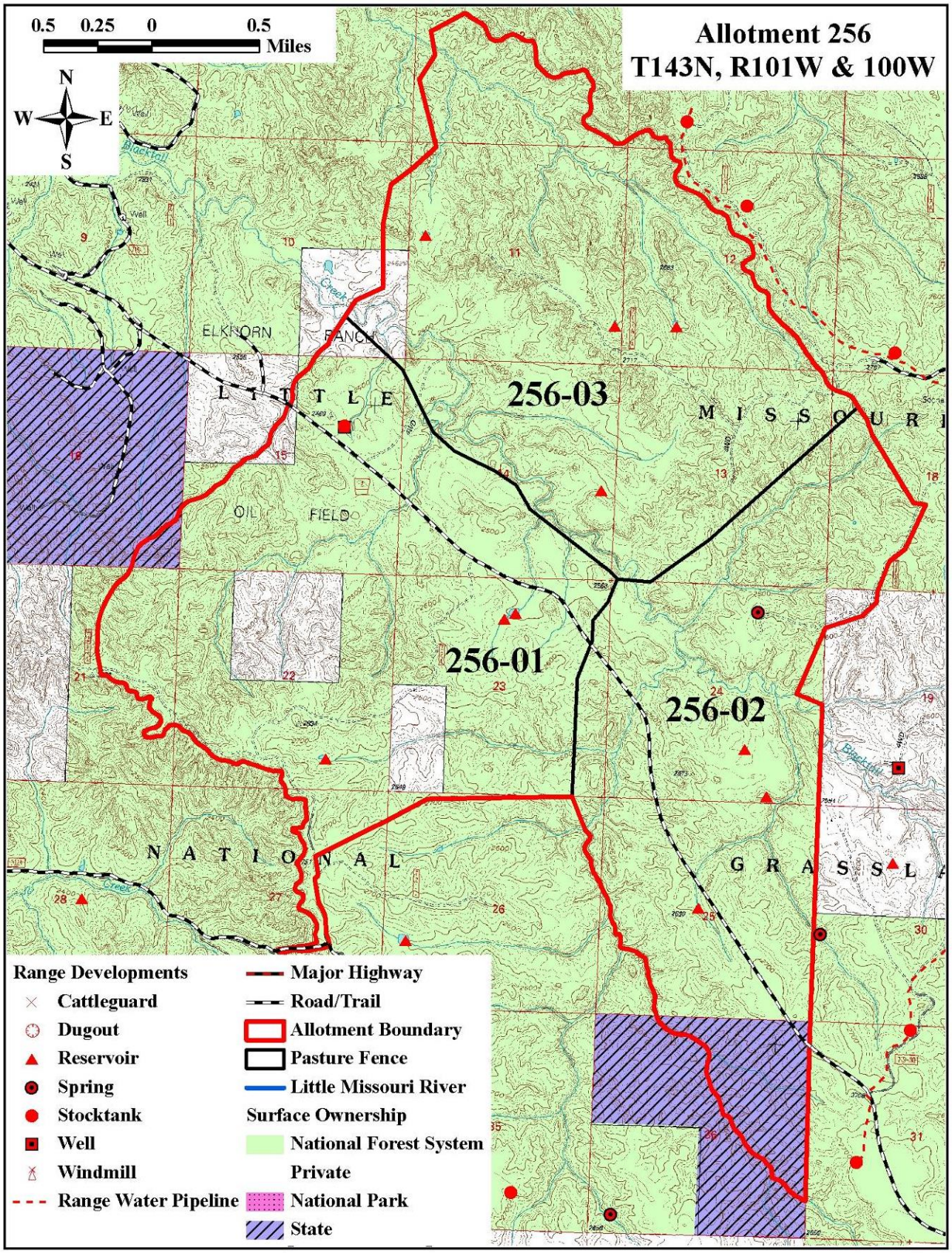
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Miles
N
W
E
S
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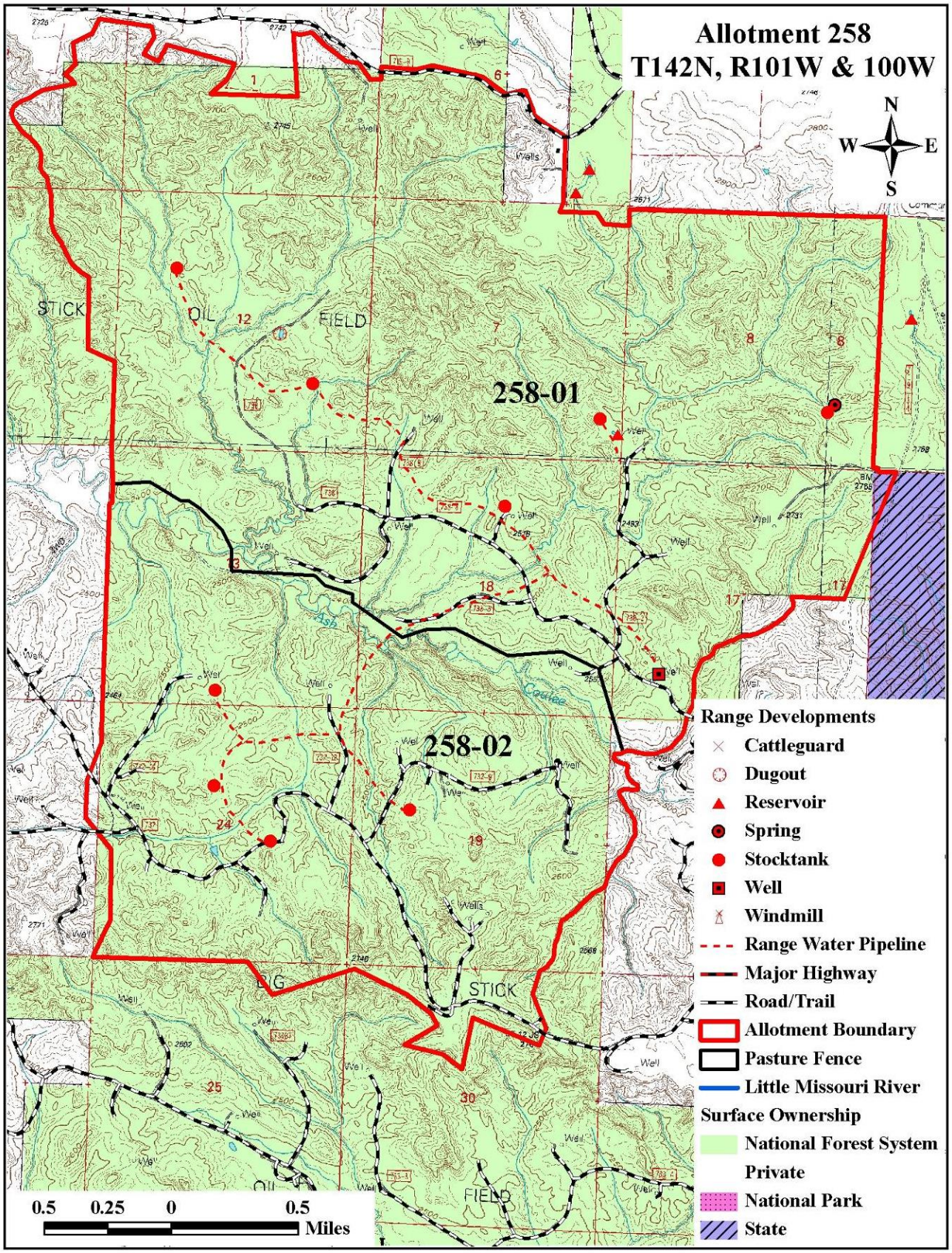
256-01
256-02
ELKHORN
RANCH
OIL
FIELD
L I T T L E
M I S S O U R I
N A T I O N A L
G R A S S L A
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State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W
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S
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258-02
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OIL
FIELD
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Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
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Little Missouri River
Surface Ownership
National Forest System
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National Park
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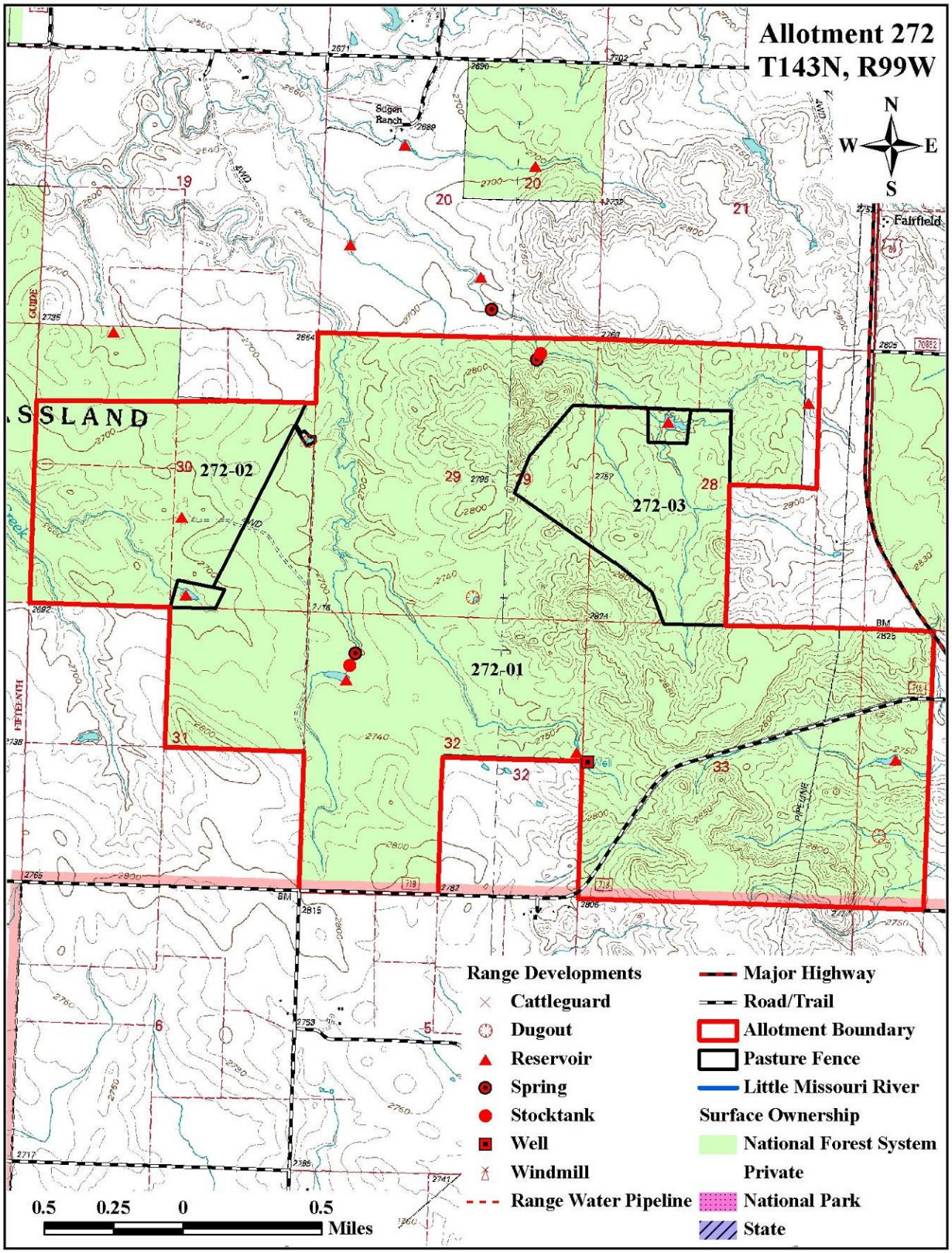
Miles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N
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S
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272-01
272-02
272-03
Range Developments
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Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
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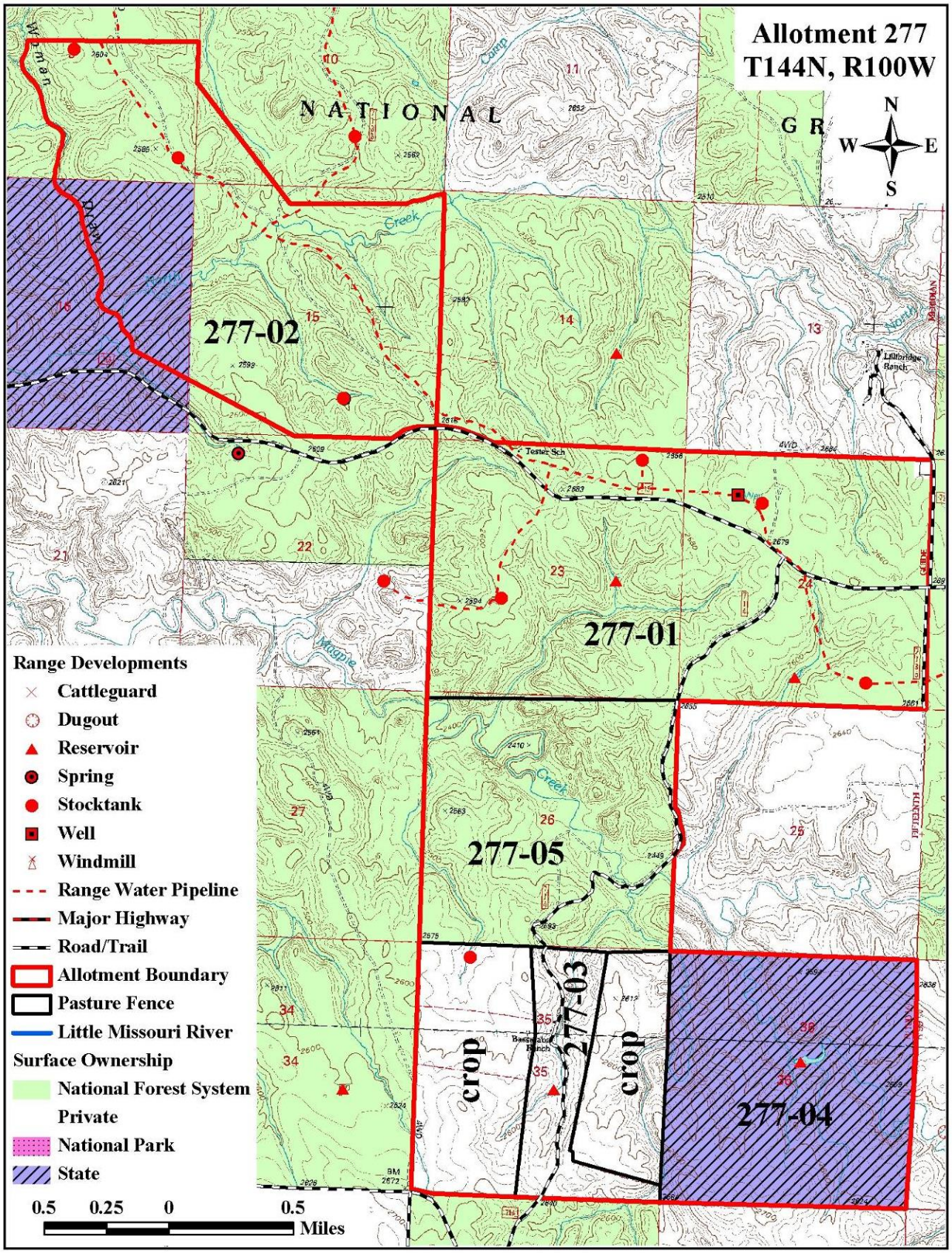
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
0.5 0.25 0 0.5
Miles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S
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277-03
277-04
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Cattleguard
Dugout
Reservoir
Spring
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Windmill
Range Water Pipeline
Major Highway
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Surface Ownership
National Forest System
Private
National Park
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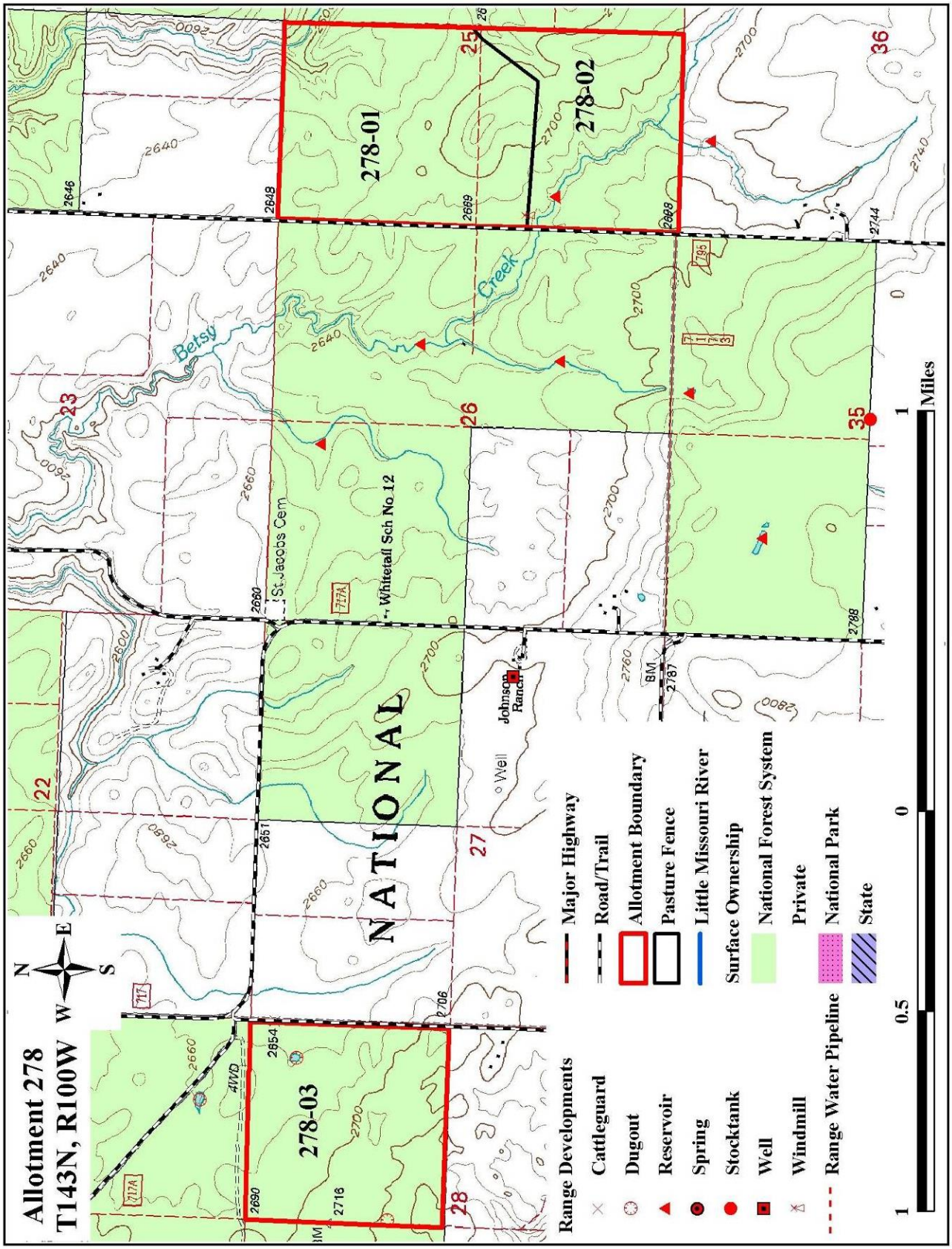
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N
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S
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278-02
278-03
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Creek
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Whitetail Sch No. 12
Johnson Ranch
Well
22
23
25
26
27
28
35
36
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
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Little Missouri River
Surface Ownership
National Forest System
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State
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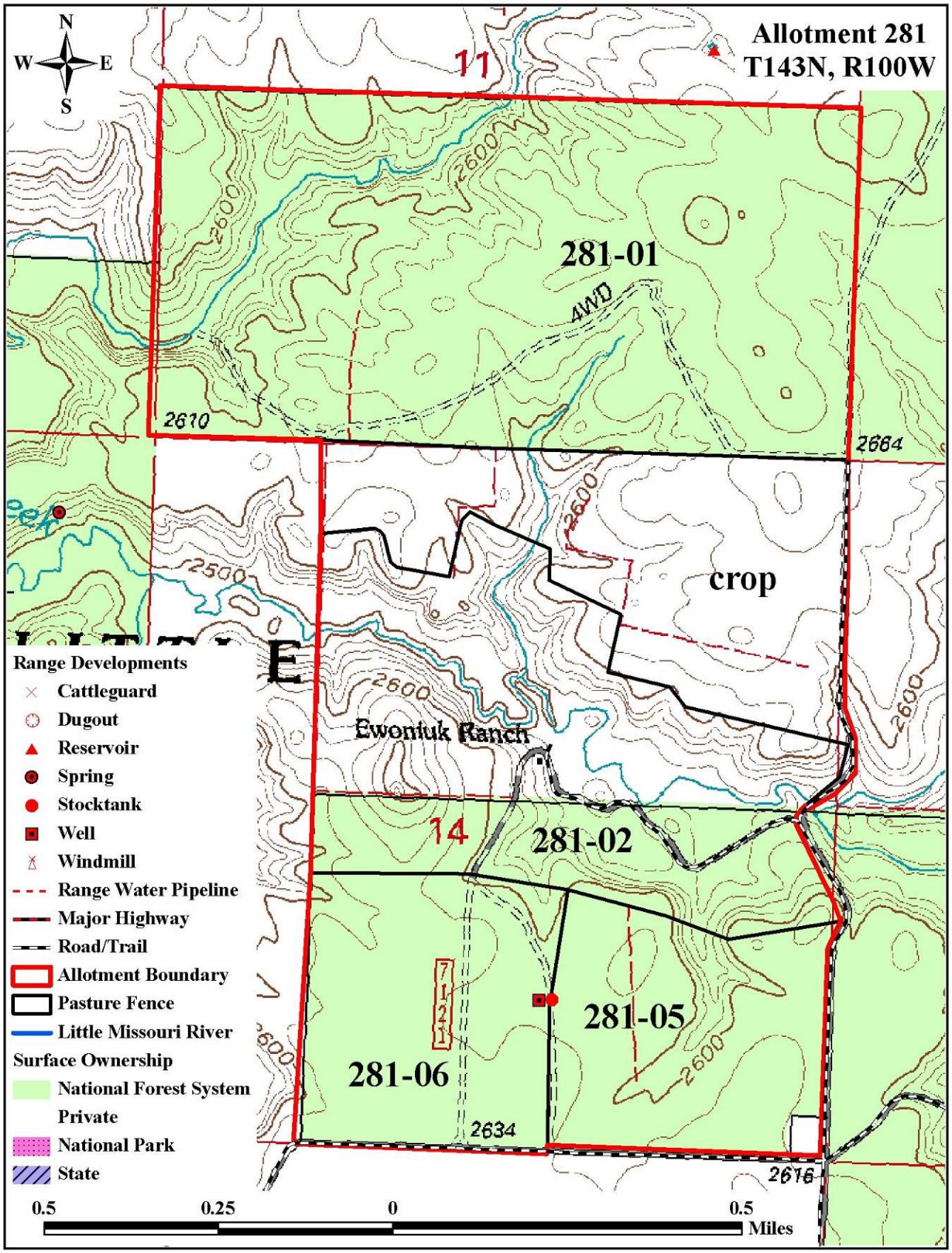
1
Miles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N
W
E
S
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281-01
4WD
2610
2664
2600
2500
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14
281-02
281-05
281-06
2634
2616
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
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Surface Ownership
National Forest System
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State
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0.25
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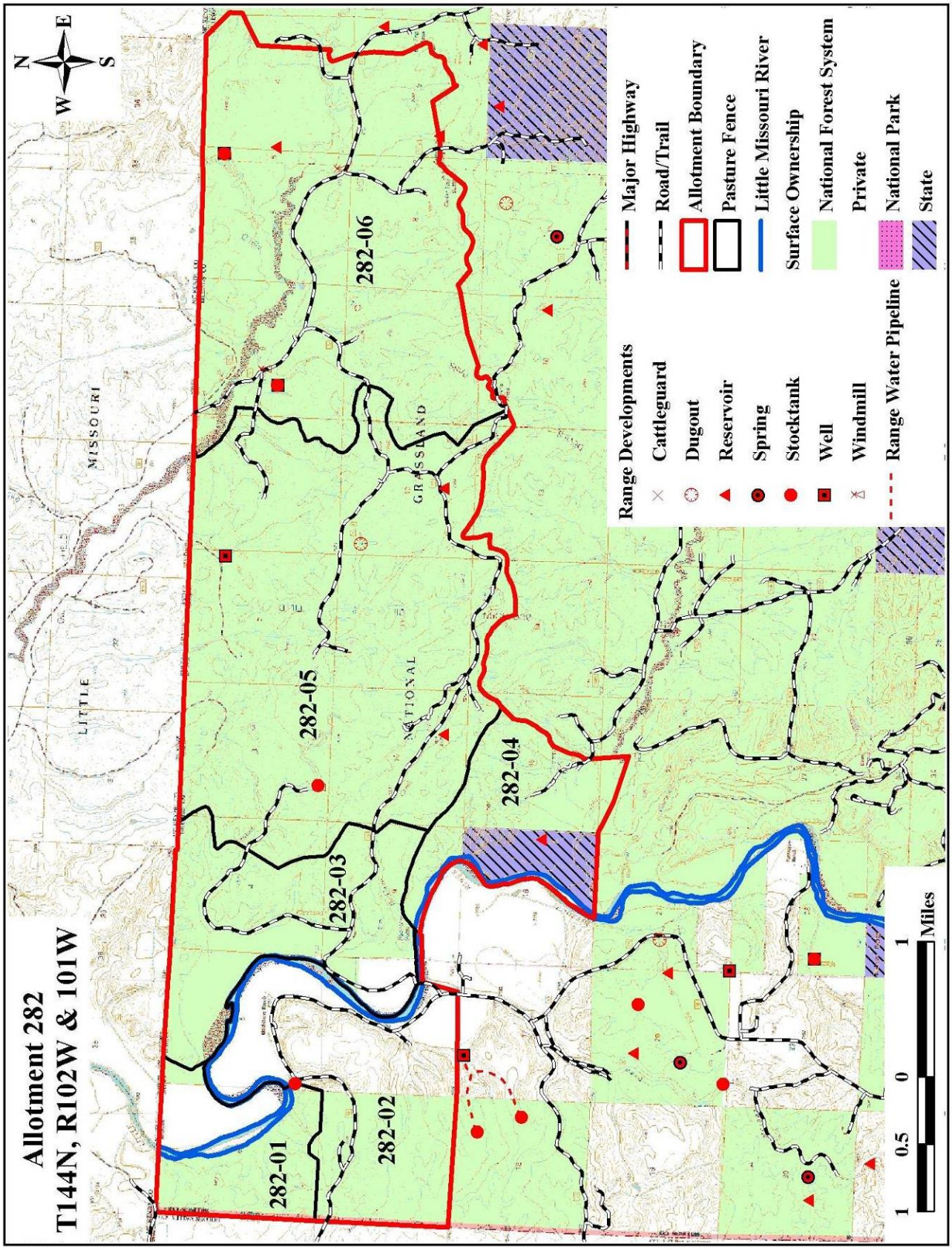
0.5
Miles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E
S
W
282-01
282-02
282-03
282-04
282-05
282-06
LITTLE
MISSOURI
NATIONAL
GRASSLAND
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
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Surface Ownership
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0
1
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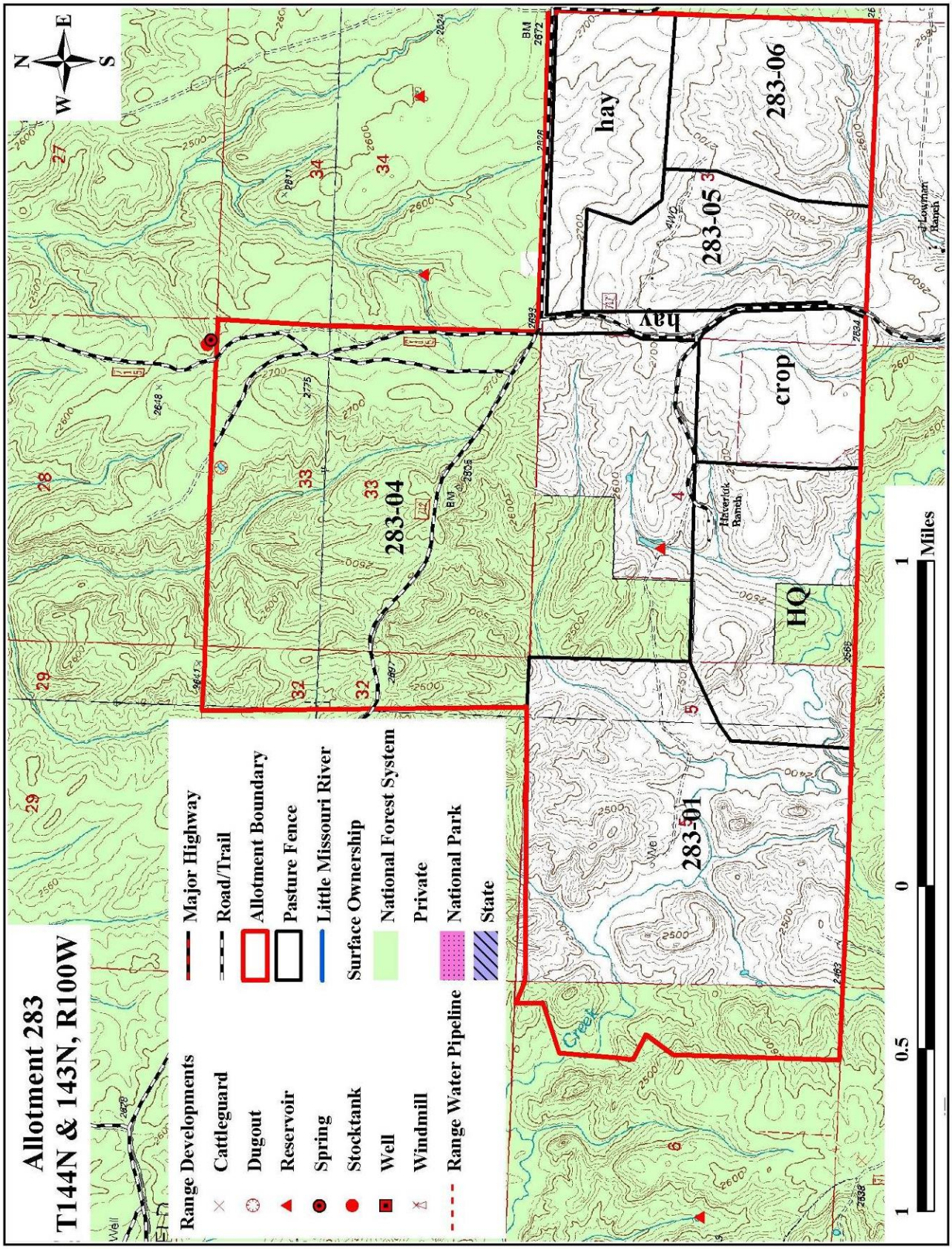
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Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
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State
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283-04
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283-06
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crop
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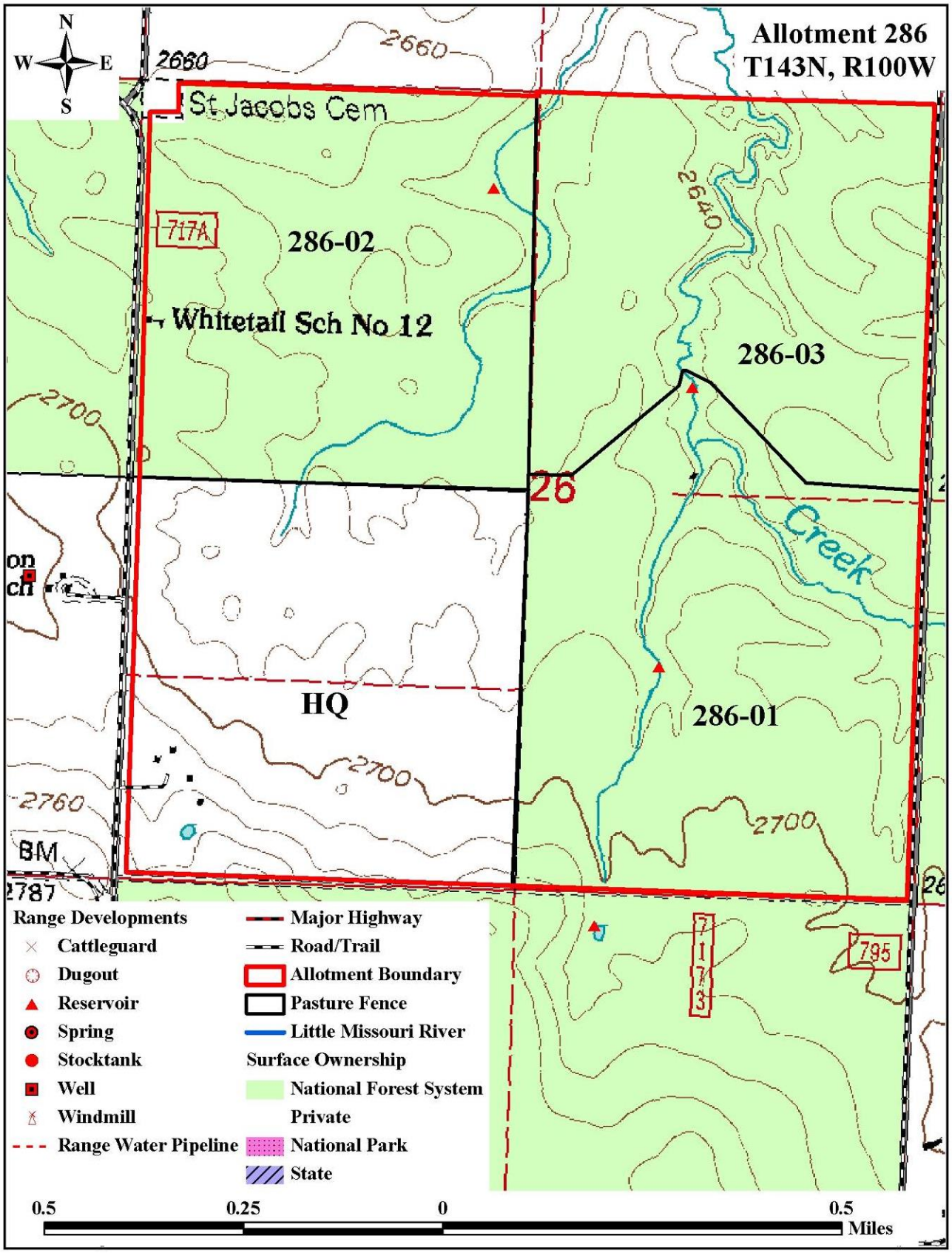
1
1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W
E
S
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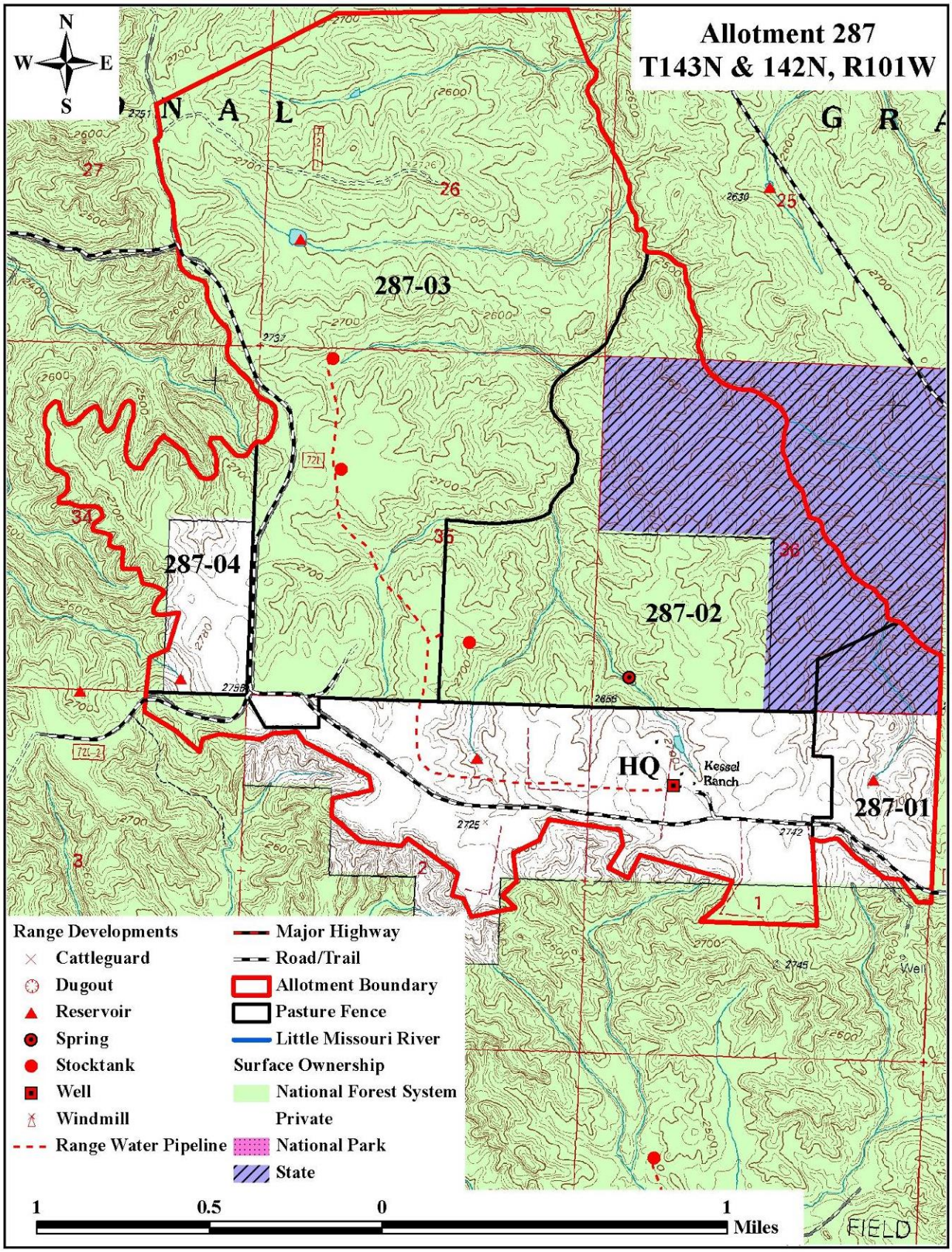
St Jacobs Cem
717A
286-02
Whitetail Sch No 12
286-03
2640
2700
26
Creek
HQ
286-01
2760
BM
2787
795
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
0.5
0.25
0
0.5
Miles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W
E
S
287-03
287-04
287-02
287-01
HQ
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Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
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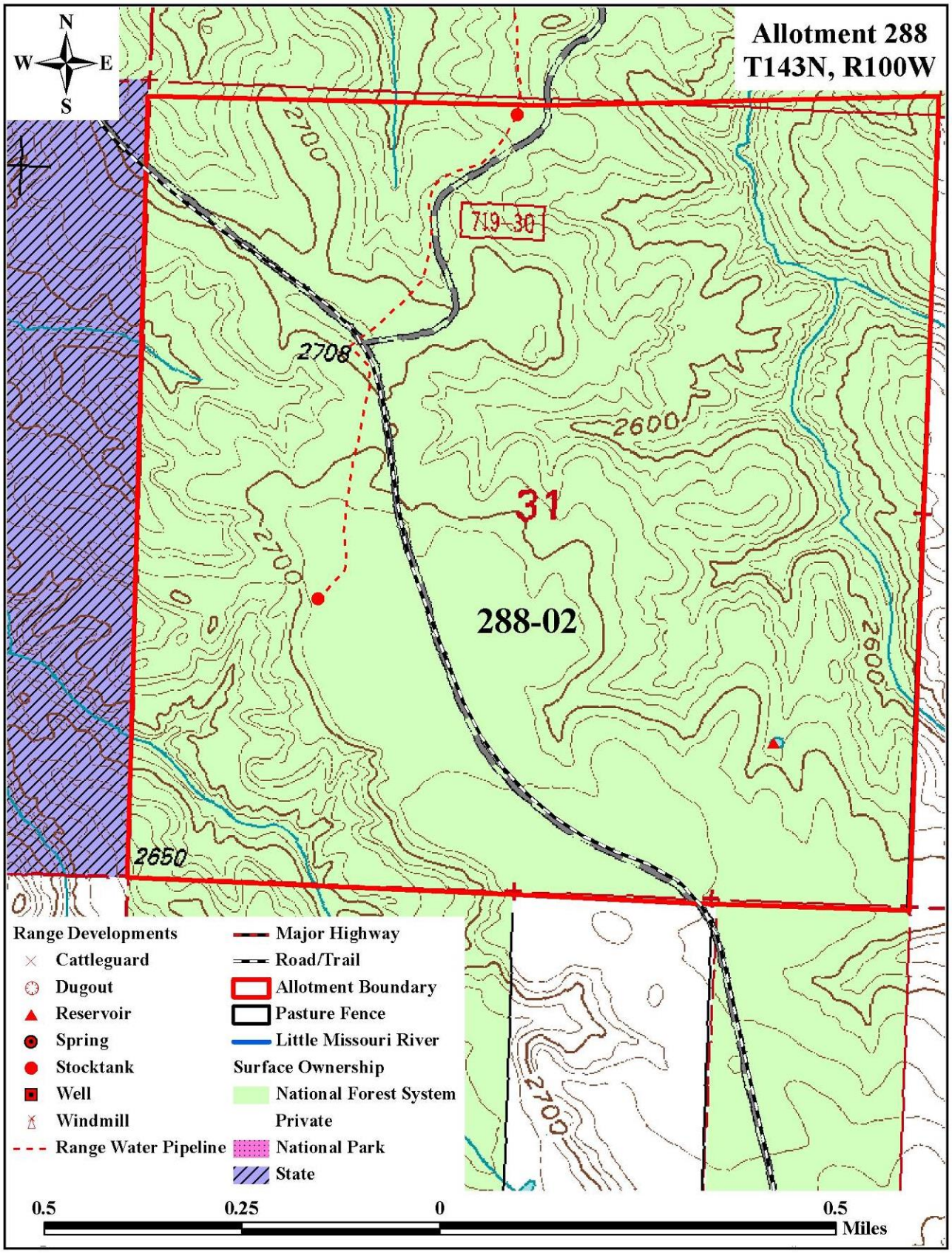
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T143N, R100W
N
W
E
S
2700
719-30
2708
2600
31
2700
288-02
2600
2650
2700
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
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Private
National Park
State
0.5
0.25
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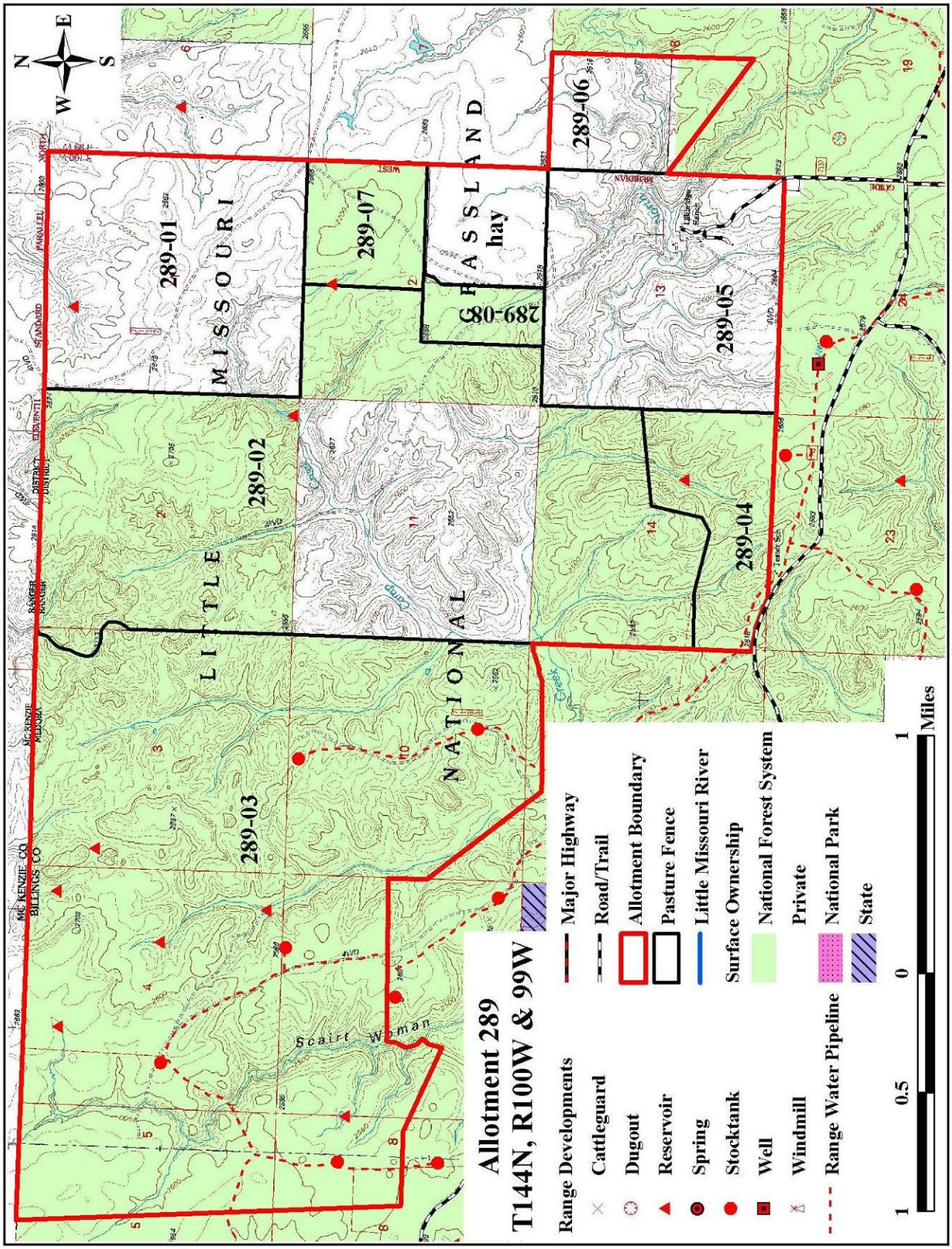
0.5
Miles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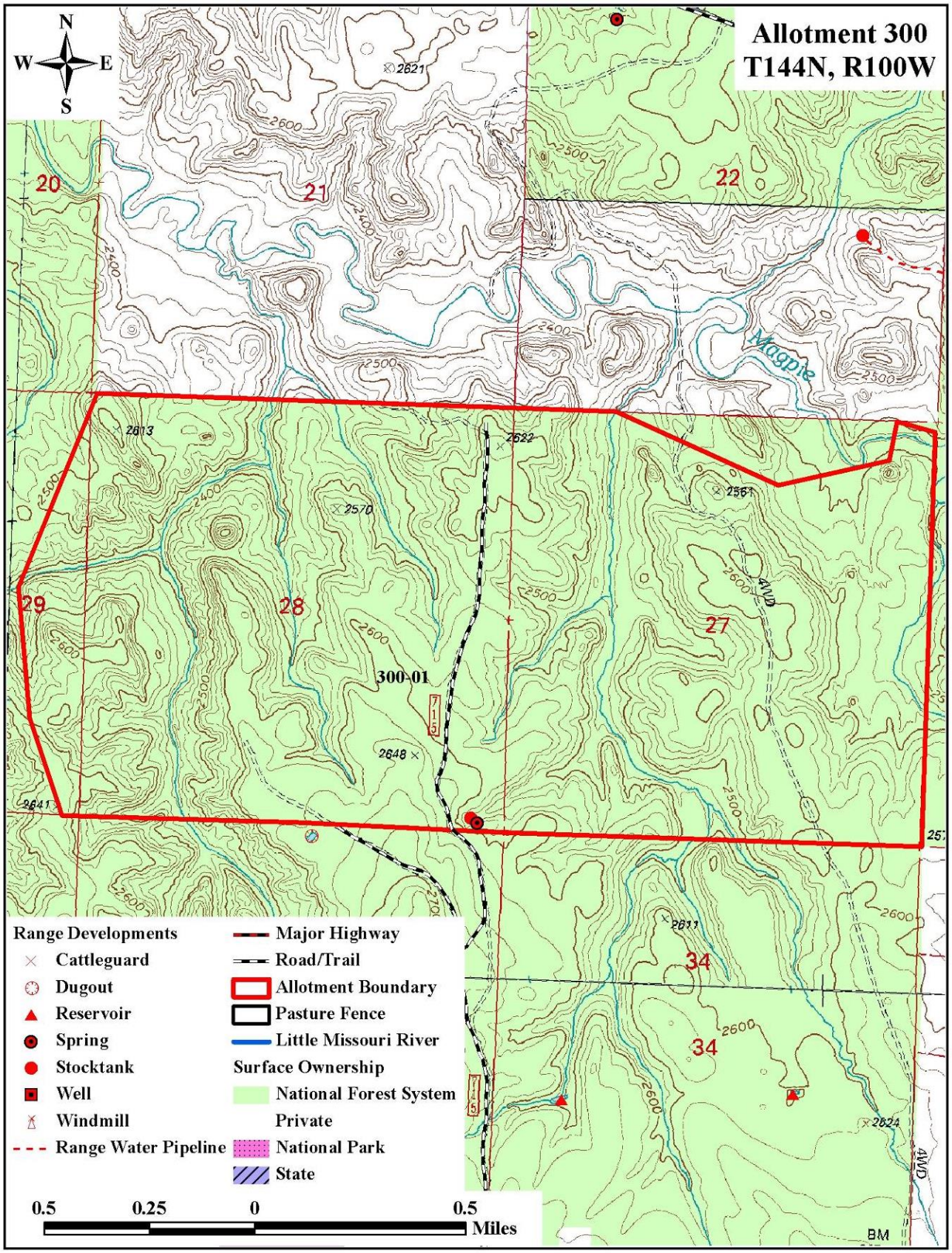
T144N, R100W & 99W
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
1 0.5 0 1 Miles
N
E
S
W
289-01
289-02
289-03
289-04
289-05
289-06
289-07
289-08
LITTLE MISSOURI NATIONAL GRASSLAND
hay
Scairt Woman
Camp Creek
MC KENZIE CO
BILLINGS CO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N
W
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S
20
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27
28
29
34
34
300-01
Magpie
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
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0.5
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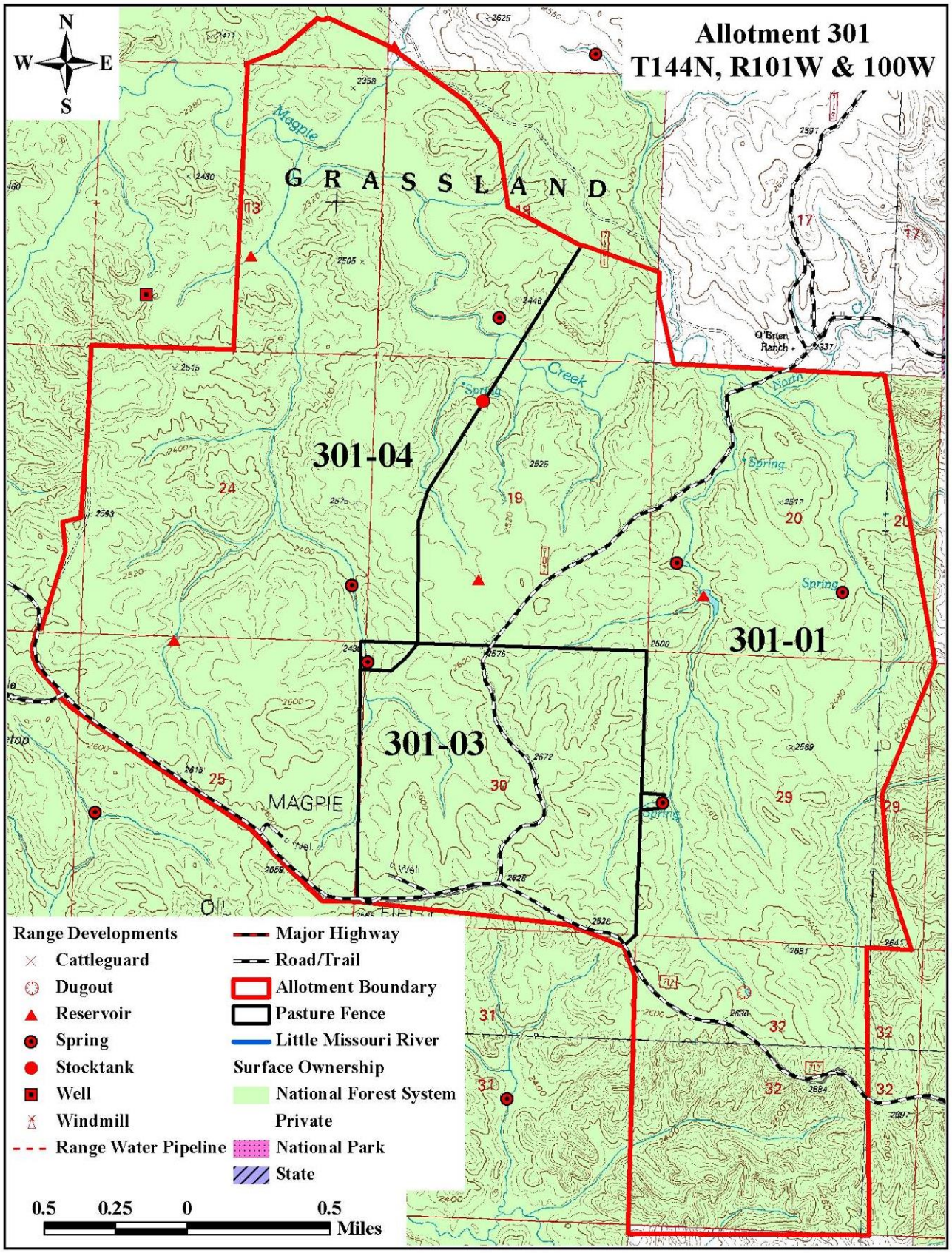
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W
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S
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North
Spring
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301-04
301-01
301-03
MAGPIE
Range Developments
Cattleguard
Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
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Surface Ownership
National Forest System
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National Park
State
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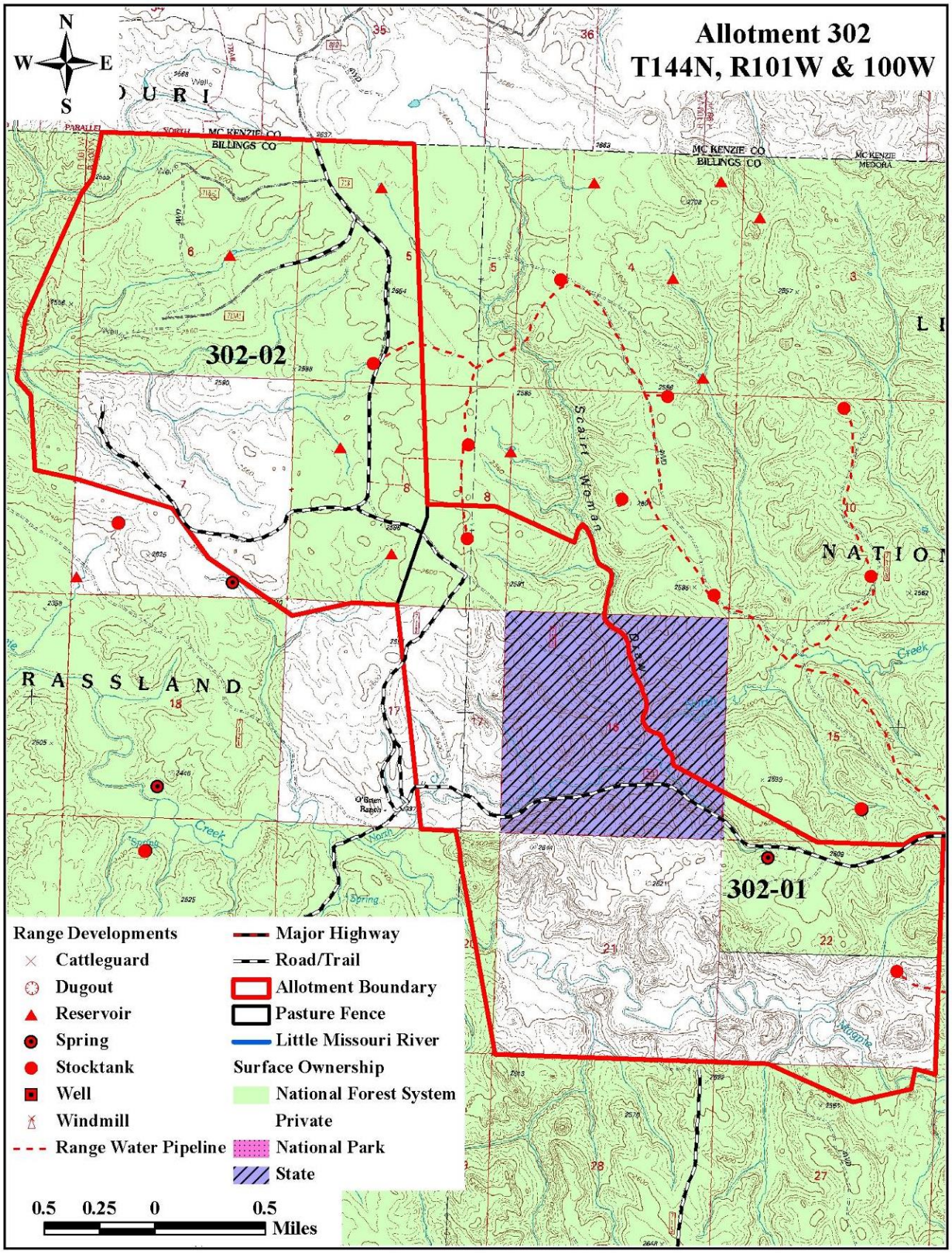
Miles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W
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S
302-02
302-01
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BILLINGS CO
RASSLAND
Range Developments
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Dugout
Reservoir
Spring
Stocktank
Well
Windmill
Range Water Pipeline
Major Highway
Road/Trail
Allotment Boundary
Pasture Fence
Little Missouri River
Surface Ownership
National Forest System
Private
National Park
State
0.5 0.25 0 0.5
Miles

Appendix C
SRT Recommendations

Appendix C

SRT Recommendations

Following are the applicable SRT recommendations associated with the North Billings FEIS.

SRT Recommendation I-1: The NRCS has completed Order 2 (five acre accuracy for dissimilar soils) soil surveys for all portions of the DPGs. Therefore, the SRT recommends using these maps and associated ecological site information in the development, implementation, monitoring, and refinement of pasture or allotment-level management plans.

The analysis utilized the recommended NRCS soil survey information in the calculation of carrying capacities for Alternative 4. See Chapter 3, Range, in the FEIS and the Range Report for a detailed discussion of how this information was applied.

SRT Recommendation I -2: AMPs herbage production estimates should be estimates for all sites. If adjustments in livestock carrying capacities are necessary because of unsuitable terrain (i.e., unsuitable sites), adjustments should be made directly (i.e., no allowable forage) rather than indirectly (i.e., no herbage produced).

Herbage production was calculated for all ecological sites as part of the carrying capacity analysis, NRCS soils and production information was used in the calculations. No adjustments, either directly or indirectly, were made to the livestock carrying capacity for unsuitable terrain or sites. Further detail is provided in Chapter 3, Range of the FEIS and in the Range Report.

SRT Recommendation I-3: The SRT recommends studying and revising the definition of "Biologically Capable" to accurately reflect the capability of the soils and plant communities to meet structure goals for the gallinaceous 2 Management Indicator Species.

The Forest Service defined "biologically capable" as any site classified as one of the following habitat types: western wheatgrass/green needlegrass, western wheatgrass/needle-and-thread grass, needle-and-thread/sedge, silver sage/western wheatgrass, big sage/western wheatgrass or western snowberry. Sites dominated by crested wheatgrass were also considered biologically capable (FS Final Response to SRT Reports, p. 5).

VOR readings taken in the allotments in 1996-1999, 2004, and 2005 years show that habitat types included in the definition of biologically capable can produce high structure. Chapter 3, Herbaceous Structure of the FEIS provides more detail on the findings of these monitoring efforts.

SRT Recommendation I-4: The SRT recommends the FS discard the FQI for determining seral stages and adopt a system such as the NRCS similarity index for seral state determinations.

As recommended the FQI was not used. The analysis did not use the NRCS similarity index instead seral stages where determined by comparing relative plant composition from measurements of basal cover, canopy cover, or biomass production (from NDSU plots) with quantitative descriptions included in the NRCS ecological site descriptions, state and transition models, and/or USFS habitat

descriptions (1992, 2003). Additional detailed information regarding the methodology used to determine seral condition is identified in Chapter 3, Seral Stages of the FEIS, and the Botany Report, located in the Project Record.

SRT Recommendation II-1: Standardized protocols should be adopted and training provided for consistency among years and observers using the Robel pole method.

The collection of Visual Obstruction Readings (VOR) using the Robel Pole protocols was completed in accordance with direction provided by Robel et al. 1970, Benkobi and Uresk 2000, and Warm 2000. The Robel pole protocols for this analysis are addressed in Chapter 3, Herbaceous Structure of the FEIS and in the Wildlife Report. A standardized form was utilized and training provided.

SRT Recommendation II-2: Robel pole data should be summarized by frequencies of readings rather than by averaging readings.

Robel data was summarized by transect average in accordance with the Roble protocol. The analysis also provides the data summarized by frequency readings as recommended by the SRT. Detailed information is located in Chapter 3, Herbaceous Structure of the FEIS and in the Wildlife Specialist Report.

SRT Recommendation II-3: Associations between fall measurements and subsequent spring measurements should be determined in relation to vegetation type (e.g., Kentucky bluegrass (Poa pratensis) vs. green needlegrass (Stipa viridula)) (reference for plant scientific names is Flora of the Great Plains. 1986), winter precipitation, grazing after fall measurements, and other factors.

The DPG monitoring strategy, (Grasslands Plan, p. 4-21) provides for the collection of spring VOR information which is consistent with this recommendation. The Grasslands Plan identifies that this type of monitoring was to begin five years after the completion of the Plan which was in 2006. So the monitoring is not scheduled to start until 2011.

However, some initial transects were collected in one block in 2007 by the Medora Ranger District. This sample is of insufficient size to draw any conclusions so the information was not used in this analysis. It will be of value in the future when combined with spring VOR readings that are to start in 2011.

SRT Recommendation II-4: All Robel pole data should be collected, summarized, and interpreted with full consideration given to potential influences of ecological sites on plant species composition, and current and potential vegetation structure.

Based on input received from the SRT members in 2003, the VOR monitoring protocol was revised to not cross vegetative community boundaries. For this analysis the Forest Service used habitat types to map basic vegetative mapping units. Habitat types are delineated based on soils, landform type, aspect, and potential vegetative composition. For additional information see Chapter 3, Herbaceous Structure of the FEIS and the Wildlife Report.

SRT Recommendation III-1: Monitoring of habitat features considered key to the success of gallinaceous MIS populations should be intensified. Intensification should include both an increase in the sampling intensity using current methodology as well as using additional techniques as necessary (e.g., June infrared photograph showed well-established dancing grounds in northwestern North Dakota). Realizing that intensive monitoring each year is difficult on 1 million acres, monitoring 20 percent, as an example, of non-referenced areas each year over a five-year period will locate many lekking arenas on the entire DPGs. Over several years this should help detect any change in lekking arena numbers; thus management adjustments could be made accordingly, if necessary. Methodology for monitoring lekking arenas should be stringent, standardized across years and sites, and detailed in annual training workshops. In addition, a Geographic Information System driven data base system should be developed for permanent record-keeping of display grounds to evaluate changes in conditions affecting populations (e.g., number and location of arenas, and number of males on each display ground).

Lek surveys were conducted for the analysis area. The surveys were conducted by the Medora District wildlife biologist and were placed into a GIS system. The methodology and results are located in Chapter 3, Sharp-tailed Grouse of the FEIS and in the Wildlife Report.

SRT Recommendation III-2: Monitoring protocols must include assessment of rate and extent of change of woody plant communities.

The IDT took a hard look at the rate and extent of change of woody plant communities by comparing aerial photos from 1939, 1953, and 2009 for sample drainages in the project area. This comparison shows that woody draws in general have expanded less than five percent and in some cases have decreased. The photos show that in some cases the density of plant vegetation in existing woody draws has increased over the decades represented by the photos, however, there are no new woodys in drainages previously unoccupied by trees.

Woody vegetation also includes species such as snowberry. However, because it occurs in small patches across the landscape it is difficult to assess. Antidotal evidence suggests that snowberry has increased but there is no indication that the potential increase in snowberry has reached a threshold tolerance for sharp-tailed grouse.

Detailed information concerning woody plant communities is located in Chapter 3, Woody Draws of the FEIS.

SRT Recommendation III-3: VOR field sampling and subsequent summarization and interpretation of data should be appropriately stratified in accordance with vegetation type (i.e., herbaceous vs. half-shrubs vs. shrubs, etc.). A maximum number of high-structure readings obtained from snowberry should be established.

VOR transects were done in 1996-1999, 2004 and 2005. The VOR transects are randomly placed in a single vegetative type biologically capable of producing high structure herbaceous vegetation (see recommendation I-3 above).

The sampled vegetative communities are delineated by habitat type (which considers soil, landform, aspect, and potential natural vegetative community) and existing vegetation. Any inclusion of western snowberry encountered along a VOR transect was measured. Inclusions of other shrubs, such as buffaloberry or chokecherry (which provide different vegetative structure), were excluded.

SRT Recommendation IV-1: All parties should agree to share detailed (i.e., number and size of grazers, on and off dates, etc.) pasture-specific records on an annual basis.

Information regarding actual use is unavailable on the allotments. Actual use describes the number of livestock, the grazing season (turn on, turn off dates) and rotation that a permittee actually grazed on an allotment in the past grazing season. The MGA has stated that actual use is provided in the grazing association grazing permits and AOIs/Allotment Worksheets (AOIs/AWs).The MGA initially supplied the Forest Service with grazing permits for the years 2005 through 2007 and, after further requests for actual use, provided grazing permits and AOIs/AWs for the years 2005 through 2009 for each allotment in the analysis area. The grazing permits contained information on the number and kind of livestock to be grazed, and on/off dates for the allotment as a whole. The grazing permits did not supply actual use or size of livestock as described above since the grazing permits are issued prior to the initiation of the grazing season. The AOIs/AWs provided pasture rotation information. AOIs/AWs are written during the winter preceding the upcoming grazing season as a tentative plan for the upcoming grazing season, and are recognized as needing updates as the season progresses. They are to be updated by the MGA throughout the season to reflect actual changes.

Between the DEIS and the SDEIS, the FS conducted a review of MGA files for actual use information. The review found the same AOI and permit information that was supplied by MGA and some additional information documenting changes to some of the AOIs. The review noted a general lack of documentation updating the AOIs or permits as the grazing season progressed. There was no evidence that the grazing association requests actual use from their members at the end of the grazing season.

It is possible to collect actual use data for the allotments in this analysis, however, that would take three to five additional years during which time existing adverse resource impacts would not be addressed. To address this concern, mechanisms are currently in place that will require the MGA to provide actual use at the end of the 2010 season and annually thereafter. A letter has been sent to the MGA detailing, as per the MGA Grazing Agreement, the required actual use information, and the need to complete year end reviews with each permittee to verify or amend the AOIs to reflect what actually occurred for the past grazing season

Permits present us with the maximum potential use for a given year. Therefore, in lieu of actual use the interdisciplinary team used the three year (2005-2007) average MGA permitted use and/or AOI information to compare to the authorized use under the different alternatives. The three year average MGA permitted use is information taken from grazing association grazing permits which are completed prior to turn out. The AOIs/AWs were used to help describe, under current management, how an allotment is managed as far as rotation and type/class of livestock.

SRT Recommendation IV-2: The FS should collect, on a periodic basis, information that will permit them to determine the effectiveness of management actions (see specific recommendations related to monitoring below).

The general recommendations identified by the SRT Report (2005) identified that the objectives of monitoring need to be clearly stated. Protocols need to be objective, repeatable, and where ever possible quantitative. Procedures should be carefully described so they can be followed in subsequent years. Information derived from protocols should clearly demonstrate progress towards meeting the objectives. The SRT also recommended that the use of photo stations, Visual Obstruction Readings (VOR) and Species Composition should be considered for monitoring

The objective of monitoring identified in the FEIS is to determine if implementation of selected management actions are meeting or moving towards Grasslands Plan goals and objectives. Monitoring has been identified for each affected resource (seeFEIS, Chapter 2, Monitoring and Chapter 3, Part 2) which is repeatable, easy to learn, and produces information that will determine the effectiveness of implemented management actions.

VOR and species composition are specific monitoring activities that will occur in the allotments included in this project (see Ch 2, Monitoring Section, CH 3 Part 2). Photos of different resources were taken during field surveys for this analysis. If desired selected areas can be revisited and photo points established based on those pictures.

SRT Recommendation V-1: Maintain and share detailed, pasture-specific grazing records by Grazing Association and FS personnel.

The Forest Service completely agrees. During the creation of the proposed action the Forest Service provided detailed information concerning resource conditions of the individual allotments, what was working and what wasn't. The Grazing Association has provided five years of grazing permits, AOIs, and sporadic AOI updates.

SRT Recommendation V-2: Redefine the Animal Unit to reflect current cow size along with older, larger calves and recalculate the corresponding authorized livestock numbers on allotments.

The widely accepted unit of measurement for grazing livestock is an "Animal Unit Month" (AUM). An AUM is the amount of oven-dry forage (approximately 780 pounds) required by one animal unit for a standardized period 30 animal-unit-days. This definition of an AUM is from the Society for Range Management (SRM), and is used by the Forest Service, Bureau of Land Management, and NRCS.

There is an advantage to using a standardized unit of measure to compare different grazing areas. Because cattle of different sizes (from 900 to over 1800 pounds per cow) are currently being grazed on the grasslands the standard AM is not reflective of actual forage being removed for livestock weighing more or less than 1,000 pounds.

The analysis utilizes the SRM definition of an AUM. Under Alternative 4 the amount of AUMs utilized was adjusted to account for animal size. Adjustments were calculated using Animal Unit Equivalents (AUE) with one AUM equaling one AUE. It was agreed with the Medora Grazing

Association that 1,200 pounds would be used to represent the average cow/calf unit. A 1,200 pound cow/calf unit is equivalent to an AUE of 1.15. Detailed information on livestock weight adjustments is contained in Chapter 3, Range of the FEIS and the Range Report located in the Project Record.

SRT Recommendation V-3: Increase the use of management tools such as temporary electric fencing, herding, combining allotments, prescribed fire and water developments (wells, pipelines and tanks) in order to achieve specific ecological improvement and restoration goals.

Alternatives 3, 3A, and 4 address this recommendation. Table 2.11 located in Chapter 2 of the FEIS identifies the different management tools proposed under those alternatives to address resource concerns. Chapter 3 Part 2 of the FEIS identifies the specific management tools proposed for use under both initial and adaptive actions by alternative by allotment. Chapter 2 of the FEIScontains a "Toolbox" listing all of the tools that are proposed or available for use under the adaptive alternatives.

SRT Recommendation V-4: Where possible, crested wheatgrass in native grasslands should be fenced separately, prescribed burned, or fertilized. Where this is not possible, grazing primarily native grassland should not occur before the 3.5 leaf stage of the management plant species or June 1.

Depending on the allotment all of the above actions related to crested wheatgrass have been proposed as either an initial or adaptive options (see FEIS, Chapter 3 Part 2). Not grazing native species before the 3.5 leaf stage is identified in Chapter 2 of the FEIS as a design criteria that is common to the action alternatives.

SRT Recommendation V-5: Efforts should be expanded to define relationships among production, grazing/harvest efficiency, and post-grazing structure within ecological sites.

Appendix I of the Grasslands Plan describes how vegetation structure can be achieved through the adoption of stocking rate guidelines. The analysis for this project evaluated the existing structure condition for the allotments (FEIS, Chapter 3 Part 2) and how grazing has affected structure. The alternatives include a monitoring strategy to evaluate how the initial actions and adaptive actions move the allotments towards structure objectives.

SRT Recommendation VI-1: Use historical black-and-white aerial photographs and current Dragon data to document trends. Document historical woody trends using specific woody community types such as green ash (Fraxinus pennsylvanica) draws, willow (Salix spp.), quaking aspen groves, cottonwood (Populus spp.), creeping juniper (Juniperus horizontalis), juniper (Juniperus spp.), ponderosa pine (Pinus ponderosa) savanna, sagebrush (Artemisia spp.), bur oak (Quercus macrocarpa) savanna, low-shrub, tall-shrub.

See Recommendation III-2.

Detailed information concerning the trend of woody plant communities is located in Chapter 3, Woody Draws of the FEIS.

SRT Recommendation VI-2: Develop quantitative objectives for each woody community type, and identify a range of patch sizes and distribution across the landscape for each type (see Recommendation VI - 1 of Woody and Riparian Communities for possible types).

The DGP Final Response to the SRT Reports identified that the DPG would consider woody plant community objectives and continue to collect and review data on woody communities. Plant community objectives for woody draws are contained in Chapter 1 and 2 of the Grasslands Plan. These objectives where considered in the analysis of woody data. The extensive woody draw information collected for this project has been used to evaluate the condition of woody draws including age class, structure and species.

SRT Recommendation VI-3: Determine if PFC rating is applicable to North Dakota, use multidisciplinary team to conduct PFC ratings, and develop a training manual and process.

PFC is applicable to North Dakota. The PFC methodology is a widely accepted, interagency protocol used to assess riparian conditions. It was developed in the American West by federal land-management agencies and has been used extensively for more than a decade. The methodology is universally applicable because all assessments are made with respect to potential condition.

The DPG uses a team of trained resource specialists to conduct PFC surveys. The team walks along a stream and evaluates a variety of attributes of the riparian area as well as the upland environment, such as the degree of bank sloughing and erosion, the amount and condition of streambank vegetation, and ability of the stream to handle flood events, etc. On the DPG, team members provide experience and knowledge of soils, hydrology, geomorphology, botany, ecology, geology, biology, and range management.

SRT Recommendation VI-4: Tailor grazing tactics to meet site-specific goals and objectives of riparian habitats.

The grazing tactics in Alternatives 3, 3A, and 4 were designed to address site-specific resource conditions in order to meet specific goals and objectives. They utilized a variety of different management tools including rotation changes, developing range water, pulling livestock out of riparian areas, riparian exclosures, creation of riparian pastures, etc. Part 2 of Chapter 3 identifies these actions by allotment and alternative.

SRT Recommendation VI-5: Develop specific guidelines for quick response by the Grazing Association members and FS to exclude livestock when suitable flooding event(s) occur.

This recommendation is associated with flooding that presents opportunities for the establishment of cottonwood regeneration. Within the project area this recommendation would apply to the Little Missouri River. To date no specific guidelines have been developed to address this recommendation, however, under the current Grazing Agreement the FS. However, under the Grazing Agreement the FS has the right to use or permit use of national forest system lands for a variety of activities including watershed protection and management (Grazing Agreement, pp.12,

13). Further with the assistance of the grazing association AOIs can be quickly adjusted to respond to the situation (Grazing Agreement, p.9).

SRT Recommendation VII-1: Aggressively monitor [prairie dog] colony expansion and proactively develop rapid response control procedures that limit expansion to desired area(s) in a timely manner (see Appendix C for greater detail on prairie dog control).

Currently there is one small (< 1 ac.) prairie dog town in the project area. Periodic monitoring for prairie dogs is conducted on the DPG every five years. This town will be monitored as well as any new towns the FS becomes aware of, in the project are. Treatment response is addressed in the 2006 Black-tailed Prairie Dog Assessment and Strategy for the Medora Ranger District.

SRT Recommendation VIII-1: Develop viable, proactive drought management strategies and tactics that, when followed, reduce economic risks, minimize ecological risks, and enhance the long-term sustainability of both the responsible management enterprise and the grassland resource (see Appendix D for details regarding Drought Strategies).

The DPG is working with universities, the grazing associations, Forest Service specialists, the NRCS, and others to develop a drought strategy for the Dakota Prairie Grasslands. Once completed the strategy will be applied to this project. In the interim, a modification of the drought strategy presented in the 2005 NE McKenzie Allotment Management Plan Revisions FEIS will be used to address drought. Details of the drought strategy are contained in Chapter 2 of the FEIS.

Appendix D
Grazing Management Toolbox

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The Grazing Management Tool Box
Alternatives 3, 3A, and 4 are alternatives that are based on adaptive management. Briefly, under adaptive management an initial set of proposed actions (see FEIS, Chapter 3 Part 2) is put forth to address a resource concern. However, if an initial action(s), i.e. tool(s) is shown through monitoring not to be meeting or moving toward the desired condition, under adaptive management another management tool(s) can be selected from the Grazing Management Tool Box for implementation. Adaptive management is explained in depth in Chapter 2 of this document.

The Grazing Management Tool Box is a collection of all the different management actions proposed for the 43 allotments within the project area. It is important to understand that many of the tools in the toolbox are interrelated to each other and that no single tool within the toolbox will address any and all issues identified in this analysis. For example, creating a riparian pasture may not effectively resolve riparian concerns for an allotment because the effectiveness of this action is interrelated to stocking levels, grazing duration, and timing of grazing in the pasture. If these other tools aren't applied with the creation of the riparian pasture the effectiveness of the tool is reduced or nullified. The potential interactions of tools are extensive and attempting to analyze the effects of all possible combinations of tools would be a near infinite exercise. Presented below are discussions of the general effects of each individual tool within the tool box, the information is taken from specialist's reports for range, botany, wildlife and watershed.

The potential interactions of the different tools supports the proposed approach of using a team of resource specialists along with the permittee and affected grazing association board director to evaluate tools when an adaptive management adjustment is needed to meet or move a resource towards Grasslands Plan resource objectives. This approach would provide a rounded recommendation(s) for the responsible official to consider when deciding how to address the resource concern.

Drought Strategy

Drought is a recurring fact of life on the grasslands of western North Dakota. Reece et.al. (1991) state that drought is generally defined as a prolonged period during which annual precipitation is less than 75 percent of average. Based on this definition, drought has occurred in 21 percent of the years in the northern Great Plains, since 1940 (Holechek et.al. 1989). Drought affects water availability which in turn affects the rangeland ecosystem and those who depend on it for life, wildlife and ranchers alike.

Heitschmidt et al (1987, 2005), notes that an understanding of drought's impacts on the structure and function of rangeland ecosystems is paramount for developing effective management strategies and that all grazing systems will fail if stocking rates are sufficiently high to preclude the

accumulation of a forage reserve for consumption during periods of dormancy induced by either temperature (winter) or water (drought) stress.

While the occurrence of drought can't be predicted, it can be managed to reduce its effects. A drought management strategy is useful in maintaining appropriate stocking levels and curtailing excessive use of range vegetation during poor growth or low production years. Excessive use during any grazing year requires additional time for forage productivity to return to potential levels, so a drought management strategy is useful for maintaining long-term range production.

Implementation of a drought strategy is important to the US Forest Service (FS), grazing associations, and permittees. The purpose of a drought-management strategy is to use the recent precipitation amounts to trigger early and proactive adjustments in stocking. Early response permits opportunities to retain some high structure, even during drought years, for wildlife needs; to exercise various livestock decisions, such as weaning times, culling practices, and marketing decisions; and to retain plant vigor and health to accelerate post-drought recovery.

Currently a drought strategy doesn't exist for the Dakota Prairie Grasslands (DPG); however, one is under construction. In the interim this project will use the drought management strategy that was developed on the McKenzie Ranger District.

Range – A drought management strategy that would effectively maintain the current conditions or minimize a downward trend in Grasslands Plan goals and objectives would typically result in reduced authorized use for the grazing seasons that a drought management strategy is being applied. In the long term, though, this type of management should moderate authorized use by minimizing the extreme fluctuations in authorized use from below average to above average production years.

Botany – Climate or available moisture is the main factor affecting annual forage production and plant composition (Biondini and Manske 1996, Biondini et al 1998, Briske et al 2008, KSU 1994, Vermeire et al 2008). Forage plants are less tolerant of grazing during drought (Biondini and Manske 1996, NRCS, 1997), so stocking at typical grazing levels during these periods has the potential to decrease forage production and composition.

Forage plants weakened by drought are susceptible to injury at grazing levels that would have no adverse impact during normal growth years (Biondini and Manske 1996, NRCS 1997). Decreased plant vigor and production due to drought can be exasperated by failing to adjust stocking levels to the level of decreased forage production can increase and extend the effects of drought on decreased plant vigor (NDSU 2009, NRCS 1997).

Further development of a drought management strategy may establish guidelines that are more precise or trigger points such as precipitation to date, soil moisture, or current range production, to establish expectations of stocking level adjustments according to the range of annual precipitation. This could influence long-range planning of the grazing permittees in regards to annual stocking levels or alternate forage reserves during years of drought, thereby contributing to the maintenance of forage resources.

Wildlife – The focus of the drought management strategy is on minimizing impacts on forage for livestock and minimizing economic loss to the rancher with no apparent consideration given to

wildlife habitat or other ecosystem attributes. Therefore, this somewhat narrow focus may result in a short-term effect to herbaceous structure. But minimizing the effects to the forage base during the drought should also allow for a relatively shorter time for recovery from the drought. Bottom line is, conceptually, having a strategy (Reece) is likely preferable to what has been historically done. It is potentially more proactive and could allow for more rapid recovery of resources.

Soils/Hydrology –The purpose of a drought-management strategy is to use the recent precipitation amounts to trigger early and proactive adjustments in stocking. Early response permits opportunities to retain some high structure, even during drought years, for wildlife needs; to exercise various livestock decisions, such as weaning times, culling practices, and marketing decisions; and to retain plant vigor and health to accelerate post-drought recovery.

Adjust season of use

Range – Season of use is the period of time that livestock are in a given pasture during a specific time/season of the year. Proper season of use is directed at matching the timing of livestock grazing with the kind of plant community within the pasture taking into consideration the long term objectives for the pasture. Adjusting the season of use on pastures would allow species to be grazed at different phenological stages instead of being grazed at the same time of year, year after year. Sedivec and Manske (1990) stated that the most common grazing management problems are seasonlong grazing on one pasture from mid May to mid November, early grazing in April or May, annual repeated seasonal grazing in pastures (such as consistently using the same pastures for spring grazing, summer grazing, and fall grazing), and continually stocking a pasture higher than its carrying capacity.

By adjusting the season of use in a pasture, native herbaceous plants have the opportunity to initiate growth until range readiness or the opportunity for plant recovery. The flexibility and changes made in the season of use would be dependent on the individual allotment, its pastures, type of livestock being used, livestock water availability, and most importantly, the type of vegetative species making up the different plant communities. Authorized Use levels should not be affected by adjusting the season of use, just the management of the various pastures within an allotment may change. Livestock distribution may change depending upon the herbaceous plant community within the pastures.

Botany **–** Different plant species have optimum periods of grazing when they are most palatable to a class of livestock (KSU 1994, NRCS 2006, Heitschmidt 1987), so adjusting the season of use can change the degree that certain plant species are utilized or avoided. Composition or seral stage of the plant community can therefore be influenced by seasonally directing grazing pressure to alter the competitive relationship between different species. For instance, selective grazing of a species at a certain time of year has the potential to decrease its vigor and ability to compete with other species. Conversely, coordination of the grazing season with low palatability of a species facilitates its uninterrupted growth that can confer a competitive advantage against species that are selectively grazed. For instance, delaying turn-in until mid or late summer can facilitate the growth and vigor of cool season climax species and direct grazing towards warm season grass. In the case of invasive

grasses, establishing the season of use during May could increase utilization of Kentucky bluegrass, thereby impeding the accumulation of plant litter that assists its maintenance or spread, while also deferring or decreasing a portion of the native grass utilization that therefore contributes to its maintenance or increase. Adjusting the season of use can also contribute to the maintenance of plant vigor and production by providing opportunities for the completion of critical growth stages that include the initiation of spring growth, replacement of defoliated leaf area, and the translocation of carbohydrates to the crown and root system for winter respiration and initiation of the following year's growth. Repeated seasonlong or seasonal grazing conducted during critical growth periods at moderate and greater utilization levels can alter plant composition and reduce forage production (Briske et al 2008, NRCS 1997, 2009, Vermeire et al 2008). Decreased competitive ability of the affected species can facilitate shifts to increased dominance of other species of varying desirability.

Certain growth periods can also be selected for grazing to increase plant vigor. For instance, grazing of crested wheatgrass during May can promote tiller development and increase forage quality and quantity, while delaying or continued grazing into mid to late summer can result in relative stagnation of crested wheatgrass plants and increased levels of bare ground favorable for the outbreak of grasshopper populations (Manske 1995b, Manske and Onsager 1997).

Adjusting the season of use can also affect woody draw conditions by changing the amount of time livestock spend in the draws. High temperatures during mid and late summer contribute to increased use of woody draws when livestock seek water, shade, cooler temperatures, escape from insect pests, and extended green periods compared to upland grasses that have dried or become less palatable. Although browsing of woody draw plants can increase during the fall after dormancy of upland grasses (Uresk 1986) spring, fall, and winter use have resulted in decreased livestock disturbances and increasing conditions within woody draw and riparian areas (Bailey 2004, Boettcher and Johnson 2005, Butler 1983, Elmore 1989, Severson and Boldt 1978, Swanson 1995). Holechek et al (1999) concluded that the primary benefit of rotational versus seasonlong grazing systems might be conferred to riparian woodland communities through increased opportunities for regrowth during the period of non-grazing. However, this potential can be limited by the relatively slow response of woody species to browsing and trampling disturbances that impedes their ability to escape the next browsing disturbance (Girard et al 1987).

Wildlife – This is an important concept in the context of rotational grazing systems which provides for deferment so that species are grazed at a different phenological stage on a regular basis, contributing to rangeland health.

The benefit to herbaceous structure from this tool may come with the implementation of a grazing system such as a deferred rotation where the number of pastures may dictate the effectiveness of this for herbaceous structure. In the long-term, assuming compositional changes to a different state are achieved, perhaps there may be improvement in density of species increasing the height density of structure.

But, under the assumptions of moderate grazing intensity (see Holechek 1999 and USDA 2001) and rotational grazing systems (see Briske et al 2008), the herbaceous structure distribution may not change appreciably (Grasslands Plan, Appendix I).

Soils/Hydrology –Riparian areas are especially sensitive to the season of use (see Wyman et al., 2006, for details). Various grazing options include:

- Seasonlong grazing
- Spring grazing
- Hot-season grazing
- Fall- (late) season grazing
- Winter- (dormant) season grazing
- Deferred grazing
- Rest-rotation grazing.

Some of the potential advantages and disadvantages are summarized in Table 1 below. Additional details are provided in Wyman et al. (2006, pp. 36-62).

Table 1. Abbreviated comparison of various grazing treatments.

Grazing Treatment	Potential Advantages	Potential Disadvantages
Seasonlong	• Generally none	• Generally riparian areas suffer greatly with long seasonal use. Any pasture with >30 days continuous use is at risk of riparian damage
Spring	• Use of riparian vegetation limited as upland vegetation is generally palatable • Riparian soil compaction might be reduced if livestock are utilizing uplands • Ample time for regrowth • Riparian vegetation in good shape during annual peak discharges	• High potential for soil compaction and bank trampling when soils are moist • Livestock may impact fish spawning areas • Repeated grazing of desirable herbaceous species in spring may affect plant vigor—a short grazing season is beneficial
Hot season	• Stream banks generally more stable than in spring • Riparian vegetation may be more palatable and nutritious than desiccated upland plants	• Greater tendency for livestock loafing in riparian areas and channel • Reduced plant vigor and possible changes in vegetation communities • Possible damage to riparian vegetation that is needed for canopy and instream cover • Adverse fish-livestock interactions are generally greatest at this time
Fall (late) season	• Most herbaceous vegetation	• Great risk of heavy browsing

Grazing Treatment	Potential Advantages	Potential Disadvantages
	has completed its growth, therefore it is less susceptible to overgrazing	on woody species • Regrowth of riparian vegetation is unlikely • Livestock distribution is poor
Winter (dormant)	• Minimal soil compaction and bank trampling • Complete growing-period rest every year • Use of herbaceous plants generally non-detrimental	• Browsing of trees and shrubs can be detrimental—must monitor • Livestock may be using key wildlife winter habitat • Soil compaction possible on thawed soils
Deferred	• Grazing season is shifted leading to alternating impacts and rests • Livestock use may be less selective when use in concentrated in shorter periods	• Every year there will likely be one pasture where riparian areas are at high risk of damage from livestock • Fence materials and maintenance may be costly • If pastures are few, the duration of the grazing season may be too long for some riparian areas
Rest-rotation	• Plants periodically receive a full growing season of rest • The duration of grazing is shortened from a seasonlong treatment and the frequency of defoliation is decreased	• In some season, livestock will concentrate in riparian areas. • In some pastures, the duration of grazing season may be too long for some riparian areas.
Short-duration	• Plants less impacted due to few repeated defoliations • Long periods of growth and recovery • Decreased time of exposure to grazing and trampling • Fly problems are decreased as livestock rotation breaks the fly larvae cycle	• Intensive management is required (frequency of monitoring and moving animals high) • High fencing requirements • Mistakes in the timing of moves can lead to excessive grazing intensity with animal concentration • Cover for wildlife may not be adequate during and right after grazing

Adjust Authorized Use

Range – The selection of the correct stocking rate is the most important of all grazing management decisions from the standpoint of vegetation, livestock, wildlife, and economic returns (Holechek et al. 1989). One point made by leading range managers is that stocking is and always will be the major factor affecting the condition of rangeland resources (Pieper and Heitschmidt 1988, in Holechek et al. Range Improvement Task Force Report No. 57). No grazing system can counteract the negative impacts of long-term overstocking (Holechek et al. Range Improvement Task Force Report No. 57). An adjustment in Authorized Use within an allotment would affect the number of AUs allowed and/or the number of total grazing days for the season for those permittees that are issued a turn-in grazing association permit. For those permittees issued an inventory grazing association permit, adjusting authorized use would result in changing the number of AUs only because of the 12-month nature of the inventory permit.

Botany – Livestock grazing or other herbivory results in disturbance to the plant community, with the degree of affects correlated with the intensity, frequency, and seasonality of defoliation (Briske et al 2008, NRCS 1997, Vermeire et al 2008). Most leading range scientists recognize stocking rate as the principal variable under control of management that effects long-term range productivity, species composition or seral stage, and animal performance (Briske et al 2008, Hart 1999, Hart et al 1993, KSU 1994, NRCS 1997, Pieper and Heitschmidt 1988, Smart et al 2005, Vermeire et al 2008, Whitman and Wali 1975, Wilson 1986). Increasing the number or density of livestock over the same grazing period increases the total amount of forage harvested. Species that are preferentially selected or that are least able to tolerate the level of increased grazing will therefore be competitively disadvantaged. This will generally result in a shift towards early seral stages and species that are able to escape or tolerate the increased grazing pressure through specific growth responses to grazing pressure, growth form, palatability, season of growth, or appendages such as thorns or awns that deter grazing. Non-selection of a species can provide a competitive advantage over selected species and allow the former to increase in relative dominance (Briske et al 2008, Dietz 1989, NRCS 1997, Trammel and Butler 1995). Thus, species that loose palatability such as crested wheatgrass and Kentucky bluegrass relative to native grasses may have an increased opportunity to spread.

Conversely, increased livestock density also increases the evenness of livestock distribution across the pasture, and competition between grazing animals for a limited forage resource can decrease the degree of selection for individual plant species, thereby increasing the evenness of species utilization and potentially maintaining composition of the community by not conferring a competitive advantage to one species over another. Increased livestock numbers and distribution can also influence the management of plant litter by harvesting greater amounts of the annual production that becomes unavailable for litter input. Increased trampling disturbances increase the rate of litter decomposition by decreasing the size of litter material and increasing contact with the ground surface that increases decomposition by bacteria, fungus, and micro fauna.

Decreasing the number of livestock over the same grazing period decreases the level of utilization and increases the potential maintenance or increase of preferentially selected species. Increased

community development with decreased utilization can facilitate shifts towards late seral stages (Barker and Whitman 1989, Biondini and Manske 1996, Biondini et al 1998, Briske et al 2008, Brand and Goetz 1986, Hart 1999, Hart et al 1993, Lauenroth et al 1994, Rauzi 1963, Smart et al 2005, Vermeire et al 2008).

Increasing the number of days in a pasture with the same number of livestock also increases the level of utilization with potential effects of altering the species composition or seral stage. The extended season can contribute to the utilization of different plant species as they increase and decrease in relative palatability, but selective utilization of one or a few species can also occur in areas of repeated spot grazing (NRCS 1997, Sedivec 2006). Lengthened grazing seasons also have the potential to overlap critical plant growth stages when grazing can decrease plant vigor and competitive ability (Vermeire et al 2007, Briske et al 2008), thereby favoring plant species that .

Decreasing the number of grazing days with the same number of livestock decreases the level of utilization, with potential shifts towards late seral stages. Shorter grazing seasons also increase the potential for scheduling outside the period of critical plant growth stages with positive benefits for the plant community (KSU 1994, Biondini and Manske 1996, NRCS 2007).

Increases and decreases in the Authorized Use would have potential effects of respectively decreasing and increasing woody draw conditions through changes in the level of woody draw use. Increasing the length of the grazing period may result in greater periods of mid and late summer use when livestock are likely to spend greater amounts of time within woody draws with greater levels of browsing and trampling disturbances (Boettcher and Johnson 2005, Butler 1983, Elmore 1989, Severson and Boldt 1978, Swanson 1995). Increasing the number of livestock over the same grazing period increases livestock density that can increase the intensity of woody draw browsing and trampling disturbances. The increase in livestock density can also contribute to increased livestock distribution, thereby increasing woody draw disturbances in secondary range.

Wildlife – Several authors (e.g. Holechek et al, 1999; Rangelands; SD State College 1956; Holechek, Pieper, Herbel 1989; Hart et al 1993; Salo 2004; Reece et al 2001; Van Poollen and Lacey 1979) indicate that lower production (or biomass/standing crop assumed = herbaceous structure: Robel et al 1971) occurs under heavy grazing, with moderate grazing resulting in stable to increasing production, and under light grazing, increased production. It follows, then, that adjusting Authorized Use can be an important tool to achieving a mosaic of herbaceous structure across the landscape. Increasing Authorized Use will result in lower herbaceous structure; whereas, decreasing Authorized Use will result in increased herbaceous structure by providing opportunities for growth and regrowth of herbaceous plants.

Soils/Hydrology – Reducing Authorized Use should help improve the uplands vegetation which in turn reduces overland flow further benefitting the riparian conditions along streams. A reduction in overland flow delivered to the stream would result in reduced stream velocities allowing for the establishment of riparian vegetation and building stream banks.

Adjust for cow size

Range – This tool is essentially taking into consideration the actual animal unit equivalent (AUE) of the livestock being grazed. Through improved genetics, breeds, and selective breeding the average cow size has increased over the years meaning that more forage is required to maintain that cow; therefore, the preference needs to be updated to account for the increased forage consumption.

Heavy grazing continues to be a problem on rangelands in the United States and in other parts of the world (Holechek et al 1999). This is somewhat puzzling in view of the fact that 25 long term grazing studies are consistent in showing it to be a losing proposition, financially, as well as biologically (Holechek et al 1999). As a result, adjusting for AUE is another step to assure that the allotments are stocked at the proper level for the class of livestock and available forage in each pasture to assure that over use doesn't occur. Adjusting for cow size would affect Authorized Use by changing the number of AUs and/or the number of days grazed depending upon the type of grazing association permit as mentioned above in Adjust Authorized Use – Range.

Botany – Accurate calculation of forage utilization and permitted AUMs necessitates incorporation of actual livestock weight because by definition, an AUM is defined as the amount of forage utilized by one 1000 pound cow and calf (Biondini and Manske 1996, Carter 2008, Hancock 2006, KSU 1994, NRCS 2003, SRM 1974). Through increased breeding and selection, average livestock weights have increased in the U.S. (McMurry 2009). Average livestock weight reported by the USDA in North Dakota increased from 1,072 pounds in 1984 to 1,242 pounds in 2004 (Carter 2008). Most cows on the Missouri Coteau in the central portion of the state average between 1,200 to 1,400 pounds (Hancock 1994).

Adjusting for average cow weight is critical for establishing stocking levels to maintain forage production and plant composition and predict the effects of a given level of use on future forage conditions. Not incorporating average livestock weight or the class of animal has the potential to underestimate actual levels of use that can contribute to shifts towards early seral stages and adverse effects to range conditions. Accurate assessment of total utilization should also incorporate forage harvested by calves. For instance, KSU (1994) identifies an AUE of 0.3 AUMs for a 400 pound calf at about four months of age. This value is increased to 0.5 AUMs at 500 pounds, and gradually increases thereafter with increasing weight.

Wildlife – Adjusting for livestock weight is a key factor in determining applicable stocking levels (Reece et al 1991). To not consider this factor in determining stocking levels risks over utilization of the forage resource. In brief, this could result in a loss of plant vigor, lost production, increased potential for establishment or spread of noxious or invasive species, lower herbaceous structure affecting wildlife habitat, increased overland flow which can result in gullying, pedestalling, etc. There is no positive effect for rangeland resources of not considering livestock weight in determining an appropriate stocking level.

Having said this, there are some legitimate uses of heavy grazing that may help meet management objectives such as prairie dog management, providing low structure habitats for some species of wildlife, or restorative efforts aimed at reducing specific grass species. But heavy stocking over

time (such as not accounting for increased forage demands of heavier livestock) could result in loss of productivity, a downward trend in range condition, lower economic returns on calves, etc (Holechek 1999).

Soils/Hydrology – Adjusting for cow size would typically result in a reduction in Authorized Use. Reducing Authorized Use should help improve the uplands vegetation which in turn reduces overland flow further benefitting the riparian conditions along streams. A reduction in overland flow delivered to the stream would result in reduced stream velocities allowing for the establishment of riparian vegetation and building stream banks.

Utilize non-native grass pastures early to defer grazing on native grasses

Range – Many of the allotments on the rolling prairie have been cultivated at one point in time and have been reseeded to graminoid species (crested wheatgrass) or allowed to "go back"; and as a result the plant communities in these pastures are a mixture of both introduced and native species. Manske and Sedivec (1999) state that introduced grass pastures reach grazing readiness two to four weeks earlier than does native range, permitting grazing in May and deferring native rangeland grazing until native grasses reach the three and a half leaf stage. They state that crested wheatgrass is the only introduced grass pasture ready to be grazed by May 1 in most years, and smooth bromegrass and meadow bromegrass are typically ready for grazing by the second week in May. Additionally, they note that grazing native rangeland prior to range readiness will be the most costly alternative, with both economical losses (in most cases) and reductions in production associated with physical damage to the plants (Manske and Sedivec 1999).

Application of this tool would affect allotment management by utilizing those pastures deemed as non-native first before use of the native pastures potentially changing the season of use depending upon how the allotment is managed currently. Livestock distribution would potentially change as it should now be focused on the specific grass species in the pasture. For example, livestock would focus grazing pressure on crested wheatgrass in pastures grazed early and on native cool or warm season grasses in pastures that are deferred depending upon the season of use.

Not all allotments and pastures have been fenced to separate the introduced and native grasses, and would require additional fencing, as recommended by the SRT in their final report. An evaluation of the areas fenced would be needed to determine the proper stocking level for the forage available in each pasture. The SRT also indicated that if fencing out the crested wheatgrass from the native species isn't possible, they don't recommend early-season grazing of predominantly native grassland units. Essentially utilization of these pastures should be deferred until the three and a half leaf stage or June 1st. Individual permittees in these situations would have to find other spring pastures to compensate for the delayed turnout.

Botany – Greater utilization of invasive grass pastures through early season grazing would therefore contribute to the maintenance of native plant communities and would be a primary tool in re-establishing the dominance of native plant communities.

Forage nutrition and palatability of all grasses is generally at its highest prior to the development of seed stalks (KSU 1994, NRCS 1997). Invasive grasses such as crested wheatgrass and Kentucky

bluegrass initiate growth and seed development, and decrease in palatability earlier in the season than native grasses (Frank et al 1993, Manske and Sedivec 1999, Smoliak 1981). However, these species can be highly palatable, nutritious, and more desired by livestock than many native grasses during late April through mid-June (NRCS 2009, Sedivec 2006). Early season use of invasive dominated pastures should therefore increase the utilization of these species and increase the efficiency of harvesting the range of available forage components (Dekeyser et al 2010). Increased use of the invasive component can decrease the extent of selectively grazing native grasses that occur intermixed in these communities, thereby contributing to increased vigor and maintenance, and ideally, facilitating shifts back towards the native community by altering the competitive relationship between native and invasive grasses.

Utilizing invasive-dominant pastures early in the season can also defer the use of other pastures that are dominated by native grass communities, thereby increasing opportunities for the completion of critical early season growth periods that maintains plant vigor. Further delays in the initiation of grazing allows greater amounts of growth and leaf production that can increase the tolerance to grazing disturbance by maintaining greater amounts of leaf area that increase the plants ability to replace tissue lost to grazing. Therefore, delaying turn-in onto native dominant pastures can enhance the maintenance of these communities. Early season use of Kentucky bluegrass, possibly in conjunction with prescribed burning, could help shift the community towards greater native species dominance (NRCS 2009, Smith 2010) desired for the maintenance of native plant diversity.

Several pastures contain intermixed stands of invasive and native grasses, or intermingled patches of invasive versus native grass dominance. Early season grazing in these pastures presents the possibility of premature grazing of native grasses rather than selective utilization of invasive grasses. Livestock tend to graze what they are accustomed to eating, but some work in North Dakota has shown that they will begin to seek or selectively graze bluegrass when intermixed with native grasses during early grazing seasons (Brand 2006). Although Kentucky bluegrass may produce only 25 percent as much forage as the native community, grazing can promote regrowth and extend the green period of nutritious forage, potentially increasing the total production (Sedivec 2006). Failure to incorporate utilization of invasive grasses in mixed pastures by missing their period of palatability has likely resulted in over-utilization of the native component. This can effectively increase the stocking rate on the native component and confers a competitive disadvantage that can provide positive feedback for continued invasive grass expansion (Belsky and Gelbard 2000, Brisk et al 2008, Dietz 1989, NRCS 1997, Trammel and Butler 1995). Only forage production from palatable or likely to be utilized forage species should be included when determining proper stocking levels (Hancock 2006, KSU 1994, NRCS 1997). Non-use of avoided species does not compensate for heavy use of highly selected species, and averaging use among differentially selected species does not address the effects of a utilization level on plant community composition (NRCS 2006).

Early season grazing of invasive grass pastures would have the potential to decrease browsing and trampling disturbances in woody draws, thereby contributing to increased regeneration and improved conditions. Cooler temperatures, fewer insect pests, and high palatability of invasive

grasses in the uplands would contribute to decreased woody draw use and disturbances compared to later season grazing

Wildlife – The earlier the livestock come off the early season pasture, and stay off, the more regrowth that could occur by fall. It is feasible that the early season non-native pasture(s) could provide higher structure in the fall and contribute to the diversity of herbaceous structure if sufficient time is provided for regrowth. Also, since native range will not be grazed until June 1st or later, the longer livestock are on the pasture(s), the less potential for regrowth there would be to achieve desired structure objectives (Reece et al 2001).

It is assumed that every pasture within an allotment will be grazed at least once during a grazing year. It is also assumed that a stocking rate will be employed that allows for maximizing use of consumable forage without damaging the productivity of the plants and the soil (i.e. "proper stocking"; Launchbaugh Univ. ID). Regrowth may or may not occur on the non-native pastures to recover some fall structure (Reece et al 2001).

Allow early turnout on native pastures one out of three years on inventory permits

Range – Grazing native pastures in the absence of tame grass pastures earlier than June 1st or the three and a half leaf stage for key graminoid species one out of three years, relieves some of the grazing pressure on winter pastures which may contain National Forest System (NFS) lands. Although livestock are typically being fed hay and/or supplements while on winter pastures, livestock grazing pressure on winter pastures has the potential of increasing as the graminoid species green up whether or not the graminoid species are ready to be grazed.

Botany – Premature grazing of native grasses can decrease plant vigor and production by interrupting critical early season growth stages when carbohydrate reserves for initiating new growth are low. Defoliation of limited leaf area early in the season is apt to result in small amounts of remaining leaf, thereby impeding a plants ability to recover. This effect can contribute to decreased plant vigor and production during the remainder of the season (Frank et al 1993, KSU 1994, Manske 2001, NDSU 2009, NRCS 2007, Sedivec 1992). Manske (2001) measured 45 to 60 percent less forage production compared to the potential when grazing was initiated during mid May, but there was very little decrease in forage production when grazing was initiated in early June. Continued grazing through the second critical period in late summer/early fall can compound adverse effects of early season grazing, as can below normal precipitation that limits the potential for regrowth. Although early season use is proposed only once every three years, a relatively high potential exists for other factors such as low precipitation or high levels of grazing to act in combination with premature grazing to facilitate or maintain early seral stages and decreased plant production. Decreased levels of use and/or early removal of grazing are likely to be necessary to avoid excessive utilization and long-term adverse impacts to forage production and species composition (Manske and Sedivec 1999). Vermeire et al (2007) found unfavorable increases in annual brome and prickly pear (*Opuntia polycantha*) when grazing was conducted before June, particularly in areas with high stocking levels such as calving or feeding grounds.

Several invasive grass pastures that are underutilized due to poor coordination of the grazing season with palatability of these species could eliminate the necessity of implementing this practice. However, a potential benefit of premature grazing might include increasing the utilization of invasive grasses. Most pastures contain an invasive grass component and early grazing could increase selection for this species, thereby increasing the utilization of undesirable species and potentially decreasing plant litter that contributes to their persistence or spread. Although livestock may become accustomed to grazing and selecting invasive grasses early in the season (Brand 2006), the potential exists for premature grazing and adverse effects to desired native grasses, with the degree of potential effect increasing with increasing proportions of native grasses.

Early season grazing on native dominated pastures could have adverse effects on woody draw conditions by impeding the development of tree and shrub saplings that would also be at early stages of growth with low carbohydrate reserves. Conversely, relatively cool temperatures, fewer insect pests, and palatable upland forage may limit livestock use of woody draws (Swanson 1995).

Wildlife – Premature grazing on a pasture prior to "readiness" could affect plant production for the current year and perhaps the following year, especially if stocking levels are heavy. This could affect regrowth and herbaceous structure levels the following fall with potential consequences for ground nesting species the following spring. Another factor would be the length of the regrowth period; whereas, the earlier the livestock leave the pasture, the higher potential for increased herbaceous structure readings. Though the winter grazed pasture may have more time for regrowth, that fall structure would be lost due to winter grazing the following winter and not be available for ground nesting species in the spring.

Defer native pasture turn-in until June 1st or until development of the three and a half leaf stage for key graminoid species

Range – It is a general practice in rangeland management that native cool season graminoid species should not be grazed before reaching range readiness (grazing readiness) which is typically the three and a half to four leaf stage. Range readiness is defined by the Society for Range Management as "The defined stage of plant growth at which grazing may begin under a specific management plan without permanent damage to vegetation or soil; usually applied to seasonal range." Range readiness is used to determine the actual allotment entry date in response to plant phenology. Methods of determining range readiness for native and tame pastures can be found in Frank et al. (1993). They conclude that using the growing degree day (GDD) approach to determine grazing readiness, managers have minimized the guess work about when grazing can begin on any pasture. They also conclude that if grazing starts at the proper development stage, the plants will be more tolerant of grazing stress and will maintain the higher vigor needed to continue forage production during the grazing season and in following years. As the spring season varies from year to year, and grazing readiness varies year to year, the GDD approach will help determine the best date to begin grazing (Frank et al. 1993).

This tool would affect permittees that have a turn-in grazing association permit by shortening their grazing season typically by one month. However, because of the nature of the turn-in permit their

Authorized Use would not change because they could run additional AUs for the shorter period of time. Permittees with an inventory grazing association permit would also see a shortened summer grazing season. But unless they were allowed to graze/feed on their winter pastures for the extra month, they would see a decrease in Authorized Use because they would have to run less AUs.

Livestock distribution would potentially change as it should now be focused on the specific grass species in the native pasture. For example, livestock would focus grazing pressure on native cool or warm season grasses in pastures that are deferred depending upon the season of use.

Botany – Deferring turn-in until sufficient growth is attained assists plants in meeting physiologic requirements of carbohydrate storage and transfer to initiate and maintain regrowth after grazing (KSU 1994, Manske 2001, 2009, NRCS 2007). Grazing schedules that meet minimum physiologic requirements of the plant contribute to the health and stability of a given plant community and associated forage production, animal performance, and economic returns (KSU 1994, Manske 2001, NRCS 1997). Meeting or exceeding plants' minimum physiologic requirements is necessary to facilitate the development and maintenance of mid and late seral stages, while purposing not meeting these requirements will facilitate shifts towards early seral stages or the establishment of weedy species. Greater amounts of leaf area at the time of grazing are more likely to result in sufficient leaf area remaining on the plant to assist regrowth (Briske et al 2008). The greatest extent of both invasive and native grass production is achieved when plants reach the 3.5 leaf stage (Frank et al 1993, Manske 2001, NDSU 2009). Manske (2001) measured 45 to 60 percent less forage production compared to the potential when grazing was initiated during mid May prior to the 3.5 leaf stage, but there was very little reduction in plant production when grazing was initiated in early June. Biondini and Manske (1996) found 72 percent of aboveground net primary production occurred by mid-June in North Dakota. Thus, delaying grazing until this time should result in greater amounts of forage available to livestock production compared to earlier season grazing.

Wildlife – Since this tool dictates that native range will not be grazed until after June 1st, depending on the length of time in the pasture, regrowth may not be sufficient to achieve structure objectives within the allotment (Reece et al 2001). Given these assumptions, it follows that this tool would typically continue to contribute to structurally homogenized native pastures because of a limited regrowth time for early season species.

At this time, it is assumed that every pasture within an allotment will be grazed at least once during a grazing year. It is also assumed that a stocking rate will be employed that allows for maximizing use of consumable forage without damaging the productivity of the plants and the soil (i.e. "proper stocking"; Launchbaugh Univ. ID). Appendix I of the Grasslands Plan states that "moderate grazing intensity" (assumed to be "proper") would provide "limited opportunity to provide quality habitat for management indicator species needing high structure."

Rest for one or more seasons

Range – Rest is defined in the Grasslands Plan as "To leave an area of rangeland ungrazed by livestock or unharvested by mechanical methods for at least one year (12 consecutive months) (Grasslands Plan, p. G-45). Holechek et al. (1989) defines rest, distinguished from deferment, as

the range receives nonuse for a full year rather than just during the growth period. They further explain that rest gives plants a longer period to recover from past grazing influences and provides wildlife with a pasture free from livestock use during the critical dormant period. A disadvantage of both deferment and rest is that the grazing load on other pastures must be increased during the critical growth period, and that it is questionable if periodic nonuse during critical periods compensates for periodic heavy use (Holechek et al. 1989). Holechek et al. (1989) explains that both deferment and rest do provide plants on sacrifice areas with some opportunity for recovery. Heitschmidt and Taylor (*in* Heitschmidt and Stuth 1991) concluded that forage quality is seldom directly enhanced by deferment from grazing although it may be indirectly enhanced if deferment induces a desirable qualitative change in species composition.

Authorized Use on the allotment receiving rest would be reduced based on the size of the pastures that rest is being applied to. The permittee would need to find other pasture land to place the permitted livestock onto. Continued long-term rest has the potential of negatively impacting the range developments within an allotment or pasture because of the non-use of the development, such as in range water wells and pipeline systems.

Botany – Providing rest can help restore plant vigor by providing periods for uninterrupted growth and the storage of carbohydrate reserves to weather stressful periods and initiate growth during the following year (Dietz 1989, Holechek 1989, NRCS 1997). Rest periods can also facilitate greater seed production and recruitment of new seedlings to replenish species populations (NRCS 1997). Grassland communities may start shifting towards late seral stages and increased plant structure with sufficient rest periods, but development of late seral stages would likely require several years depending on the starting point of plant composition. The potential for woody draw sapling recruitment would similarly increase with rest by increasing opportunities for saplings to grow above browsing heights.

Holechek (1989) cites several studies where various rest-rotation grazing strategies involving an entire year of rest for one of four pastures on a rotating schedule resulted in increased plant vigor and density and improved range conditions compared to seasonlong grazing at moderate stocking rates. Although rest-rotation grazing systems did not significantly improve livestock performance in prairie ranges, periods of rest contributed to multiple use values of aesthetics and wildlife habitat quality.

Wildlife – The lack of herbivory (and fire) for various time frames (rest) was a natural part of the ecosystem prior to the introduction of livestock and non-native flora to the Great Plains. The range of the temporal and spatial extent of those rest periods was highly variable, contributing to a shifting mosaic across the scale of the Great Plains. The rest periods provided certain wildlife species habitats generally free from disturbance and potential later successional habitats (USDA 2000b). Now that ecosystem is gone. Now invasive grasses place a risk to native species – flora and fauna. Now resting an area can favor certain aggressive non-native species such as Kentucky bluegrass and smooth brome. These species can potentially turn an area into an Invaded Grass State. Sites dominated by invasive grasses are generally not conducive to promoting native species because of a tendency to form monocultures and providing a different vertical and horizontal habitat structure. This, however, does necessarily nullify the potential benefits that rest could provide to flora and

fauna along with restoration of ecosystem processes – notably fire and rest (Fuhlendorf et al 2009). Although the specific time frame is ambiguous, we must distinguish between shorter term rest and long-term rest. Currently, in order to preserve the traditional range management paradigms, the range management literature seems biased toward the perceived, and probable negative impacts of long-term rest (greater than 10 years) in today's ecosystem realities rather than rest-rotation and relatively short rest periods. Long-term rest (≥10 years; No Grazing Alternative) may not be beneficial especially over large areas over longer time frames for two reasons: the potential for too much moderate and high structure at the expense of low structure (i.e. poor structural diversity); and two, the longer the rest period(s), the higher the probability, or risk, of favoring invasive grass species. Invasive grass species can provide high structure in the fall but due to its vegetative structure may not hold up over the winter. But studies are mixed on the value of Kentucky bluegrass to grouse (Uchytil 1993 plus see Rice and Carter 1984 compared to Kohn 1976). I suspect that the value of this invasive species may be relative to its presence within the plant community. But given the widespread presence of invasive grasses on the Little Missouri National Grassland (LMNG), and the project area, that long-term rest is favorable to herbaceous structure as measured in the fall, but its value for wildlife is highly suspect for upland nesting species.

Relative short-term rest (perhaps 1to 5 years) could provide ecosystem diversity in processes and habitats (Fuhlendorf and Engle 2001, Briske et al 2008). Short-term rest (e.g. 1-5 growing seasons) would provide increased amounts of high structure as measured in the fall and, assuming a strong native grass component, would provide increased quantities of potential habitat in the spring as well for species requiring higher structure habitats such as sharp-tailed grouse and Baird's sparrow.

On the other hand, long-term rest would reduce the habitat suitability for some of the same species. Populations of Baird's sparrow and Sprague's pipit can peak at 1to 5 years after a fire, but they were absent from areas with long-term rest (80 plus years: Madden et al 1999). Increasing litter depth reduces habitat suitability for these species (DeChant 1998).

Soils/Hydrology – The cessation of grazing would have an immediate, short-term positive effect on riparian areas. Trampled banks, compacted soils, and trailing would heal within one or a few seasons. Riparian plant communities would begin to expand in areas where plant density is light, sparse, or absent. Woody riparian shrubs and trees would likely see a marked increase in population as seedlings would not be trampled and seedlings and saplings would not be browsed by livestock.

Long-term rest with sod forming invasive grasses such as Kentucky bluegrass invasion could lead to poor nutrient cycling in the soil and poor rangeland hydrology with excessive runoff and reduced infiltration in upland soils. Decreased infiltration reduces available soil moisture for upland plants. Increased runoff can initiate gullying of drainage ways and erosion of channels due to increases in peak stream discharge.

Reallocation of pastures (change allotment boundary)

Range – Reallocation of pastures and changing an allotment boundary would provide more flexibility in the management of an allotment(s) in many ways. The decision to change allotment

boundaries could be due to topography, distribution of livestock, or vegetative communities (native versus non-native). Several of the allotments within the project area were cultivated and planted back to crested wheatgrass. By combining allotments or changing boundaries, managers have the ability to utilize the non-native pastures and defer the native pastures instead of a typical eight month grazing season on a pasture that is crested wheatgrass or grazing native before range readiness has been achieved. In the case of topography, a rotation may be more easily achieved if pastures are reallocated since the topography may have restricted the movement of livestock to the next pasture in a rotation. Livestock distribution has the potential to change as well, depending on the topography and/or plant composition of the exchanged pastures. This tool was also one of several recommended in the Report of the Scientific Review Team (2005) under Issue V-3, where they state that one of the issues in the sample AMPs was the redistributing of animals over time and space in contrast to reducing animal numbers has been inadequately considered.

Depending on the pasture reallocation, a common allotment could be created which would require additional coordination with all common members for the grazing management to succeed. Grazing administration would need to be updated so that the grazing association grazing permits would reflect the reallocation of NFS acreage and associated AUMs. An analysis of available AUMs per pasture would be required, as well. Lastly, there could be costs associated with updating allotment boundary fences so that they are up to FS specifications.

Botany – Pasture reallocations or boundary changes can assist efficient utilization of available forage. For instance, greater utilization of invasive grass forage might be achieved if existing permittees do not have a sufficient number of head to provide the desired level of utilization before these species decrease in palatability, or the permittee would not have a sufficient forage base to maintain an increased number of head during other times of the year. Reallocating under-utilized forage in one allotment may allow needed rest in other allotments to increase plant vigor, production, and composition of both grassland and woody draw communities. Changing pasture boundaries can assist separating invasive versus native grass communities for more efficient utilization of the former and protection from premature grazing for the latter.

Fencing areas of similar topography and forage can assist more even utilization or decrease excessive utilization of preferred grazing areas (Bailey 2004). For instance, livestock are more likely to graze on gentle rather than rough topography when both are present, but splitting the area of more difficult terrain into a separate pasture can result in more efficient use of available forage. Hart et al (1993) found pasture size in relation to water availability had the greatest influence on livestock distribution and forage utilization. Thus, changing or dividing pasture boundaries could increase the uniformity of utilization. Although this would have the potential of decreasing the desired mosaic of different grazing pressure and seral stages, grazing levels could be specifically established in different pastures to facilitate a range of seral stages that could be rotated among different potential plant communities to promote a shifting mosaic of seral stages and plant diversity.

Changing pasture boundaries can also alleviate high levels of concentrated trailing and erosion that result from topographic constraints or unusually shaped pasture boundaries. Changing pasture boundaries might also alleviate excessive use of sensitive areas such as woody draws or riparian

habitats that might be less accessible from another pasture. Conversely, changing boundaries to achieve greater access to a given area would increase browsing and trampling disturbances within woody draws, and/or facilitate shifts towards early seral stages of upland grass communities.

Wildlife – Reallocation of pastures can provide opportunities to adjust management to address various resource issues such as adjust for non-native cool season grass areas, take advantage of topography, reduce trailing, or permit better distribution of water sources.

This tool can also provide opportunities to adjust management to address similar resource issues. However, if issues exist prior to the adjustment, the potential for those issues still exists after the adjustment is made, as well. For example, if stocking rates are at the root of an issue, they may not be adjusted initially due to the perception that a new rotation will fix the issue (Briske et al 2008). This tool is dependent on many factors including stocking rate, water distribution, timing, etc.

Given this dependency on other factors, it is uncertain at this time how specifically this tool will affect herbaceous structure and monitoring of the specific situation will be required. Potential exists for improvement in the herbaceous structure distribution because of potential to better utilize tame grasses, water sources, etc. On the other hand, potential exists for no changes or negative impacts to herbaceous structure in some areas, as well.

Soils/Hydrology – The increase in number of pastures allows livestock to spend less time in each pasture and to increase the rest period. In general, plants are healthier when they have longer periods of rest between grazing intervals. Most native prairie plants can better rebuild aboveground biomass, recharge food reserves to root systems, and rebuild root structure during longer rest periods than shorter intervals.

Construct temporary fence to control livestock distribution patterns

Range – For distribution, fences serve to control seasonal drift of livestock, regulate use among forage types, protect choice grazing areas for special uses, and to separate units for special management (Holechek et al. 1989). Intensive and effective management of grazing lands is dependent on adequate fencing (Vallentine 1989). Although stock water developments, salting practices, placement of other supplements, and occasional drifting of livestock are useful indirect methods of controlling livestock, fencing and herding are the only direct means of regulating seasons, numbers, kinds, and distribution of grazing animals (Vallentine 1989). Vallentine explains that the uses and benefits that can be expected from fencing, are many. Some of the 19 benefits he identifies include: 1) permit rotation, deferment, and resting of grazing lands, 2) regulate season of grazing use, 3) regulate stocking rates, 4) provide better distribution of grazing, 4) protect soil and related resources on erosive sites, 5) reduce labor required in handling livestock, 6) protect new seedlings and other range improvements.

Livestock distribution would potentially change as it should now be focused on the specific grass species in the temporarily fenced off location. For example, livestock would focus grazing pressure on crested wheatgrass in areas grazed early and on native cool or warm season grasses in areas that are deferred depending upon the season of use. Temporary fencing, typically, would be an additional expense to the permittee in both installation and maintenance.

Botany – Temporary fencing can assist greater uniformity of utilization by enclosing livestock within a smaller area, but can also provide rest or deferment in other areas. Therefore, temporary fencing can promote late or early seral stages across different areas of a pasture. Fencing can be effective in delineating areas of different forage quality or seasonal use (Holechek 1989). For example, crested wheatgrass or other invasive grasses can be fenced from areas of native grass, thereby increasing utilization of invasive grasses while protecting native grasses from premature grazing. Temporary fencing can also remove grazing-related disturbances and improve conditions of sensitive areas such as riparian habitat, springs, woody draws, and sensitive plant habitat.

Wildlife – If the objective of the fence is to create a more even utilization pattern, and given other assumptions of moderate grazing intensity and rotational systems (Bailey, 2003) and (Holechek et al, 1989), then the effect will be little, if any, improvement to overall herbaceous structure diversity. If the objective is to help rest another pasture, then effects would be more positive, assuming appropriate stocking for each pasture rather than increasing the grazing burden on the grazed pastures to make up for the deferred grazing from the rested unit. If the objective is to better utilize crested wheatgrass, then the effect may be mixed but perhaps generally positive because of likely regrowth from crested wheatgrass.

USDA (2001b) states that smaller pastures result in more uniform forage utilization. However, Briske et al (2008), Bleich (2005), McCuistion (2008), and Holechek (1989) suggest that rotational systems, albeit with smaller pastures, may be used to benefit conservation goals such as wildlife habitat if other tools (e.g. rest or variable stocking) are used alongside this management technique. Utilizing temporary fences would allow for more temporal control and management responsiveness and flexibility of specific situations.

Construct or remove cross fences

Range – Constructing fences has the same effects as discussed under the previous section, the exception being that these are permanent fences so the ability to change management actions requiring a fencing change is slower than with temporary fencing. Removing fencelines can facilitate simultaneous use of adjacent pastures, and may alleviate problems associated with water distribution providing other opportunities for improving resources towards desired conditions.

Botany – Constructing new fences results in subdividing or splitting pastures and can have effects similar to the above, but of permanent duration. Subdividing a pasture into several smaller pastures can increase the evenness of livestock distribution and utilization, potentially decreasing over utilization of key grazing areas (Holechek 1989). However, increased evenness of utilization can conflict with Grasslands Plan objectives for maintaining a mosaic of utilization levels and seral stages unless this goal is specifically incorporated in grazing management. Some studies have shown that subdividing pastures into several smaller pastures that rely on the same water can result in increased trailing and erosion impacts (Hart et al 1993).

Removing fencelines can facilitate simultaneous use of adjacent pastures and may alleviate problems associated with water distribution. Increases in pasture size with limited water distribution can decrease the evenness of grazing distribution and utilization (Hart et al 1993),

thereby facilitating a range of seral stages across the pasture. Although a mosaic of grazing intensity is desired to support a range of seral stages and plant communities, poor livestock distribution can result in excessive grazing in primary use areas (Holechek 1989).

Wildlife – Constructing a cross fence would typically result in smaller management units and increased distribution of livestock and potential for increased herbaceous structure homogeneity. However, more units can also increase management flexibility with a clearly stated plan designed to meet desired objectives. With more units available, potential management options could include such tools as varying stocking rates/timing to influence the disturbance regime and provide a mosaic of herbaceous structure. Increased permanent fencing could increase grouse mortality (and big game) from collisions with permanent fencing.

Conversely, removing fences may enlarge management units and may result in decreased livestock distribution and increased potential for herbaceous structure heterogeneity. Depending on context, a loss of management flexibility to alter the disturbance regime at the management unit level may be experienced. There may be less mortality to grouse from collisions with permanent fencing.

Construct livestock water development (well, pipeline, tanks, windmill, reservoir, dugout, or spring)

Range – New water developments will typically be located in uplands away from woody draws and riparian areas. According to Holechek et al. (1989) livestock water is the center of grazing activity and additional watering locations will often improve livestock distribution. The location of water developments on rangeland is important in controlling the movement, distribution, and concentration of livestock, and that improper distribution of grazing frequently results from improper distribution of watering places (Vallentine 1989). Vallentine (1989) concludes that a good rule of thumb is that cattle should not have to travel more than one quarter to one half mile from forage to water in steep, rough country or more than one mile on level or gently rolling range according to the USDA Forest Service (1969) and the USDA Soil Conservation Service (1967). These findings indicate that livestock distribution would potentially change; however, to prevent livestock from utilizing the woody draws and riparian areas the development should be at least one quarter of a mile away to minimize the disturbance by livestock in the Badlands geographic area and even farther in the Rolling Prairie geographic area. The location(s) of the water development(s) is site specific within an allotment and should be analyzed to assure proper placement to meet management goals. Utilization in the area of the water development would increase, however, with other management tools and the planned monitoring in place this should assure that over use doesn't occur. For each water development there would be initial construction costs to the permittee and the FS, and continued maintenance costs to the permittee.

Botany – Adding water developments can result in more even livestock distribution and utilization throughout a pasture with increased livestock performance (Bailey 2004, Hart et al 1993, Holechek 1989). Improved livestock distribution with additional water sources can also improve range conditions by alleviating excessive use and adverse impacts around limited water sources located in

typical grassland communities or near sensitive areas such as woody draws and riparian habitats. Development of off-site water away from riparian and woody draw sites can result in decreased browsing and trampling disturbances and an increased potential for improved conditions (Miner et al 1992, Porath et al 2002). Decreased turbidity and other improved water quality characteristics often obtainable with an alternative water source can significantly improve livestock performance (Porath et al 2002, Surber et al, 1996).

There is direction in the Grasslands Plan for maintaining or restoring riparian areas; therefore development of new springs may require some additional mitigation to follow plan direction. Plumbing systems designed with check valves to maintain flow at the spring while providing livestock water some distance away can improve the ecologic condition of undeveloped springs that experience high livestock disturbance, particularly if the spring and associated riparian habitat is fenced. Potential improvement of woody draw conditions adjacent to disturbed springs would most typically be confined to the immediate area that is fenced from continued livestock browsing and trampling disturbances associated with access and congregation around the water tank.

Adverse effects of developing new water sources can include zones of high disturbance around the water source with decreased plant production and composition (Brooks et al 2006, Rinehart and Zimmerman 2001). Rinehart and Zimmerman (2001) measured decreased plant production, composition, and structure with decreasing distance to water sources on the LMNG. They concluded that the existing density of water developments was resulting in homogenization of disturbance patterns and were inhibitive of attaining a mosaic of grazing intensity and a range of seral stages and plant structure within western wheatgrass – needlegrass habitat types.

Constructing new reservoirs or dugouts along drainages alters natural hydrologic characteristics of the system and has a high potential to increase woody draw disturbances from livestock trailing along the drainage and congregating around the reservoir. Interrupted hydrologic flow also has the potential to decrease downstream moisture availability for the regeneration of woody species.

The addition of new water sources supplied by pipelines or water wells increases the reliability of water but also increases the potential for continued grazing during drought conditions compared to other water supplies that are likely to become dry during drought and expedite the removal of livestock under poor forage conditions. Forage plants are less tolerant of grazing during drought (Biondini and Manske 1996, NRCS, 1997), so continued use during these periods has the potential to decrease forage production and composition. Disturbances associated with pipeline construction have a high potential to assist the establishment and spread of invasive plants.

Wildlife – Water developments influence the structure distribution by increasing livestock distribution (USDA 2001b, LMNG Rangeland Assessment 2002, Fontaine et al 2004). Homogenization effects are expected under traditional range management paradigms (e.g. "proper" stocking, goal of increased efficient use of the entire pasture, and most rotation systems - Fuhlendorf and Engle 2001), particularly within a half-mile of a development (LMNG Rangeland Assessment 2002, Fontaine et al 2004). There is also the potential loss of secondary range (USDA 2001b). On the other hand, water developments, by providing management flexibility, could aid in achieving herbaceous structure objectives if the disturbance regime (livestock management and fire)

is variable over time (i.e. years; Fuhlendorf et al 2006 and Fuhlendorf et al 2009) within the sphere of the water development(s). To recreate secondary range may require reducing water density artificially and/or temporarily via rotations and/or shut-off valves. The objectives, along with the spatial, timing, and environmental context would be critical in determining the potential effects of infrastructure.

Soils/Hydrology – Constructing new water developments would pull livestock away from riparian corridors depending upon the particular location of the development thus reducing livestock use in these areas. Improvements in the desired conditions for riparian areas and streams should occur by minimizing bank trailing, trampling, and loafing in the riparian area, allowing for herbaceous and woody riparian vegetation maintenance.

Remove/reclaim water development (well, pipeline, tanks, windmill, reservoir, dugout, or spring)

Range – As stated in the standards and guidelines of the Grasslands Plan, areas such as seeps, springs, wetlands, and riparian areas need to be protected. Natural springs have been developed in these areas in the past, and livestock are attracted to these areas due to the water source. The removal/reclaiming of these water developments may or may not affect the distribution of livestock. Livestock distribution may not change because of the size of pasture, topography, climatic conditions, other existing water developments, or other management tools used within the management plan for the allotment. Distribution on larger pastures along with other management tools has the potential of changing livestock distribution; however, the extent of the change will depend on management and monitoring of the allotment.

The Grasslands Plan on pages 1-9 through 1-10 in section B, lists the standards and guidelines for water. The North Dakota Water Commission also has state laws that require abandoned wells to be plugged if the water well has been abandoned. If this has been the case for some time, the distribution of livestock will not change. On the Medora Ranger District livestock water wells are plugged if a new well is drilled to replace the old one, or if the well is abandoned, the DPG has a program to plug the wells due to state laws and regulations.

Botany – Removal of an upland water tank would facilitate shifts towards late seral stages in the surrounding area due to decreased grazing disturbances. However, high levels of previous disturbance around the tank would have the potential to support populations and seed banks of invasive grasses and weedy species. Although most early seral weeds would gradually decrease in occurrence with removal of the tank and plant succession, invasive grasses would have the potential to increase in vigor, dominance and extent. The removal of a water development has a high potential to result in increased disturbances around other water developments.

Reclaiming developed springs or various reservoirs along drainages has the potential to improve conditions of adjacent woody draws by decreasing livestock disturbances and restoring natural hydrologic conditions that can increase the growth and regeneration of woody species.

Wildlife – Reclaiming water developments and not replacing them with new water provides an opportunity to decrease water density and increase secondary range which could potentially contain higher herbaceous structure and contribute to the herbaceous structure distribution.

Removing or reclaiming a water source from woody draws or riparian areas should improve woody draw or riparian conditions and have a positive effect for those wildlife species that utilize these areas.

Manage water availability/access at water developments

Range – In review of Wyman (2006) techniques that attract livestock away from riparian areas and Ganskopp (2004) field day range report on affecting beef cattle distribution in rangeland pastures with salt and water, they indicate that this tool is effective in improving livestock distribution. Ganskopp (2004) reported this method can be used to temporarily lure livestock away from seasonally sensitive portions of a pasture. In this study they used portable stock tanks and closed off access to specific watering points within the pastures and initially herded livestock to the new salt location or water source. Ganskopp's (2004) primary goal of the study was to evaluate the effectiveness of salt and water manipulating cattle distribution in large sagebrush/steppe pastures. Wyman (2006) also reported that this tool was successful in south-central South Dakota where a rancher distributed water tanks throughout a large pasture and turned the water on and off which distributed livestock to various portions of the pasture and decreased the amount of interior fence needed in rough terrain. In review of Ganskopp (2004) one will also see that this tool was used along with other management tools such as the placement of supplements and herding.

In the case of a range water pipeline system this tool would be easy to implement, but the permittee would need to monitor livestock use closely in the area of available water to prevent overuse. In other water development situations, additional input would be required to control livestock access of the water development, such as, water lot fences around reservoirs and dugouts resulting in additional construction and maintenance costs. Livestock distribution would be altered depending on the size of the individual pastures and topography. With the success of moving livestock use from one available water source to another there should no longer be a need to install extra interior fences in an allotment depending upon topography.

Botany – Controlling flow or access to various water developments assists in controlling livestock distribution and the intensity of forage utilization and grazing disturbances (Bailey 2004, Holechek 1989). Limiting access to a water site can therefore facilitate shifts towards late seral stages in the surrounding area, while increasing access can shift plant composition towards early seral stages. The affect of controlling water access can be similar to implementing a rotation grazing system without the need for subdividing a pasture with cross fencing because livestock grazing will shift to the area of present water availability (Hart et al 1993).

Wildlife – See "Construct livestock water development" tool.

Managing water sources may add flexibility to an allotment or pasture by allowing the manager to control access to the water, thereby influencing distribution of livestock and, hence, herbaceous structure. The effectiveness of this tool for addressing the herbaceous structure distribution within

an allotment or pasture would depend largely on two to three factors: distribution of manageable and fully accessible water sources; a clearly stated plan on how to manage the water sources so as to meet desired objectives; and management compliance.

Maintain existing developments to reestablish use

Range – The lack of maintenance on developments leads to them becoming nonfunctional for livestock use or minimally functional. As the water developments decrease in functionality, livestock distribution will change leading to a concentration in use around areas where the developments are functional. Without adjusting for this change in livestock distribution, areas will become heavily used by livestock, and over time plant diversity will change. Maintenance of allotment boundary fences will prevent excess use within an allotment from livestock in adjacent allotments. Maintaining interior allotment fences will ensure that the planned rotation occurs.

Botany – This practice is primarily directed to reconstructing or repairing developed springs, dugouts, water wells, and fencelines that are in disrepair or no longer functioning effectively. Spring and dugout developments occur along drainages usually supporting woody draw communities where maintenance or repair of the development will likely ensure continued or increased livestock disturbances that impede the improvement or maintenance of woody draw conditions. However, as discussed above, reconstruction of spring developments can assist improved conditions of the wetland habitat and portions of adjacent woody draws. Repair of water wells to supply upland water tanks can reestablish livestock distribution and utilization patterns, with potential positive and negative effects as discussed above for the "Construct livestock water development" tool. Repairing fencelines allows for controlling the degree of use in different pastures of an allotment, thereby allowing for the control or management of desired plant composition and seral stages.

Wildlife – This would essentially re-establish a development. See "Construct livestock water development" tool.

Implement deferred grazing system

Range – Grazing systems are often proclaimed to be viable options for enhancing the productivity and ecological condition of grasslands (Vermeire et al. 2008). Vermeire et al. (2008) explains, however, that no individual grazing system investigated in their study effectively altered standing crop or functional group composition relative to other grazing systems. Biondini and Manske (1996) concluded that their results clearly indicated that in the grasslands of western North Dakota, rainfall is more important than grazing or grazing systems in the control of ecosystem-level variables measured. The greatest changes in standing crop were climate-related and therefore, selection of grazing strategies should not be based primarily on the premise that a particular system or the implementation of pasture rotations will hasten alterations in standing crop or plant community composition (Vermeire et al. 2008). They concluded that the greatest opportunity for affecting the plant community appears to be through controlled timing of spring grazing and stocking rate (Vermeire et al. 2008)

Specialized grazing systems have been a major focus of range research and managers since the 1950s (Holechek et al. 1989). Holechek et al. (1989) stated that during the 1950s and 1960s, deferred-rotation systems received considerable attention and rest-rotation grazing was heavily applied on public lands in the intermountain West during the 1970s. According to Holechek et al. (1989) a disadvantage of both deferment and rest is that the grazing load on other pastures must be increased during the critical growth period. Deferment and rest, however, do provide plants on sacrifice areas with some opportunity for recovery (Holechek et al. 1989). Briske et al. (2008), however, explains that there is a preponderance of evidence generated from grazing experiments over the past 60 years that has consistently indicated that rotational grazing is not superior to continuous grazing on rangeland at similar stocking rates. Briske et al. (2008) concludes that this intuitively leads us to conclude that management commitment and ability are the most pivotal components of grazing system effectiveness and that grazing systems do not possess unique properties that enable them to compensate for ineffective management (i.e., grazing systems do not provide a ‘‘silver bullet’’ to ensure attainment of desired goals). The basic principle of grazing management is control of the frequency and severity of defoliation of individual plants (Heitschmidt & Walker 1983). Sedivec (1992) states that a grazing system(s) must be adapted for individual farms or ranches and that the systems are developed to suit each particular set of pastures, the type of livestock operation, kind and type of forage available for grazing, number, size and/or carrying capacity of different pasture units available, and relative location of pastures for easy movement of livestock between pastures.

Deferred rotation grazing systems provide an opportunity for preferred plants and areas to maintain and gain vigor compared to continuous grazing and works best where considerable differences exist between palatability of plants and convenience of areas for grazing (Holechek et al. 1989). This rotation requires a minimum of two pastures. Sedivec (1992) defines a deferred rotation grazing system as one that allows discontinuation of grazing on different parts of the range in succeeding years, which allows each grazed part to rest during the succeeding growing season. He further explains that traditionally, deferred rotation grazing generally implies no grazing until seed is mature on one unit during the first growing season or on another unit during the second year, and so on in the rotation. A pasture grazed early in the growing season but left ungrazed during rapid growth and flowering of key plant species would not be a deferred pasture (Sedivec 1992).

Twice-over rotational grazing is a variation of deferred rotation grazing (Sedivec 1992). This system rotates the livestock faster, resulting in more acceptable forage for livestock throughout the grazing season (Sedivec 1992). Sedivec (1992) concludes that during the first grazing cycle, cool season grasses and sedges are utilized before they become too mature and unpalatable. At least three pastures are required. This system allows for an adequate period of rest between rotations, although one pasture is grazed during the critical period in plant development when carbohydrate root reserves are being used for spring growth, but the grazing sequence of the pastures will alternate from year to year (Sedivec 1992).

Authorized Use levels should not be affected by the type of grazing system implemented; just the management of the various pastures within an allotment may change. Livestock distribution may change depending upon the herbaceous plant community within the pastures. Livestock may focus

grazing pressure on crested wheatgrass in pastures grazed early and on native cool or warm season grasses in pastures that are deferred depending upon the season of use.

Botany – Grazing systems are a tool to improve range conditions by providing periods of non-grazing for growth and recovery of forage species and production (Dietz 1989, Dormaar 1997, Heitschmidt 1987). However, stocking rates will always be the main factor affecting the success of any grazing system, none of which can compensate for over-utilization (Briske et al 2008, Eckert and Spencer 1987, Hart et al 1993, Heitschmidt 1987, Holechek 1991, KSU 1994, Pieper and Heitschmidt 1988, Wilson 1986).

Reviews of various grazing rotation studies across a range of ecosystems in the western U.S. showed that average forage production increased by about seven percent compared to seasonlong grazing (Holechek et al 1989, 1999). However, less improvement in forage production has been obtained from rotation systems in semiarid and prairie regions under moderate stocking levels, largely due to the importance of precipitation in affecting annual plant production (Biondini and Manske 1996, Derner and Hart 2007, Heitschmidt 1987, Holechek et al 1989, 1999, Hart et al 1993, Vermeire et al 2008). Smoliak (1960) summarized reports of other researchers ranging from beneficial to negative effects of rotational grazing studies on livestock gains and vegetation trends, and found no benefit of a deferred rotation conducted over a nine-year period. Continuous grazing resulted in less clubmoss and greater livestock gains than a deferred rotation. Holechek et al (1989, 1999) concluded that forage production and economic returns have been slightly greater under seasonlong versus rotation grazing in the Northern Great Plains (NGP). Seasonlong use may have a greater tendency to result in uneven grazing distributions or excessive use of primary grazing areas compared to rotation systems (Holechek 1989), but Hart et al (1993) concluded that pasture size and water availability rather than grazing systems were the primary factors of uneven utilization and decreased livestock performance.

While recognizing inconsistent or conflicting results, deferred rotation systems can result in increased opportunities for plant species to regain vigor and production by providing periods of rest during critical growth stages (Smoliak 1960). Although plant reproduction can be maintained vegetatively through the development of tillers from existing plants when the period of grazing is appropriately timed (Manske 1995b), sufficient rest of a pasture during late spring and early summer allows carbohydrate reserves to be replenished and provides a period of protection for establishing seedlings before grazing is initiated later in the year. Rest during late summer and early fall provide similar benefits during the second critical growth period and may provide an increased opportunity for seed production. Allowing for the completion of these critical growth periods helps to maintain plant vigor, composition, and long-term production (Briske et al 2008, Dormaar 1997, Holechek et al 1989, 1999, NRCS 1997).

Deferred rotations may also assist in greater utilization of different species within a pasture when they exhibit different periods of palatability because the same species will not always be selected for grazing with a deferred rotation (Holechek et al 1989), thereby assisting the maintenance of a diverse plant community. However, among pastures with a high proportion of tame or invasive grasses, implementation of a deferred grazing system is likely to maintain or perpetuate poor or infrequent coordination of the grazing season with high palatability of these species, thereby

contributing to selective use of the native component when the pasture is used relatively late in the season. Potentially excessive use of the native component on an alternate year cycle can confer a sufficient competitive disadvantage to facilitate increases of the invasive component. These effects are further discussed above in the Botany section for the "Utilize non-native grass pastures early to defer grazing on native pastures" and "Adjust season of use" tools.

Periods of rest may also assist woody draw and riparian vegetation (Holechek 1999). Livestock are likely to spend greater amounts of time within woody draws during hot summer months compared to early spring or fall-winter. Thus, changing the period of use on an annual basis is likely to result in decreased woody draw disturbances compared to seasonlong grazing. However, the slow growth response of woody plants to browsing and trampling disturbances can impede or stunt their rate of growth and escape from additional disturbances, with sufficiently repeated browsing leading to mortality (Girard et al 1987). This is in part due to growing points of woody plants located at the branch tips that are removed during browsing, compared to grasses that grow upwards from the base of the plant that is generally not grazed.

Wildlife – "The four principles of grazing management are: 1) timing; 2) distribution; 3) kind/class of livestock; and 4) stocking rate. Stocking rate is the most important variable in grazing management" (Walker 1995). On page 3-86, the NGP FEIS (USDA 2001a) displays that for the Medora Ranger District, approximately two-thirds of the district uses a deferred rotation grazing system. With this established, theoretically then, the first two principles are addressed.

Cattle have been used in western North Dakota since the late 1800's and is a generally accepted ecological substitute for bison (Towne et al 2005), therefore another principle is addressed (class and kind).

Analyses for this project indicate that many allotments are over stocked and the project area, has yet to meet the objectives of the Grasslands Plan. Hence, many of the allotments within the analysis area help elucidate the conclusions reached in Briske et al (2008), and others, that stocking is an over-riding factor in grazing management and that relying on grazing rotations will not alleviate higher stocking rates. However, Briske, and others, also indicate that rotations can be used to help achieve objectives. The final conclusion is that rotations are not generally superior to continuous grazing, though rotational systems certainly provide viable options for the manager. Stocking is, and always will be, a major factor affecting rangeland ecosystems (Pieper and Heitschmidt 1988) and the relative success of any grazing system (Heitschmidt 1987).

- Implement deferred grazing system – Kempema (2007) suggests that a four or five pasture deferred (or rest rotation) grazing system could provide the greatest landscape scale heterogeneity and that a combination of systems across the landscape may support a "universal management goal that enhances biodiversity and supports the ranching enterprise." Partners in Flight (PIF 2000) also recommend rest rotation or deferred rotation, although the number of pastures is not stated. In contrast, Rice and Carter (1982) found that deferred rotation systems on the Fort Pierre National Grasslands did not leave enough residual cover for grouse (greater prairie chickens and sharp-tailed grouse) despite a lighter stocking rate than the preferred rest rotation scheme (see also Norton 2005).

- Implement 2-unit deferred grazing system – Due to a limited number of pastures which limits regrowth potential, this deferred rotation strategy is probably the least favorable to develop a diverse herbaceous structure distribution (Kempema 2007). This strategy is not likely to provide the length of time necessary for regrowth in early season pasture and would contribute to a uniform structure distribution. (e.g. Fuhlendorf and Engle 2001; Van Poollen and Lacy 1979).
- Implement 3-unit deferred grazing system – Most literature indicates that rotations in semiarid regions show no definite advantage over continuous grazing in terms of desired forage species relative to seasonlong (e.g. Holechek et al 1999, Briske et al 2008, Kothman et al 2009). However, the more pastures there are, the better the opportunity for regrowth after cattle are rotated in the early grazed pasture. But with a typical eight month grazing season, regrowth may be limited, even in this pasture, which could limit herbaceous structure distribution.
- Implement 4-unit deferred grazing system – Similar to the three-unit deferred grazing system except adding another pasture increases the potential for regrowth, and contributing to diversifying the herbaceous structure distribution, in the early pasture after cattle leave.

Implement rest-rotation grazing system

Range – Rest-rotation grazing is unique in that one pasture receives twelve months of nonuse while the other pastures absorb the grazing pressure (Holechek et al. 1989). Holechek et al. (1989) also explains that most rest-rotation schemes involve four pastures and that the problem with rest-rotation grazing is that the benefits from rest may be nullified by the extra use that occurs on the grazed pastures. Sedivec (1992) states that in North Dakota a rest-rotation is normally designed to include four pastures of which three are grazed, leaving one idle each year. The first pasture is grazed in the spring, second in the summer, third in the fall, and the beginning pasture is alternated every year (Sedivec 1992). Authorized Use would not change, and livestock distribution would not be expected to change either.

Botany – This grazing system provides for a complete growing season of rest for each pasture in a rotation on a sequential basis. The completion of both spring and fall critical growth periods during years of rest allows for maximum potential regrowth and replenishment of carbohydrate reserves compared to seasonlong grazing or shorter periods of rest. The extended period of rest can assist in maintaining plant vigor, forage production, and plant composition. Additionally, the season of grazing each pasture is deferred or staggered under this system, such that the pasture rotation generally provides for the completion of at least one of the critical growth periods during years it is grazed. However, this would depend on the total number of pastures in the system that also affects the frequency of rest years.

Holechek (1989) speculated that rest-rotation systems may help improve rangeland in relatively poor condition but would have less benefit in rangelands of good condition stocked at moderate levels. However, allowing pastures an entire year of rest may help achieve multiple use goals.

Wildlife – Holechek, Pieper, and Herbel (1989) state on pages 225 through 228, "Rest-rotation grazing has a number of multiple-use advantages" including wildlife habitat; "heavy stocking rates will prevent range improvement under an otherwise appropriate grazing strategy"; "…a good system for both vegetation and livestock in rugged…terrain…on flatter terrain there are better systems when goal is primarily livestock... however, when multiple use is an important consideration, rest-rotation grazing has important advantages even on these ranges." Univ. of Arizona (2001) and Bleich et al (2005) reached the same conclusions. This tool, if exercised properly, has definite advantages for wildlife and other multiple-use objectives. Rest-rotation grazing has the potential to diversify herbaceous structure under the right circumstances.

However, if it is assumed that the grazing load on other pastures must be increased due to rest of one pasture, then the probability decreases for the allotment to meet the desired herbaceous structure spectrum. Holechek et al (1989) states that heavy stocking rates will not be overcome by an otherwise appropriate grazing strategy – which probably applies to all grazing strategies.

Implement twice-over grazing system

Range – Twice-over rotational grazing systems are a variation of deferred rotation grazing (Sedivec 1992). This system rotates the livestock faster, resulting in more acceptable forage for livestock throughout the grazing season (Sedivec 1992). Sedivec (1992) concludes that during the first grazing cycle, cool season grasses and sedges are utilized before they become too mature and unpalatable. At least three pastures are required in a twice-over rotational grazing system. This system allows for an adequate period of rest between rotations within a pasture. One pasture is grazed during the critical period in plant development when carbohydrate root reserves are being used for spring growth, but the other pastures are allowed the potential for initial growth. This grazing sequence will alternate from year to year to provide for adequate initial growth in all pastures over time (Sedivec 1992).

Authorized Use levels should not be affected by the type of grazing system implemented; just the management of the various pastures within an allotment may change. Livestock distribution may change depending upon the herbaceous plant community within the pastures. Livestock may focus grazing pressure on crested wheatgrass or native cool season grasses the first time through, especially in the first pasture, and on native cool or warm season grasses the second time through depending upon the season of use.

Botany – Each pasture in this system is grazed twice with a period of rest between the grazing periods. Sedivec and Barker (1991) noted apparent improvements in plant vigor and forage production with twice-over versus seasonlong grazing that allowed for 40 percent increases in stocking rates and improved economic returns on pastures already in good to excellent condition. However, Biondini and Manske (1996) found seasonlong versus twice-over grazing resulted in the same grazing intensity with no affect on species composition or plant production, but twice-over grazing and no grazing resulted in similar carbon and nitrogen flows compared to seasonlong grazing, suggesting greater long-term maintenance of range productivity with a twice-over system. Contrary to Holechek (1989) that reported uneven forage utilization with seasonlong grazing,

Biondini and Manske (1996) reported less even utilization with twice-over grazing. However, increased stocking levels under the twice-over system due to shorter total grazing periods will result in increased livestock density that has the potential to increase the evenness of livestock distribution and utilization across a pasture. Thus, the mosaic of grazing intensity and seral stages is likely to be reduced under this system.

Some research has shown that any period of rest is beneficial to plant health, but Holechek et al (1989) speculated that benefits of various rotation systems are most likely to occur in humid regions with greater precipitation compared to semi-arid regions. Depending on the period of rest, there may be little potential for regrowth in the semi-arid NGP, and periods of deferment during low growth or non-critical growth periods may provide minimal benefit to the plant resource (Briske et al 2008). If regrowth occurs but is grazed during late summer or fall, translocation of carbohydrate reserves for storage would be decreased, thereby increasing the difficulty of over-wintering and initiation of regrowth the following spring.

Twice-over grazing systems are unlikely to have a large influence on woody draw conditions compared to seasonlong grazing due to the continued potential for repeated browsing and trampling under both systems.

Wildlife – Most literature indicates that rotations in semiarid regions show no definite advantage over continuous grazing under similar stocking rates. Sedivec (1994) indicates that in central North Dakota that there may be little difference between seasonlong and twice-over grazing systems, even though the twice-over was stocked higher than the seasonlong system in his study. Though apparently taken, fall VOR readings were not provided in his dissertation. Manske (2000) asserts in his report that twice-over increases residual vegetation. On the other hand, Vermeire et al (2008) found that none of seven investigated treatments effectively altered standing crop. Logically, it also seems that time for regrowth would be limited after the second (or third) rotation, thus limiting the recovery of a diverse structural condition (Reece et al 2001). Hence, in terms of altering herbaceous structure, the twice-over grazing system may require more monitoring and/or research. (See also Pieper and Hietschmidt 1988. But see also Salo 2004 and Messmer 1985, 1990).

Incorporate private “off permit” land into rotation

Range –This tool would allow for more flexibility in designing a rotation to meet the goals and objectives set for the allotment. This tool would add additional pastures to a rotation allowing for a change in season of use and recovery of desired plant communities in multiple pastures in any given year. Livestock distribution may change depending upon the herbaceous plant community within the pastures. Livestock may focus grazing pressure on crested wheatgrass or native cool season grasses on the pastures used early in the season, especially in the first pasture, and on native cool or warm season grasses as the season progresses depending upon the season of use. This tool has the potential of reducing the amount of time livestock are grazing on NFS lands because there would be an additional pasture(s) to run the livestock through within the grazing season.

Botany – Adding pastures to a rotation would result in decreased grazing periods within individual pastures, but likely with increased livestock densities corresponding to the increased total level of

use. Total forage harvest in individual pastures would remain similar to harvest levels prior to adding the additional pasture, but increased livestock density would contribute to an increased evenness of distribution and forage utilization, thereby decreasing the potential mosaic of seral stages. However, longer periods of non-use within individual pastures would increase the potential for regrowth or the completion of critical growth periods that could assist in maintaining or increasing plant vigor and facilitating shifts towards late seral stages.

Wildlife – Adding pastures and reducing time and numbers on NFS lands have the potential to provide opportunity for obtaining the desired structure distribution. However, as with all the different rotations the effects to structure and wildlife depend on other associated factors such as stocking rate, timing, duration of grazing etc.

Fertilize crested wheatgrass areas

Range – In review of literature on fertilization there are many direct and indirect effects along with positive and negative results. Holechek et al. (1989) reported that fertilization can be used to improve livestock distribution by providing a longer green period of range grasses in parts of a pasture with light use, and that nitrogen fertilizer can make unpalatable species attractive to grazing animals by increasing their protein content and succulence. Vallentine (1989) reported that botanical composition greatly affects the response to fertilizer applications, and that the type of fertilizer can also greatly affect the grass to legume ratio in the forage mixture. Vallentine (1989) explains that fertilizer applications often fail in drought years when ample moisture supplies are required to maximize the benefits of fertilizer whether on irrigated pasture, introduced pasture on nonirrigated sites, or native range. On semi-arid sites, response to fertilizer may occur only in above average rainfall years (Vallentine 1989). Smoliak and Johnston (1981) suggest that unproductive stands of crested wheatgrass can be made more productive through the use of fertilizer, and under some conditions triple or even quadruple the yield. They also report initial and residual responses of crested wheatgrass to fertilizers are related to both seasonal precipitation and temperature (Smoliak and Johnston 1981). Research conducted in North Dakota has shown that fertilizing domesticated grasses can be beneficial in increasing production, palatability, and livestock distribution on crested wheatgrass, smooth bromegrass, and altai wildrye pastures (Sedivec and Manske 1990). Sedivec and Manske (1990) also report that on native rangeland studies, using nitrogen fertilizer, have shown that only native cool season graminoid species benefit from fertilizing, and that native warm season species of graminoids did not respond as did the cool season species. They also conclude that fertilizing consecutive years promotes a cool season graminoid response, which causes a direct change in species composition and an unbalanced combination of warm and cool season graminoids.

Botany – Productivity of crested wheatgrass stands tend to decline after initial establishment and nitrogen fertilizer has been an effective tool for improving forage quality and quantity, increasing utilization, livestock distribution, and livestock performance (Bailey 1994, Frank and Reis 1990, Holechek et al 1989, 2001, Nyren et al 1983, Lorenz and Rogler 1973, Rogler and Lorenz 1957, Smoliak 1981, Vallentine 1989.).

However, some experimental studies have shown mixed results. The positive effects on forage production are most apparent during the year of treatment and quickly decrease thereafter (Houston 1953). The benefits of fertilizer also decrease with decreased precipitation (Houston 1953, Nyren et al 1983) and increasing coarseness of soil texture (Sedivec and Manske 1990). Lorenz and Rogler (1973) report that phosphorous only contributed to increased production when combined with nitrogen, and generally only after three years of annual treatments. Houston (1953) found plant production increased most significantly with nitrogen fertilizer when crested wheatgrass stands were also harrowed or disked, but these treatments also resulted in large increases of nonpalatable weed species for two years following treatment.

The large majority of crested wheatgrass stands on the LMNG contain a mixture of native and invasive grasses, and many native plants of the NGP are adapted to low nutrient levels (USNA 2006), with potentially lower response to fertilizer treatments. However, western wheatgrass production has increased on fertilized native rangeland (Rauzi et al 1968, Vallentine 1989) and in conjunction with crested wheatgrass on seeded pastures (Frank and Reis 1990, Rogler and Lorenz 1957, Sedivec and Manske 1990). Nonetheless, Sedivec and Manske (1990) recommended against fertilizing pastures with high amounts of native grasses due to adverse effects of nitrogen and phosphorous on mycorrhizal fungi to which many native grasses exhibit symbiotic relationships. Interruptions of this relationship can lead to decreased native plant productivity after growth effects of the fertilizer have ended. Several invasive grasses such as Kentucky bluegrass and annual brome are highly responsive to increased nitrogen levels (Belsky and Gelbard 2000), so the combination of fertilizing and decreased mycorrhizal activity can add to competitive advantages of invasive grasses over native grasses.

A portion of the low forage production among mixed crested wheatgrass/native pastures can be associated with preferential selection of the native component due to low palatability of the crested wheatgrass at the time of grazing. Preferential selection of the native component has a high potential to result in excessive utilization and low plant vigor and production. At the same time, low utilization of crested wheatgrass can contribute to decreased vigor and production (Manske 1995b). Taken together, low production, relatively early seral stages, and impairment of native plant establishment are likely to be maintained under this scenario.

Wildlife – One of the major findings in Rogler and Lorenz (1969) was that fertilization increased the proportion of yield at the end of the grazing season to above the two-inch clipping height. When grazing commenced in the spring, approximately 50 percent more forage was available on the fertilized than on the unfertilized. Since fertilization has the potential to increase forage, the potential exists to contribute to diversifying the herbaceous structure distribution.

Hay or cut-&-leave crested wheatgrass areas

Range – Smoliak and Johnston (1981) concluded that mowing and fall burning are satisfactory treatments to remove old growth accumulated from previous years; however, production is not affected but consumption increases. This tool would remove decadent crested wheatgrass stands, which in return should improve the overall palatability of the stands. Cut-and-leave would provide

additional litter material on the ground, and could provide the opportunity for better nutritional forage for the livestock if the pasture is not able to be grazed early in the season. Depending on the overall plant community composition of the pasture, livestock distribution may change as livestock focus use on more palatable herbaceous species. Deferred use, a reduction in Authorized Use, or rest may result from utilizing this tool depending on the size of the pasture and/or tool applied until the desired conditions are reached.

Botany – Some level of AUM equivalent is accounted for the amount of crested wheatgrass hayed. Although cutting and haying of crested wheatgrass do not immediately increase forage production, they can be effective in removing old growth stems and increasing vigor and palatability (Smoliak 1981). However, the fact that these treatments are usually implemented every other year suggests that they are not very if at all effective in increasing the use of crested wheatgrass. If treatments were effective in promoting efficient use of crested wheatgrass there would be no need to repeat the treatment in alternate years. Development of wolfy or stemmy crested wheatgrass is generally the result of grazing seasons that are poorly coordinated with the palatability and potential utilization of the species.

Haying removes plant material that would have contributed to litter, soil organic matter, and nutrient availability. Haying therefore prevents excessive litter accumulation, but most hayed sites exhibit high levels of bare ground suggesting that more litter or plant basal area would be beneficial for general range health (NRC 1994). Haying obviously reduces the potential for high vegetative structure and observations of stands during the year of no haying generally suggest insufficient plant density to achieve high structure. Most if not all stands of crested wheatgrass contain varying amounts of Kentucky bluegrass, smooth brome, and annual brome, and haying contributes to the spread of these species through movement of seed propagules throughout both private and federal grasslands, thereby decreasing the maintenance of native plant communities and diversity.

Cutting and leaving crested wheatgrass maintains litter inputs and may increase rates of decomposition and nutrient cycles by placing material on the soil surface with increased bacteria and microorganisms. Plant community composition might therefore increase through improved nutrient and moisture conditions, but the potential exists for invasive grasses to respond equally or greater than native grasses.

Cutting is conducted after July 15 to protect potential bird nesting habitat. This late or dormant season cutting has been shown to reduce vigor and tillering of crested wheatgrass compared to spring grazing, with the decrease in plant biomass and basal area potentially facilitating the outbreak of grasshopper populations (Manske 1997). Clipping studies reviewed by Pellant and Lysne (2005) resulted in sharply decreased seed production of crested wheatgrass when treatments were repeated for five years during mid-June and early July, thus supporting Manske's conclusion of decreased vigor when defoliation occurs during mid season. Decreased vigor of crested wheatgrass should inadvertently promote the expansion of other grasses, but again, invasive grasses have the potential to benefit as well as native grasses. Cutting and leaving crested wheatgrass during mid-summer every other year should not have a strong adverse effect on native grasses mixed in the community because plants should be between critical growth periods and have the

opportunity for regrowth in the fall. However, there is no evidence or research suggesting that cutting or haying of crested wheatgrass promotes the re-establishment of native plant communities.

Wildlife – Because mowing or haying is typically conducted in mid-July, there would be limited regrowth time, plus, it homogenizes the structure within a site. However, there is still potential to contribute to the structure distribution. Cutting height could be altered to help diversify structure, perhaps more on an annual basis than within a single year. Cutting and leaving the residue may be helpful as a litter layer for some species. If continuously repeated, this would have to be monitored to ensure this doesn't become excessive for some species. These tools are probably not a significant factor at the landscape scale. Crested wheatgrass sites could provide habitat for species such as Baird's sparrow (Dechant et al 1998) and sharp-tailed grouse (Kohn 1976). However, mowing or haying would render these sites typically unsuitable for nesting purposes the following year.

Interseed pasture with native grass species

Range – The results from the Goetz and Whitman (1978) and Nyren et al. (1978, 1981) studies done on the Dickinson Research & Extension Center show that establishing native grass species by interseeding is difficult, and that native grasses established by interseeding produce less herbage than the previously intact native plant community (Manske 2005). They concluded from these studies that introduced species, such as smooth brome and crested wheatgrass are easier to establish; however, they do not increase overall production. Interseeded areas would need to be deferred from livestock grazing until the desired conditions have been reached (Manske 2005). There would be initial implementation costs to the both the permittee and the FS. The permittee would need to find other pasture or reduce livestock numbers. In order for the treatment to be successful proper stocking levels are required to achieve and maintain the desired conditions of the treatment area.

Botany – Seeding native grasses within relatively poor condition crested wheatgrass or native pastures would have the potential to increase pasture productivity, available forage, and shift seral stage. In the case of interseeding crested wheatgrass pastures, increased proportions of native grasses could increase management flexibility by creating pastures with longer periods of appropriate use if stocked according to the proportion of species utilized during the grazing period. Although crested wheatgrass would remain in the pasture, greater proportions of native species could increase plant diversity, wildlife habitat, general aesthetics, and help shift the community towards late seral stages. Introduction of some native species may facilitate the natural establishment of other species (Pellant and Lysne 2005). Seeding techniques suitable for site conditions, and treatments applied to reduce competition from existing species are often necessary to ensure adequate success of plantings (Pellant and Lysne 2005).

Wildlife – In terms of structure, the effects of this tool are not known. Also, given the cost and time required to potentially re-establish a native stand, it is likely prohibitive. Secondly, although (non-native) crested wheatgrass is prevalent in the Rolling Prairie, this tool would likely occur on a very small scale and would not be significant at the landscape scale at this time. Lastly, it may be assumed that the goal would be to replace non-native species or clubmoss dominated sites. In the case of the non-native crested wheatgrass, there may be a loss of structure if the site was producing,

or was capable of producing high structure to begin with, but it may also enhance some structure by filling in some of the more open sites within a "thin" stand. Also, reducing the amount of crested wheatgrass stands on the landscape may contribute to limiting management options for early season grazing, potentially impacting fall herbaceous structure in unknown ways. But the end result is not likely to be a significant factor to contributing to the herbaceous structure objective at the landscape level. This tool could promote a more diverse herbaceous structure distribution at the allotment level.

Scarify clubmoss areas within a pasture

Range – Brewer and Skeen (2005) indicate that clubmoss (*Selanginella densa Rydb.)* impedes the establishment of other plants and if dense enough inhibits plant succession. Brewer and Skeen (2005) report that clubmoss is largely unaffected by changes in the timing, intensity, or frequency of grazing, however prescribed livestock trampling is an effective tool for small localized infestations, and for large infestations chiseling has been the most common method of treatment. Both Crane (1990) and Brewer and Skeen (2005) indicate that mechanical treatment will reduce clubmoss. Crane (1990) reports that a combination of treatments (chemical, mechanical, interseeding, etc) are effective, and over 30 years, researchers concluded that clubmoss did not easily reestablish on northern mixed prairie following treatment. Lacey et al (1995) indicates that the implications of chiseling and other mechanical treatments is that they can improve forage production in the northern Great Plains, and that improvements are most feasible on productive sites where forage production is limited by blue grama, clubmoss, and other shallow rooted plants. Brewer and Skeen (2005) reported that some landowners and resource managers consider mechanical treatment (i.e. chisel plowing) unacceptable due to the amount of soil disturbance. In their study, they used two new mechanical treatments (Tar King Plant-O-Vator and Lawson Aerator). Brewer et al. (2007) indicated that treating dense clubmoss-infested rangeland with the Lawson Aerotor in the spring positioned at 10 degrees reduced dense clubmoss ground cover for three years. The Tar King Plant-O-Vator also reduced dense clubmoss ground cover for two years compared with no treatment, but soil disturbance was insufficient to increase total herbaceous yield. Brewer et al. (2007) also report that treating dense clubmoss-infested rangeland in the fall or with the Lawson Aerator positioned at 5 degrees was unsuccessful. Colberg and Romo (2003) conclude that range managers in the water limited northern Mixed Prairie may want to identify and implement grazing management practices that improve water relations, before considering mechanical modification of rangeland to reduce clubmoss.

Deferred use, a reduction in Authorized Use, or rest may result from utilizing this tool, depending on the size of clubmoss infestation within the pasture, until the desired conditions are reached. There would be initial implementation costs to the both the permittee and the FS. In order for the treatment to be successful, proper stocking levels are required post-treatment to achieve and maintain the desired conditions for the pasture/allotment.

Botany – Dense layers of clubmoss can reduce the productivity of grasses by trapping or intercepting precipitation and limiting soil moisture availability. Dense clubmoss layers can also inhibit seedling establishment by hindering seed-soil contacts and decreasing available moisture for

seedling growth and survival. Thus, scarifying clubmoss can "release" or increase the growth, productivity, and reproduction of grasses, thereby facilitating shifts towards late stages.

However, even relatively light soil disturbances resulting from the scarification of clubmoss has the potential to also release or assist the spread of several invasive grasses. This would depend on the current presence and amount of such species, including existing seed banks, as well as the potential for their spread onto the site. Pasture aerator treatments followed by broadcast seeding in Wyoming resulted in increased cover and diversity of several desired species, but large increases in annual brome also occurred (Emme and Murray 2007). Clubmoss was not present in measurable amounts, but the site was dominated by thread leaf sedge and blue grama that tend to be major components of affected sites on the LMNG.

Wildlife – Much like the previous tool, if successful, it may somewhat enhance structure distribution at the pasture scale to an unknown degree. But again, probably not a tool that would be used widely on a landscape basis until some testing and monitoring is done to check the resource effects and cost effectiveness.

Implement prescribed burns

Range – Burning is the oldest known practice used by humans to manipulate vegetation on grazing lands (Vallentine 1989). The effects of this tool would depend on the size of the proposed burn area and what the objectives and goals are of the prescribed burn. Temporary fences, a delayed turn out, or rest may be necessary due to concerns with not meeting vegetative objectives of the prescribed burn. Therefore, a temporary reduction in Authorized Use may occur. Temporary fencing, typically, would be an additional expense to the permittee in both installation and maintenance. Since forage quality is expected to improve after the prescribed burn, livestock distribution would probably change depending upon the size of the prescribed burn compared to the size of the pasture.

Botany – Fire is a natural ecosystem process of the NGP that helped form or shape native grassland communities (Grant and Murphy 2005, Higgins 1984, Sieg 1997, Whisenant and Uresk 1990). Native Americans increased the frequency of fires in the region, but Higgins (1984) concluded that lightening strikes cause about 25 fire starts per year for every 2.5 million acres in western North Dakota. The control of wildfires since the early 1900s has likely had a large impact on the spread of woody species that have encroached into grassland habitats (Whisenant and Uresk 1990). Accumulations of plant litter resulting from the control of fire may also be assisting the establishment and spread of invasive grasses in some areas (Whisenant and Uresk 1990). Prescribed burning can control the encroachment of woody shrubs and trees such as Rocky Mountain juniper, snowberry, and silver sagebrush, thus helping to maintain native grass communities while also increasing herbaceous forage production, carrying capacity, and livestock distribution (Dietz 1989, Higgins et al 1989, Vallentine 1989). As multiple use goals include maintaining native communities and diversity, it is important to maintain the frequency and intensity of natural disturbance processes that helped shape these communities (Sieg 1997).

Prescribed burning can be conducted in grassland habitats to increase plant vigor and production that can improve livestock distribution and utilization (Holechek 1989, Vallentine 1989). Although

plant litter can improve soil moisture and nutrient availability, excessive amounts of litter can decrease soil temperatures with resulting decreases in bacteria activity that slow the rate of nutrient cycling and availability. Burning can result in a flush of released nutrients that increases forage production, nutrient content, and palatability that attracts grazing animals, thereby facilitating a shifting mosaic of grazing pressure. Prescribed burning may provide an economical means of invigorating stagnant crested wheatgrass stands or native grass communities persisting in relatively early seral stages or adversely affected by clubmoss. Increases in forb diversity and density often occur after burning.

Prescribed burning in conjunction with a prescribed grazing system has the potential for controlling several invasive grass species (Higgins et al 1989, NRCS 2009, Smith 2010, Vallentine 1989). However, intensive planning in regards to the timing of burning and grazing in relation to plant physiology and affects on environmental conditions are needed to achieve success. Poorly timed or infrequent burning can increase rather than decrease Kentucky bluegrass (Smith 2010), and the potential exists for the unplanned spread of several other undesirable species after burning (Vallentine 1989). Although noxious weed increases would be controlled under current weed management on the LMNG, invasive grasses are not controlled and potential spreading of these species after fire would remain unchecked. Documented success of burning to control Kentucky bluegrass in the NGP has generally been lacking (Uchytil 1993, Higgins et al 1989), but recent reports of frequent fall burning conducted with spring livestock grazing are encouraging (NRCS 2009, Smith 2010). Fire often assists the spread of annual brome, and the best that can generally be expected from infrequent burning for the control of this species is a one to two year reduction in brome density (Uresk 1990, Vallentine 1989).

Prescribed burning has the potential to facilitate improved woody draw conditions by triggering basal sprouting among mature or decadent trees and shrubs (Fitzpatrick 2003, Vallentine 1989, Zimmerman 1981, Sieg 1997). Fire can also improve seedbed conditions for the germination of woody species, disrupt disease and parasite cycles, and increase nutrient cycling or availability that can facilitate a flush of new growth (Sieg 1997). Potential negative effects of fire on woody draws can include high mortality of trees and shrubs that are not appreciably compensated by basal sprouting or increased recruitment from seedlings (Lesica 2001b). Rocky Mountain juniper does not resprout after burning, and its competitive effects with desired deciduous species can therefore be reduced.

Wildlife – Baird's sparrow was found more frequently in areas that were burned four times in 15 years compared to areas that were burned twice in 15 years (Madden et al 2000). However, this study was accomplished in an area (Lostwood National Wildlife Refuge, North Dakota) where there was no or little grazing pressure. But prescribed fire can also be used in conjunction with grazing to increase heterogeneity (Fuhlendorf et al 2009). This essay presented data from an experiment to somewhat mimic the natural disturbance regime in a tall grass system in Kansas, and thus, create the heterogeneous vegetative conditions, via the disturbance regime, as suggested in USDA (2000) and contribute to the "shifting mosaic" desired condition statement.

Using prescribed fire to alter the landscape composition where junipers now dominate would be beneficial to bighorn sheep, deer, and native species diversity in general, since the fire return

interval in these areas has been interrupted significantly (Higgins et al 1989 and USDA 2000). Using fire to control silver sage does not kill this shrub as it is fire adapted and will regenerate readily (Howard 2002). More than one treatment is recommended. But on the other hand, prescribed fire needs to be carefully planned to avoid significant impacts to butterfly species (e.g. Dakota skipper; USFWS 2007).

Prescribed fire can be used in conjunction with livestock grazing to diversify the herbaceous structure distribution and change composition (Fuhlendorf et al 2009).

Mechanical brush management

Range – Effects of this tool will be dependent on the size of the treatment area. If the treatment area is kept to a small scale, Authorized Use would not have to be adjusted. If the treatment is large, however, there would be a need to adjust Authorized Use to assure goals and objectives will be met. A deferred turn out or rest may be required for the pasture. Livestock distribution should change as the plant community composition changes from a shrub dominated to a grass dominated plant community.

Botany – Brush management such as mowing dense stands of silver sagebrush can increase herbaceous production and desirable forage. This practice can improve the condition or health of exceptionally dense silver sagebrush communities because they tend to exhibit high amounts of bare ground. Results of mechanical treatment can be preferable to prescribed burning because some of the brush and associated structure survives treatment and can continue contributing habitat and diversity for wildlife species. Mechanical treatments can be preferable to herbicide because the latter will generally result in non-selective control of several desirable species.

However, some silver sagebrush communities proposed for control contain high amounts of annual brome or invasive bluegrass that is likely to be a principle species released from shrub competition (Vallentine 1989). Combining low applications of Plateau herbicide with the brush control treatments could provide control of annual brome (BASF 2001, Washington 2007).

Mechanical brush treatment might also include cutting of Rocky Mountain juniper with machinery-mounted equipment rather than burning. Cutting juniper would result in the competitive release of understory vegetation with benefits of increased forage production and plant composition depending on existing plant species. Livestock would be attracted to the increased herbaceous growth with the potential of changing livestock distribution from current areas of primary use. Increased forage production while maintaining constant stocking levels would decrease the level of utilization and assist in maintaining or slightly increasing herbaceous seral stages. Any invasive grasses present in the treatment area would also have the potential to increase and greater soil disturbances relative to prescribed burning might assist the spread or increase of invasive grasses.

Wildlife – Reducing the amount of a woody vegetative community in favor of a more herbaceous community could change the habitat potential for a different suite of wildlife species. However, the effectiveness of mechanical treatment would likely leave just a less dense shrub community rather than a complete or nearly complete habitat change in the long-term. Mechanical control of silver sage via plowing, disking, and chaining is not recommended due to the promotion of sprouting

(Howard 2002). However, intensive plowing may be partially effective. It would have an adverse affect on the sage grouse if accomplished in big sage stands (Nolte et al 1994, Allegretti et al 1997) within the range of sage grouse.

Depending on the density of the pre-treatment stand, there may be a loss of structure, but a more diverse herbaceous structure distribution. The value for certain wildlife species such as Baird's sparrow may be limited unless brush (e.g. silver sage brush) is very limited after treatment. Antelope habitat could also be reduced due to the loss of a forage species. But a landscape context is needed for assessment.

Incorporate a range rider to disperse livestock throughout a pasture (herding)

Range – Although herding has been used to manipulate livestock grazing distribution for centuries, its use on rangeland cattle operations has been limited (Bailey 2004). Herding requires additional labor and cost, and its effectiveness has been questioned according to Bailey (2004). Bailey (2004) states that some producers believe that herding cattle away from riparian areas is futile, because animals often return to streams shortly after being moved. Bailey (2004) also reports that others suggest that regular herding is a very effective practice to protect riparian areas (Skovlin, 1957; Butler, 2000). Butler (2000) summarized that intensive cattle herding is an important tool that can be employed in the proper management of riparian zones which are a highly sensitive and vulnerable rangeland community. Butler (2000) also states, however, that it is not the cure-all for poor management, and it does not absolve us when we ignore the need to develop structural rangeland improvements such as fences and water developments. However, it may be one of the most effective complementary tools available to us in managing the rangelands of North America.

Livestock distribution would be changed as the herding focuses livestock grazing based on identified objectives for the allotment. Herding would increase the management costs of the permittee and the level of management for the allotment.

Botany – Active herding can increase livestock distribution and decrease over utilization of primary grazing areas or sensitive woody draw and riparian habitat (Butler 2000, Holechek et al 1989, Skovlin 1957). Herding is most effective in large pastures with significant portions of secondary range that livestock tend to underutilize because decreasing pasture sizes tend to result in relatively even livestock distribution. Early seral stages likely to occur in habitual high use areas may have the potential to shift towards late seral stages, but late seral stages likely to occur in secondary range would have the potential to shift towards early stages. Thus, as with all tools increasing the evenness of distribution and utilization, plant composition and seral stage would have the potential to increase in uniformity in contrast to desired conditions of maintaining a mosaic of grazing patterns and associated seral stages and structure. However, this could be avoided by herding in a manner that ensures various intensities of grazing across the landscape.

Wildlife – The effects of herding depends on the landscape context and management goals; however, under the traditional range management paradigm this would tend to encourage a more even utilization pattern at a landscape scale (Holechek et al 1989). Plus, the description of the tool

states "to disperse livestock throughout entire pasture" strongly implies distributing across the entire pasture. However, it is feasible this tool could potentially be used to achieve structural heterogeneity under guidelines to herders to manage livestock use levels in certain areas. Kauffman and Krueger (1984) state that herding livestock has been successful in mitigating impacts to stream bottoms and improving use on uplands. By extrapolation, then, herding can be useful in helping achieve resource objectives if those objectives are spelled out.

Manage salt and supplement locations

Range – After fencing, water and salt are two of the most frequently used tools for affecting cattle distribution (Ganskopp 2001). Research studies and technical references have suggested that mineral and salt along with protein supplements do attract livestock to areas and can have an affect on forage intake in the areas they are placed (Bailey 2004 and Wyman 2006). Other reports, however, show that salt alone does not improve distribution (Ganskopp 2001 and Ganskopp 2004). Holechek et al. (1989) explains that certain principles can be useful in the placement of supplements on rangelands. They also explain that livestock usually go from water to grazing and then to salt; thus it is not necessary to place salt at watering points. By placing salt away from water, livestock can be enticed to use areas otherwise avoided. Wyman (2006) reports that protein supplements containing products such as cottonseed or soybean meal can increase consumption of cured, low-quality grasses and are especially attractive to livestock as forage matures and becomes dormant.

This management tool is not a solve-all in attracting livestock away from woody draws, riparian areas, sensitive areas, or to minimize concentration of livestock on uplands. In combination with other range management tools, such as fencing and water developments, it would aid in drawing livestock away from such areas. By rotating the placement of such supplements, one can assure that over use of the placement areas doesn't occur, and minimizes/avoids disrupting proper soils stability, hydrologic function, and biotic integrity. Logically, this is a sound management practice, however, it will require monitoring, increased management by the permittee, and may require additional cost to the permittee. Within the FS Handbook and the annual Allotment Worksheet, it is stated that supplemental feeds are required to be at least one quarter of a mile away from water developments. Livestock distribution would change as the salt and supplements are moved and rotated to varying areas within a pasture.

Botany – Moving salt and mineral supplement is effective in influencing livestock distribution and utilization and alleviating excessive use in primary grazing areas (Dietz 1989, Holechek 1989, Skovlin 1957), thereby helping to maintain or achieve desired seral stages in localized areas. Livestock generally move from watering to grazing to salt (Holechek et al 1989), with four to eight hours elapsing between salting and watering (Dietz 1989). Thus, placing salt near water unnecessarily intensifies use near the water source and is likely to contribute in excessive impacts whether located in upland grass communities, woody draws, or riparian habitats.

Wildlife – The effects could depend on the landscape and grazing management context and emphasis, but under the traditional range management paradigms it would likely encourage a more homogenous utilization pattern (Holechek et al 1989). However, it could also be used as a tool to

achieve improved herbaceous structure heterogeneity with guidelines in the placement and duration of supplement locations designed to enhance diversity in use levels.

Construct fence to create riparian unit – allow grazing under riparian grazing dates

Range – Since the allowable days of grazing are typically limited, the remaining Authorized Use will have to be planned for in the other pastures or adjusted accordingly. There will be initial construction costs associated with fencing the riparian pasture and maintenance costs. Livestock distribution would be focused within the riparian pasture, but use will be limited. See also "Implement BMPs for riparian pastures" tool.

Botany – Constructing riparian pastures that are often grazed with compressed and deferred grazing seasons can assist the development and condition of riparian habitat including both herbaceous and woody vegetation by decreasing livestock browsing and trampling disturbances. Fencing of riparian areas facilitates the implementation of distinct grazing levels and seasons of use compared to the larger surrounding area in order to improve conditions of the riparian habitat that are more sensitive to grazing disturbances than upland grass communities. Woody draw communities are often situated along the perimeter of riparian habitat and could be similarly improved if included within the fenced pasture. However, many riparian areas contain invasive grasses that can increase in extent or dominance as a result of increasing plant litter that occurs with reduced grazing levels that are often implemented in riparian areas to help achieve desired conditions. Dense sod layers associated with invasive bluegrass and smooth brome can impede the regeneration of woody species through direct competition and decreased availability of suitable seed germination sites.

Wildlife – Depending on several factors, there may be an increase in the amount of high structure within the riparian unit, however it may not necessarily be where the wildlife habitat issues reside, which is primarily associated with upland vegetation for upland ground nesting species. Since riparian areas may contain more stands of woody species, adjacency to this habitat may not be preferred by some ground nesting bird species. However, riparian areas may provide important brooding and wintering habitat for sharp-tailed grouse.

Riparian corridors may function as predator lanes which may tend to make these areas an ecological risk for some wildlife species (Manzer and Hannon 2005). The management strategy, geographic location, scale, and shape of the riparian pasture may dictate which wildlife species are adversely affected and those that benefit from the riparian unit.

From other discussions, if there "must" be an increase in the grazing load on other pastures with the implementation of rest and/or deferred grazing systems, then utilizing this tool with the idea of implementing grazing under "riparian grazing dates" may result in a similar management scenario where the riparian grazing dates results in a deferred or rest situation, thus increasing pressure on other pastures. Under this assumption, then, there may be a decrease overall in standing crop, or herbaceous structural diversity on the other pastures.

However, riparian areas are extremely important for many wildlife species such as big game, reptiles, amphibians, fish, and riparian bird species. If management improves riparian conditions, then it follows that habitat for some wildlife species would likely improve within this zone, if not the herbaceous structure distribution.

Soils/Hydrology – Riparian pastures provide greater control of animal distribution by limiting the length of season and determining the season of use of riparian areas. If all other factors were equal, the best time to graze the riparian pastures would be late (after September 1st) or dormant (October 15th to December 31st) seasons after riparian plants have completed their life cycle, set seeds, and/or propagated asexually through rhizomes, etc. Soil moisture typically is lower in the fall, so the damage from soil compaction is lower than during spring. The hot season (June 15th to August 15th) should be avoided because livestock tend to loaf near or in water during this season. Livestock spend a disproportionate amount of time in riparian areas, especially in the hot season, because they can easily access all their needs, particularly shade, water, and palatable forage. Damage to riparian areas can be severe when animals loaf for extended periods in the riparian area (Wyman et. al., 2006).

Riparian pastures should improve riparian conditions locally. Other riparian exclosures throughout the DPG (including Ash Coulee) have proven highly successful in a matter of a few years, provided suitable weather conditions exist to promote recovery of riparian vegetation.

Implement BMPs for riparian pastures

Range – In review of the Best Management Practices for Grazing (Montana Department of Natural Resources and Conservation 1999) publication, it describes several management options to improve the health of the riparian areas which should be considered, and that no single grazing schedule can be applied to all situations, and the grazing rotation should be adjusted to the management of objectives and resource concerns. In development of a rotation for an individual allotment with a identified riparian concern one may adjust the season of use to match the riparian plant community, for example, herbaceous plant communities (sedges, rushes, etc,) versus woody plant communities (willows, cottonwoods, etc.). Prescribed grazing for these individual plant communities are different. For example, Montana Department of Natural Resources and Conservation (1999) recommends that when managing for a woody plant community along a riparian area, one should avoid hot summer use. Some of the management tools listed in this publication also are listed within this tool box include herding, placement of salt and supplemental feed, providing off-stream water sources, placement of natural materials on stream banks to limit access and number of crossings, and hardened stream crossings. A key in reaching the management objectives is monitoring, and critical monitoring points is choosing utilization standards.

The Montana Department of Natural Resources and Conservation (1999) list seven items to consider in development of best management practices of grazing management in riparian areas, as follows: 1) Tailor the grazing approach to the specific riparian area under consideration, 2) Incorporate management of riparian areas into the overall management plan for the whole operation, 3) Select a season or seasons of use so grazing occurs, as often as possible, during

periods compatible with animal behavior and conditions of the riparian area, 4) Control the distribution of livestock within the targeted pasture, 5) Ensure adequate residual vegetative cover, 6) Provide adequate regrowth time and rest for plants, and 7) Be prepared to play an active role in managing riparian areas.

Depending on the number and size of pastures within the allotment, Authorized Use may need to be adjusted. Livestock distribution would be expected to change simply due to the focus of limited use within the riparian units, but the other pastures may not see any change.

Botany – BMPs are implemented in riparian areas to improve the function and condition of these habitats. In many cases, woody draw species occur along the perimeter of riparian habitat and experience similar potentials for improvement. BMPs and expected effects are discussed in the Hydrology Report.

Restore/enhance riparian vegetation i.e. willow planting

Range – Restoring and enhancing riparian vegetation (example willow planting) would require designing a rotation (such as spring versus fall grazing) that fits the goals and objectives set forth for that segment of riparian area without creating other resource issues within the pasture or allotment. If the goal is to improve willow density, the grazing rotation should be designed to avoid hot summer use (Montana Department of Natural Resource and Conservation 1999) and according to Montana State University the season of use that would be advantageous for woody species in the riparian area would be spring use. There are, however, disadvantages to early season grazing on other native plant communities within the pasture. Monitoring and other management tools should be implemented, such as salt and mineral placement and proper stocking levels (*http://www.animalrangeextension.montana.edu/riparianmgt/grazriparian/pg1-intro.htm*). Deferment of the riparian area may be required to allow planted willows to get established. Authorized Use may be temporarily adjusted, as well, to allow for willow establishment.

Botany – Important research has shown that riparian vegetation will naturally re-establish as a result of significant shifts in the grazing period from mid and late summer to spring or early summer (Elmore 1989). Thus, practices of fencing to create riparian pastures and implement distinct grazing periods and levels of use should be sufficient to promote and maintain increased establishment of woody species, without unknown effects and additional costs associated with introducing plant stock with uncertain origins and genetic compatibility. Poor success of naturally establishing woody species can be indicative of improper management and the need for additional grazing adjustments or strategies. Naturally establishing woody species are synchronized with hydrologic conditions of the affected site and are therefore likely to exhibit higher survival rates than planted stock that usually involve an excess number of plantings to compensate for low rates of expected survival. Thus, there may be a low return on limited finances associated with planting. However, the lack of local seed sources for woody species recruitment may necessitate planting.

Soils/Hydrology – Willows along with other woody species are a component of many riparian areas on the LMNG. They hold stream banks together, shade the stream thereby reducing water temperatures, provide woody recruitment to streams, and many other functions. Planting or

restoring the health of existing willows in riparian zones is an important step in maintaining or improving the health of streams and riparian areas.

Construct/harden stream crossings

Range – Montana State University Grazing management for stream and riparian area management indicated that there is evidence that livestock prefer stable footing and clean water and will travel a considerable distance to reach them (http://www.animalrangeextension.montana.edu/riparianmgt/grazriparian/pg1-intro.htm). Livestock distribution would be altered since the livestock will utilize these areas more readily as a water source. There would be initial costs of installing the stream crossing(s) and maintenance costs to keep the crossing hardened over time. This tool by itself is not a solve-all for every allotment, other management tools and monitoring should be in place. As stated in a video provide by Montana State University on grazing management for stream and riparian area management, this tool may work for one allotment, however, it might not work in another allotment.

Botany – This is essentially a BMP for riparian systems that can help reduce bank erosion, trampling, and high sediment loads. Some benefit may accrue to adjacent woody communities if livestock trailing becomes more concentrated along specific areas rather than dispersed along extensive stream segments.

Soils/Hydrology – This BMP serves to limit the effects of livestock use on streams. Construction of stream crossings and/or hardening existing crossing areas by design minimizes livestock impacts such as degradation of stream banks and sedimentation, associated with crossings and use of a stream for watering.

Construct water gap to limit livestock access on stream

Range **–** See discussion above for "Construct/harden stream crossings" tool.

Botany – This is also a BMP for riparian systems that limits erosion and trampling impacts along stream banks that can assist the development and maintenance of woody species through decreased browsing and trampling disturbances.

Soils/Hydrology – This is another BMP whose effects are similar to the previous discussion on construction or hardening of stream crossings. Limiting access reduces livestock impacts to selected areas along a stream. Hardening the water gaps provides additional mitigation which further reduces livestock impacts to the stream.

Construct fence to exclude livestock from areas of concern (riparian, wooded draws, springs, wetlands, etc)

Range – Authorized Use would need to be adjusted if the size of the exclosure is large enough that it has removed a considerable amount of forage from livestock access. Livestock distribution may

change depending upon the size of the exclosure and the surrounding topography. See also "Implement BMPs for riparian pastures" tool.

Botany – Constructing fence exclosures around woody draws would remove browsing and trampling effects of livestock grazing with the potential for increased reproduction of tree and shrub species. Thus, fencing may provide a viable means of increasing woody draw conditions if grazing periods cannot be appropriately timed or decreased in length to achieve these goals. However, Kentucky bluegrass and lesser amounts of smooth brome are well established in the understory of most woody draws and have the potential to continue increasing as a result of increased plant litter with the removal of livestock grazing. Boldt et al (1978) measured increases in invasive grasses within fenced exclosures. Irby et al (2000) measured gradual increases of invasive grasses with and without light grazing by native wildlife. Dense sod and litter layers could increase the difficulty of successful seedling establishment, and affected woody draws may begin to stagnate without grazing, fire, or erosion disturbances that expose mineral soil where seedlings are more apt to successfully establish (Lesica 2009, Sieg 1997, personal observations). If monitoring reveals such an outcome, possible solutions may involve prescribed burning, herbicide treatments, or periodic livestock grazing to reduce plant litter and increase the amount of bare soil conditions.

Fencing of various wetland sites would also remove livestock disturbances and help achieve Grasslands Plan objectives for restoring or maintaining these habitats in high ecologic condition. The perimeter of springs and wetlands may be or become invaded by smooth brome and Kentucky bluegrass, but these species, and Kentucky bluegrass in particular (Sedivec 2006), are not well adapted to moderately long intervals of flooding and are less able to establish or spread beyond the perimeter of wetland habitats. Wetlands containing high amounts of invasive grass species around their perimeters would be less likely to be chosen for fencing due to relatively low ecologic conditions. Fencing of developed springs in conjunction with relocating the water tank a short distance away could help protect the water collection system and decrease periodic maintenance disturbances. A small portion of riparian and woody draw communities would be enhanced if included within the fence exclosure, but more extensive adjacent communities would continue to be used in accordance with general pasture management unless also fenced.

Wildlife – Effects to wildlife should be similar to constructing riparian unit above. Most of these areas would likely be very small and of minor, if any use to upland nesting species. However, there would be potential value for some species that may require typically more complex woody draw or riparian habitat conditions.

Soils/Hydrology – Riparian exclosures are recommended for reaches that have a riparian functionality rating of FAR-D or NF. Exclosures are recommended where riparian vegetation has been overgrazed or trampled by livestock trailing and is currently insufficient to protect banks and channels from erosion. Livestock should be excluded until (1) desired riparian cover reaches at least 60 percent canopy cover along intermittent reaches; and (2) the geomorphology of the channel should show evidence that incision has ceased and channel aggradation has commenced. Preferably, prescribed grazing would occur only as an adaptive action once initial objectives have been satisfied. The recovery of the riparian area should be prioritized over the condition of upland vegetation within riparian exclosures. Monitoring of upland conditions should include assessment

of accumulation of litter, shifts in plant composition toward invasive grasses (e.g., Kentucky bluegrass and smooth brome), or invasion of woody shrubs (e.g., silver sagebrush, rabbitbrush, and rose).

Move winter feeding areas off of National Forest System lands

Range – Currently, on the Medora Ranger District winter feeding and winter grazing is allowed on allotments that are issued a grazing association inventory permit. In review of the Medora Grazing Association grazing agreement any NFS lands under control of the association may be selected for winter grazing by the board of directors with the concurrence of the FS (Grazing Agreement and Rules of Management Between Medora Grazing Association and USDA Forest Service 2009). In order for this tool to be implemented, a review and possible modification to the grazing agreement will need to be made to address the difference in winter grazing versus winter feeding.

In further review of the application of this tool within the project area, there are years when there are open winters and livestock have the opportunity to graze. Due to the nutritional quality of the forage being grazed by livestock supplemental feeds are typically used. The source of this supplemental feed varies among ranching operations. Since this is a standard practice in southwest North Dakota and there were unknowns about the ecological effects of winter grazing, NDSU and Hettinger Research and Extension Center initiated a research trial in 2000 to try and answer the unknowns. Preliminary results show that from an ecological and land use efficiency perspective dormant season grazing that incorporates moderate early summer use combined with winter stocking rates utilizing 50 percent of the standing plant biomass was the preferable grazing management option (Nelson et al 2006). They also report that this method yielded greater herbage production than the other treatments used in the study. Montana Department of Natural Resources and Conservation 1999) stresses six areas individuals should be aware of for dormant season grazing, as follows: 1) It's important to maintain ground cover to decrease the amount of soil exposed to wind and water erosion. 2) The crown of the plant must remain intact due to the growing points and if removed the vigor for spring growth is gone. 3) The amount of plant height and cover needed to trap snow and retain moisture. 4) Periods of warm weather may break true dormancy and grazing must be managed accordingly. 5) Target grazing use levels which do not exceed 65 percent use of current year's growth and protect deciduous trees and shrubs by limiting access when woody species have green leaves at the beginning or end of the dormant period. 6) Place feed and mineral sites as far as possible from riparian areas or water courses.

Botany – Most hay is comprised of crested wheatgrass and patches of this species in hay feeding sites on unbroken land suggest that hay feeding is contributing to the spread of invasive grasses. More aggressive invasive species of sweet clover, smooth brome, Kentucky bluegrass, and annual brome have been observed or are likely to be included in hay as these species spread throughout hayed land in the project area. High livestock densities in hay feeding areas can result in high levels of trampling disturbance that are often compounded by moist soil conditions during the winter and spring feeding months. Livestock are observed grazing on rangeland within and around hay feeding areas during relatively open winters and can contribute to unplanned or excessive utilization as well

as premature grazing of native grasses. These factors can contribute to decreased plant vigor of native grasses and assist the establishment and spread of invasive grasses.

Winter grazing does not result in benign effects to the plant community and the potential for excessive utilization can equal that of summer grazing (Cook and Child 1971, Peck 1994). Insufficient leaf and stem area in the spring increases the dependence on carbohydrate reserves to initiate growth, but the loss of plant tissue to winter grazing can impede the ability of plants to initiate spring growth and can contribute to decreased vigor and production and increase the susceptibility to invasive grass establishment (Frank 1993, Manske 1999). Most hay feeding pastures in the project area are not solely used for this practice, so seasonal use combined with winter use increases the potential for excessive utilization and decreased plant vigor. Although browsing within woody draws is often decreased or concentrated within a few draws during winter hay feeding, livestock often seek the shelter of draws for protection from winter wind and contribute to high trampling disturbances and decreased conditions. High manure accumulations in the draws appear to promote several barnyard weeds such as kochia, pigweed, and ragweed.

Moving hay feeding off of NFS lands would decrease a vector of invasive grass introductions, would reduce the spreading and dispersal of invasive grasses due to high stocking densities associated with hay feeding sites, and would help improve or maintain plant production and composition.

Wildlife – The physical location of the feeding area is important. If moved to private land but the new location is close to the former location, little if anything may be accomplished in regards to herbaceous structure. And vice versa, if movement of the feeding area is significant, effects may be more pronounced to the structure distribution.

Due to vegetative compaction and/or consumption from winter use, fall herbaceous structure may not be available in the following spring nesting period in the surrounding area, including adjacent NFS lands.

Utilize biological controls for noxious weed control in woody draws

Range – See DPG Noxious Weed FEIS and implementation of control measures.

Botany – The primary biological agent of proven consistent efficiency for noxious weeds in the project area involves flea beetles (*Aphthona* spp.) for the control of leafy spurge. Biological controls would alleviate collateral impacts from herbicide treatments to desired woody and herbaceous species while often achieving equivalent levels of weed control. However, the successful establishment of flea beetle populations can be reduced in woody draws due to a high degree of shading, high amounts of herbaceous growth and plant litter, and low amounts of bare ground. Effective biologic controls do not exist for other noxious weeds on the LMNG.

Wildlife – Given the typically limited extent of woody draws in many areas and the overall contribution of forage within these areas, it is unlikely that control of weeds in woody draws would have a significant contribution to upland herbaceous structure. However, woody draws are still important to livestock for cover and the limited forage. And, woody draws are important to many other species of wildlife. Hence, maintaining the health and vigor of woody draws would be

important for some ground nesting species, such as sharp-tailed grouse that may use woody draws for food and cover from the fall through winter months. Though leafy spurge is generally found in more mesic sites such as draws, it can also be found in some upland sites. Controlling spurge within woodlands could spill over to upland habitat. Control of noxious weeds and invasive plants could improve the potential to provide improved levels of ecosystem services than in an invaded state.

Appendix E

Response to Comments for the Draft Environmental Impact Statement

North Billings County Allotment Management Plan Revisions

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RANDALL MOSSER

A-1 *"The private and fed lands shown on the Headquarters allotment maps for allt. 135 and turn-in permit 256 is wrong. There is several hundred acres that were called (null) on old maps was not included. Also some fed. land that was intermingled with private land on headquarters was not included".*

The map for Allotment 135 has been updated to include private and National Forest System (NFS) lands if they are listed on the current land record for the permit.

A-2 *"Mikes Creek only run water when it rains and is not a year around stream that supports aquatic veg." --*

It is correct that Mikes Creek is an intermittent stream. The reduced flow period of Mikes Creek is one of the factors contributing to the Non-functional status of the stream as identified in the SDEIS, Chapter 3 Part 2:

- **The hydrologic connection between the stream and water table (or any alluvial aquifer) has been lost due to channel incision.**
- **Upland hydrology has been altered by overgrazing, which in turn affects channel hydrology and the seasonal duration of stream flow.**
- **Overgrazing has led to poor conservation of rangeland moisture with excessive runoff and flashy stream-discharge events.**

The most relevant Grasslands Plan objectives and guidelines that specifically require actions to address degraded riparian conditions, such as those that exist along Mikes Creek (see also, USDA Forest Service, 2001, pp.1-2, 1-11) are:

- **Move at least 80 percent of riparian areas and woody draws toward self-perpetuating plant and water communities that have desired diversity and density of understory and overstory vegetation within site capability. Objective**
- **For streams identified as "non-functional" or "functional at risk with a downward trend," begin corrective action within 3 years of stream inventories. Guideline**

A-3 *"A lot of the management problems associated with allotment 135 can be attributed to no new improvements until this plan was completed. Years have gone by when all attempts at range management were stymied because of lack of improvements".*

The comment acknowledges that range management problems exist within this allotment, and that there is a need for action to correct those concerns. This analysis proposes a series of different alternatives (see SDEIS, Chapter 2 and Chapter 3 Part 2) to address range concerns on this and other allotments in the project area.

SIERRA CLUB

B-1 *"Regarding monitoring, annual VOR readings should be taken for all allotments and clipping should be done every three years to help determine utilization, species composition, and trend".*

The SDEIS Chapter 3 Part 2 provides detailed information regarding each allotment including the monitoring frequency for each allotment as identified by the interdisciplinary team (IDT). The team determined that annual visual obstruction readings (VOR) readings were not required for all allotments because some were meeting structure objectives. The monitoring plans do not preclude conducting monitoring on a more frequent basis, if it is felt the current frequencies are not adequate on an allotment. Also, in the third table for each allotment in Chapter 3 Part 2 of the SDEIS, a monitoring plan is described.

In 2007, a cooperative monitoring effort between the Medora Grazing Association (MGA), North Dakota State University (NDSU), and the Forest Service was initiated, and data collection began in 2008. This cooperative effort includes gathering species composition, forage production, VOR, and the 17 Indicators of Rangeland Health in upland sites, and species composition, forage production, VOR, and tree/shrub data in green ash woody draw sites. This effort will collect data representing each individual allotment beginning in northern Billings County, and eventually throughout the MGA.

NORTH DAKOTA STATE LAND DEPARTMENT

C-1 "*Therefore, significant reduction of grazing levels on Forest Service lands may cause a reduction in grazing levels on co-mingled school trust lands".*

Only Alternatives 1 and 4 would result in initial reductions in Federal Authorized Use. If the State Land Department believes that the Authorized Use for National Forest System (NFS) lands will influence stocking on state lands, the department has the option to fence its lands separately from NFS lands and maintain current grazing levels.

C-2 *"However, we do not recognize any authority of the Forest Service to assert stocking rates on school trust lands. Stocking rates on school trust lands are a matter of leasehold rights between the State of North Dakota and our lessees".*

The Forest Service only authorizes use for the NFS lands within each individual allotment. These authorizations are not stocking rates, but are initial use values that through adaptive management may fluctuate up or down depending on monitoring results. The Forest Service through the SDEIS has not proposed a change of the associated animal months for State lands within each individual allotment under any of the alternatives in the SDEIS. These values can be found in the Land Record table on the grazing association grazing permit.

C-3 *"The Record of Decision for the Dakota Prairie Grasslands dated July 2002 on page 27 estimates a reduction of 8.3%. Our estimate was that stocking rates in the Little Missouri National Grasslands would be reduced by 25% based on the Final EIS for the Dakota Prairie Grasslands to meet the goals and objectives contained there in. Pages 3-52 and 3-53 of the DEIS confirm the estimates we made in 2002 and propose a much higher stocking rate reduction – up to 45%. It is a major concern that the anticipated 9% reductions that were proposed by the FEIS for the Dakota Prairie Grasslands has not been carried through and applied in the North Billings County Allotment Management Plan Revision as originally proposed".*

The estimated 8.3 percent reduction identified in Table 3 (page 27) of the 2002 Dakota Prairie Grasslands Record of Decision is an estimated figure used for comparison purposes between the different alternatives that were analyzed during the Grasslands Plan revision process (Grasslands Plan 2006 ROD, p. 12). The 8.3 percent is the estimated effect across the entire Dakota Prairie Grasslands. This is a landscape number which is difficult to compare to the site specific number of the North Billings DEIS. The variability associated with the 8.3 percent average ranges from a plus 5 percent for the Cedar River National Grassland to a minus 9 percent for the Little Missouri National Grassland (LMNG) with a range of variability for the LMNG of minus 4 to minus 13 percent (see NPG FEIS, p. B-107, Table B-20). The LMNG contains the Medora and McKenzie Ranger Districts.

The analysis in the Northern Great Plains (NGP) FEIS which produced the average 8.3 percent reduction also analyzed what reductions would be at the district level. That analysis indicated that potential reductions for the Medora Ranger District ranged from 8 to 17 percent (Project Record, Supporting Documentation – Range, L-2) depending on the structure objective. Site specific analysis of the project area under Alternative 4 shows a range of possible reductions in Authorized Use ranging from 0 to 44 percent, with an average of about 20 percent reduction (SDEIS, Chapter 3 Part 1, Range, Table 3.5) from Preference.

The NGP FEIS for the Dakota Prairie Grasslands didn't propose a 9 percent reduction, as noted earlier it is an analysis number generated for alternative comparison. Neither the 2002 nor the 2006 Grasslands Plan RODs established a 9 percent reduction. Site specific analysis, under Alternative 4, indicates higher reductions in Authorized Use in addition to other actions are needed to address resource issues.

C-4 *We are pleased to see the additional data and analysis that has been applied to developing the DEIS for the North Billings County Allotment Management Plan. This was a major deficiency in the FEIS for the Dakota Prairie Grasslands and did not allow for an informed discussion of the potential effects on ranchers in western North Dakota.*

It was always the intent of the Forest Service to use data best suited to the analysis at hand. This analysis displays the effects of this site-specific project. Thank you for your comment.

C-5 *"Unfortunately, the additional analysis for the North Billings County Allotment Plan confirm our 2002 analysis of Proposed Land and Resource Management Plan and the FEIS for the Dakota Prairie Grasslands and the major negative impacts that this plan would have on communities and individuals in western North Dakota".*

The analysis of economic impacts for each alternative shows a range of impacts associated with changes in the availability of Federal forage alone and the potential impact of eliminating all animals spending at least some time each year eating Federal forage in the project area (SDEIS, Chapter 3 Part 1, Economics). The economic analysis evaluates and displays a range of expected economic impacts to all occupations in the twelve-county area in total, which includes but is not limited to direct jobs in ranching and the agricultural service sector. In summary, Alternative 1 would reduce the current total contribution to the local economic impact area by 20 to 39 part and/or full time jobs and $359,497 to $708,453 dollars of labor income annually by 2012; Alternative 2 would cause no impacts; Alternatives 3 and 3A would add $47,917 to local Federal expenditures, which would add two part and/or full-time jobs and $55,405 of labor income annually starting in 2011; Alternative 4 would add $47,917 to local Federal expenditures, but given reductions in Authorized Use, it would reduce the current total contribution to the local economic impact area by one to four part and/or full-time jobs and would change annual labor income within a range of an additional $79 to a loss of $53,626 dollars of labor income by 2014 (SDEIS, Chapter 3 Part 1, Economics).

The economics study provided by Billings County addresses ranch viability or impacts to specific operations. Although the analysis of voluminous proprietary information for MGA ranchers was not possible because this date was not made available, NDSU analyzed ranching viability by exploring debt-servicing capability using data from western North Dakota relying on the North Dakota Farm and Ranch Business Program. There impacts are broken into three herd sizes in an attempt to display what impacts may occur to individual ranches under three herd reduction scenarios (10%, 20% and 40%).

NORTH DAKOTA DEPARTMENT OF HEALTH

D-1 "*Care is to be taken during construction activity near any water of the state to minimize adverse effects on a water body. This included the minimal disturbance of stream beds and banks to prevent excess siltation, and the replacement and revegetation of any disturbed area as soon as possible after work has been completed. Caution must also be taken to prevent spills of oil and grease that may reach the receiving water from equipment maintenance, and/or the handling of fuels on the site. Guidelines for minimizing degradation to waterways during construction are attached".*

Proposed activities in riparian zones consists primarily of planting trees, fencing to create riparian pastures or riparian exclosures which is mostly hand work; therefore, there is little anticipated effect to riparian or water bodies from construction activities that would be associated with these activities. Possible activities on one allotment do include placing downed woody debris and flow deflectors to initiate meandering in a portion of Whitetail Creek. Again, this would likely be primarily hand work, however, if equipment were used in such a project they would be subject to Forest Service regulations and a hydrologist would also be on site during construction activities. Care would be taken during the construction activities and Best Management Practices would be applied.

D-2 *"We encourage monitoring of riparian areas and adaptive management to achieve functioning systems".*

Chapter 2, Monitoring of the SDEIS identifies that monitoring of riparian areas via Properly Functioning Condition (PFC) surveys will be conducted every five years. The responsible official in has decided that, for stream segments rated as Functional At Risk or Nonfunctional the monitoring period will be shortened to once every three years. The monitoring section for each allotment, found in the SDEIS, Chapter 3 Part 2, identifies how riparian monitoring will be conducted.

D-3 *"The U.S. Army Corps of Engineers may require a water quality certification from this department if the project is subject to their Section 404 permitting process. Any additional information which may be required by the U.S. Army Corps of Engineers under the process will be considered by this department in our determination regarding the issuance of such a certification".*

Proposed actions in one allotment do include placing downed woody debris and flow deflectors to initiate meandering in a portion of Whitetail Creek. This is thought to be primarily hand work but may involve some use of motorized equipment. Regardless, the Corp of Engineers would be contacted to determine if a 404 permit would be required. The Forest Service will coordinate with all involved agencies to secure needed water quality certification.

SOCIETY OF RANGE MANAGEMENT

E-1 "*Major changes have been made that recognized that the herbaceous seral condition of the Little Missouri National Grassland meets the plan goals*".

Table 3.27 (SDEIS, Chapter 3 Part 1, Seral Stages) identifies that existing seral conditions are below early and late seral objectives and exceed moderate seral objectives according to analysis of the (2005, 2006-2010) sere plot data for the project area. The ecoplot data (1996-1999) indicated that during that time period seral conditions were being met. Therefore, the most current data indicates that seral stage objectives are not being met.

E-2 "*While stocking rate reductions can be an important tool for ecosystem improvement, it should also be recognized that improved grazing management strategies (grazing rotations that control timing, frequency and intensity of defoliation) coupled with stocking rate adjustments, which in some instance may involve stocking rate increases, are just as important*".

The SDEIS recognizes the use of various management tools in Alternatives 3, 3A, and 4 to address resource concerns. The proposed initial actions in Alternatives 3 and 3A rely solely on management tools other than reductions in Authorized Use to address identified resource issues. Alternative 4 uses many of the same tools identified in Alternatives 3 and 3A but includes adjustments in Authorized Use (see SDEIS Chapter 3 Part 2). Appendix D of the SDEIS identifies multiple grazing management tools to address resource issues.

The Design Criteria (SDEIS, Chapter 2, Table 2.4) provides an explanation of how Animal Month/ Animal Unit Month (AM/AUM) adjustments may occur. The SDEIS identifies that temporary increases in Authorized Use may be granted if monitoring indicates that resource objectives are being exceeded.

E-3 *"The Billings DEIS recognizes that reducing stocking rates is not a viable method of improving riparian habitat and wooded draws. The last cow in a pasture will likely be found either in riparian habitat or the wooded draws and so focusing on stocking rate reductions would have unacceptable economic impacts. Other management techniques recognized in the Billings DEIS are more appropriate and effective for improving these areas".*

The SDEIS (Chapter 3 Part 2) recognizes multiple tools to meet or move towards Grasslands Plan goals and objectives, of which typically there isn't any one tool that is the sole 'fix' for an issue. Usually, the 'fix' requires multiple tools that are synergistic.

Analysis of Alternative 4 indicated that reduced Authorized Use could be a factor in improved woody draw conditions.

E-4 "*It appears that the general proposal to reduce stocking rates up to 45% is fundamentally driven by the Plan's direction to increase visual obstruction readings (V.O.R.). Alternative #4 proposes drastic reductions in stocking rates without quantifying how those reductions would affect V.O.Rs"***.**

The condition of the resources is the fundamental consideration in determining if additional management actions are needed to move an impacted resource towards desired conditions identified in the Grasslands Plan. See also comment E-7.

The second part of the comment relates to the relationship between stocking rates and VOR. It is difficult to develop a quantifiable relationship between stocking rate and Visual Obstruction readings. However, studies have found quantifiable relationships between production and VOR (Robel et al 1970 and Benkobi and Uresk 2000) and standing residual vegetation and VOR (e.g. Benkobi and Uresk

2000). Also, a relative relationship between stocking rate and upland game bird cover does exist. For example, Reece et al (2008) states that "the ability of wildlife [i.e. upland game birds] to carryout daily and seasonal activities without being observed by predators, declines as stocking rates increase." See also Duebbert et al (1986), Reece et al (2001), and Salo et al (2004) for other examples.

E-5 *The Billings D.E.I.S. seems to dismiss Alternative #3 from serious consideration with the following statement on page 2-24*

> *"Alternative 4 takes more aggressive steps to address resource concerns than does Alternative 3. If under Alternative 3 monitoring reveals that more aggressive measures are required, being able to implement those measures and see significant results within the 10 to 15 year timeframe associated with this project becomes questionable.*

The DEIS doesn't dismiss Alternative 3, the purpose of the above cite is to provide the reader with additional comparative information showing potential differences between Alternatives 3 and 4.

E-6 *In light of this statement it would also be fair to say that if Alternative #4 proved to be overly aggressive, then by the time monitoring reveals that less aggressive measures were required, it may also be too late to prevent the economic and environmental damage already caused by measure #4.*

One of the Design Criteria located in Table 2.4 of the SDEIS identifies that if reductions are required that they would be implemented at no more than ten percent per annum. Ongoing monitoring for herbaceous structure and composition which occurs annually on many of the allotments should reveal in a timely manner if actions have been successful. If achieved before the full reduction has been implemented further reductions would not occur. This is also a provision of the design criteria.

Reducing stocking levels and implementation of other initial actions under Alternative 4 is designed to address resource issues. It is unclear from the commentor's statement how they envision environmental damage occurring from this alternative.

E-7 *"The method to determine the initial stocking rates in the Billings DEIS was a paper exercise and did not account for the benefits of improved management methods nor did it consider the current condition of each allotment. It is well known that even with proper stocking rates, one manager can overgraze while another will have an abundance of residual vegetation".*
Therefore, the proper approach where long term management has been in place is to evaluate the current management using proven inventory techniques and through adaptive management based upon the results of a well designed and implemented monitoring program, make adjustments to meet the goals. The initial stocking rates

under Alternative #4 do not address the current management conditions but instead uses a theoretical approach that does not account for the benefits of improved management that is currently in place or that could be implemented.

The commentor is correct in that the method used to calculate the initial estimated carrying capacity did not recognize current conditions or management for an allotment. There are assumptions made within the analysis that have been identified (SDEIS, Chapter 3 Part 1, Range, Carrying Capacity Analysis). However, there are still situations where the allotments are not meeting or moving towards the desired conditions outlined in the Grasslands Plan.

The current condition of each allotment was assessed (SDEIS, Chapter 3 Part 2). Based on this assessment the IDT identified what resources were not meeting the management direction in the Grasslands Plan and why the management direction was not being attained. Based on this analysis, the team identified initial actions to move the allotments toward desired conditions (Alternatives 3 and 3A). However, the effects analysis displayed (SDEIS, Chapter 3 Part 2) that the initial actions would generally not result in improved conditions because they did not address grazing intensity or the capacity of the land.

Alternative 4 was designed by looking at (1) the existing condition (were desired conditions being met); (2) the initial actions (would the initial actions move the area towards desired conditions). Where those two conditions were met for all resources then Alternative 4 did not incorporate a change to Authorized Use. Where the two conditions were not met then initial estimated carrying capacity was used as a base for setting Federal Authorized Use.

Alternatives 3, 3A, and 4 apply adaptive management which has a goal to achieve site specific desired resource conditions in accordance with the Grasslands Plan goals and objectives. A key component of adaptive management is monitoring, as it is the driving factor which determines if management actions are accomplishing their intended resource goals. In addition, the Design Criteria in Table 2.4 of the SDEIS provides an explanation of how AM/AUM adjustments can adjust the annual Authorized Use up or down from the initial Authorized Use value adaptively, if monitoring shows that Grasslands Plan goals and objectives are being met or moving the resource towards Grasslands Plan desired future conditions.

E-8 *The Billings DEIS proposes an average 20.3% reduction in stocking rates (up to 45% in some pastures) with no explanation of the effectiveness of this change on V.O.R.s. It is suggested that a more reasonable approach, if it is determined that a reduction in stocking rate is needed for wildlife management purposes, would be to implement a maximum average reduction of 8.3% as identified in the two Records of Decision. Going beyond this point at this time would seem to be inconsistent with the adaptive management approach and the latest approved Forest Service planning efforts.*

The Grasslands Plan Record of Decision estimated there would be a 9 percent reduction of livestock grazing across the Grasslands based on the management direction in the plan (2002 ROD, page 5). Some allotments could see higher reductions, other allotments could see lower. Reducing allotments more than 9 percent is not inconsistent with the plan because the plan did not establish a limit for change.

For some allotments, Alternative 4 would reduce Authorized Use more than 9 percent in order to move allotments toward desired conditions. In addition, these reductions would occur over time (no more than 10 percent annually). Ongoing monitoring for herbaceous structure and composition which occurs annually on many of the allotments should reveal in a timely manner if actions have been successful. If achieved before the full reduction has been implemented further reductions would not occur. This is also a provision of the design criteria (SDEIS Table 2.4).

BADLANDS CONSERVATION ALLIANCE

F-1 *Initial Actions in Alternative 3 are almost wholly directed toward supplying additional forage opportunities on an already stressed landscape. While grazing rotations and more than two dozen new water tanks may provide for cattle, they do not address the severe lapses seen in riparian health, woody draws and vegetative composition. And perhaps most notably, the desired maintenance of a shifting mosaic expressed in terms of vegetative structure is nearly absent and is apt to be further homogenized rather than improved.*

Alternative 3 does propose new water tanks and other range developments; however, the reason for these stock tanks is not for additional livestock forage opportunities. There are many instances where the tank is meant to draw livestock away from a riparian area or a woody draw to address identified issues in those areas (SDEIS, Chapter 3 Part 2). Also, where applicable, stock tank management will be applied where stock tanks will be turned on and off to draw livestock to certain areas, thereby rotating the livestock use from area to area. In some cases, a proposed new development is replacing an existing development that will be rehabilitated. It should also be noted that there are several tools being proposed to address the identified resource issues. A goal of proper grazing management is to distribute the livestock throughout a location and to not have the livestock use focused in any one area. This can be accomplished with a grazing rotation system, thereby providing opportunities for vegetation growth and regrowth as the livestock rotate through the pastures within the grazing system. Although the grazing system and other management tools may appear to give livestock the opportunity to create a homogeneous landscape, that is not the intention of the various management tools.

F-2 *Adjustment for changes in animal unit forage demands with changes in cow/calf size was a recommendation by the Scientific Review Team (SRT Recommendation V-2). It should be implemented.*

The commentor is correct in their identification of this SRT recommendation. Adjusting for cow size is one of the components of Alternative 4 (SDEIS, Chapter 2, Alternatives Considered in Detail).

F-3 *We approve of the plan to carry out reductions as needed with no single year decreasing AUMs by more than 10%. We would insist on exacting, ongoing monitoring during this initial phase, with current baseline data on both structure (Visual Obstruction Readings) and vegetative composition and production.*

In Chapter 2, Monitoring the SDEIS identifies the monitoring plan, which among other information identifies the types of monitoring that will be completed and frequencies. The specific monitoring to be carried out by allotment is identified in Chapter 3 Part 2 of the SDEIS.

F-4 *As Alternative 4 stands, there is a range of monitoring frequency. Flexibility must be built into this alternative to insure a halt or slowing in reductions should a significant upward trend be identified.*

The Forest Service recognized the commentor's concern and has addressed this in the Design Criteria (SDEIS, Chapter 2, Table 2.4). This comment is specifically addressed by the following criteria: If monitoring shows that resource objectives are being met before full implementation of the AM/AUM reduction has occurred, then no further reduction in AUMs will be needed.

F-5 *Alternative 4 has the best chance of approaching the Goals and Objectives for Management Indicator Species, here the sharp-tailed grouse. Particularly on the Rolling Prairie portion of the Project Area, continuing monitoring must take place to determine needs for adaptive management.*

Chapter 3 Part 2 identifies the types and frequency of monitoring that is proposed for Alternatives 3, 3A, and 4 by allotment. The herbaceous structure monitoring would be used to provide habitat condition information for the sharp-tailed grouse. Also monitoring of known leks in DPG monitoring block located in the project area would be conducted on an annual basis.

F-6 *Efforts to improve season of use on crested wheatgrass are evident. We would suggest that similar treatment on pastures showing high percentages of invasive grass (brome, Kentucky bluegrass) should be implemented as well, even if some change in configuration of these allotments were necessary. This would allow for greater use of forage produced (invasives) without further stocking rate reductions, but it may also require the permittee to adjust for season of use.*

The Botany Report discusses this strategy (Discussion of Results - Seral Stage/Plant Composition) as a means to help control invasive grasses and alleviate use of native grasses to increase their vigor and predominance in accordance with general principles of range science (Project Record, Specialist Reports and Notes).

Achieving the desired level of high invasive grass utilization over shorter time periods would require increasing livestock density. High or maximum levels of use based on the existing forage component would therefore be maintained. However, it would often not be feasible for a given permittee to increase livestock numbers for a variety of reasons, so it could become necessary to add livestock from other permittees to an affected allotment until desired results are achieved. Ranch logistics for the original permittee would be complicated because other pastures would be required for later summer grazing until native grass components are sufficiently restored to return to normal grazing schedules.

F-7 *We also note the differing results for seral stage percentages by methodology in Table 3-16 of the DEIS. The EcoPlot Data from 1997-1998 seems to meet Grasslands Plan objectives more than the newer data. We do not find any specific analysis that explains the significance of this change and question whether or not this actually reflects a downward trend in seral conditions.*

Differences in seral proportions obtained with the ecoplot data versus the NDSU and sere plot data were suggestive of an increase in mid seral stages and decrease in early and late seral stages, as well as an increase in invasive grasses that would represent a trend away from desired conditions. However, this cannot be statistically ascertained due to significant differences in sample methodology and sample locations. The ecoplot methodology was established to classify and inventory plant communities across the LMNG and was not of sufficient rigor for precise estimates of plant composition or monitoring of trends (Project Record, Specialist Reports and Notes, Botany Report). The ecoplot data was initially utilized to augment a limited number of sere plots or other plant composition data, but recent data from NDSU plots, additional sere plots, and pace transects has decreased the utility of the ecoplot data.

F-8 *BCA was taken aback by the casual and brief discussion under the heading Irreversible/Irretrievable (pages 3-182 and3-183). The DEIS states: "Existing invasive grasses are having an irretrievable effect on native plant communities." It goes on to say, "Given enough time and the right conditions existing invasive grasses might effect native communities to a point their restoration is so difficult that it approaches an irreversible loss of native communities." This is a condition of alarm to differing degrees throughout the West, in Dakota Prairie Grasslands' own Sheyenne National Grassland and should be in the Little Missouri. It is a transition that should be stopped or slowed on the Little Missouri National Grassland while there is still a chance of success.*

See response to comment I-15.

F-9 *Adding a forage reserve to the list of options in the Grazing Management Toolbox would be significantly helpful in easing the impacts of livestock reductions as seen in the North Billings County Project Area, and in preventing repeat occurrences elsewhere in the Grassland.*

The idea of a forage reserve has many merits. This idea has been and will continue to be explored in another nearby study, i.e. the Grasslands Plan amendment and grazing management plan for the Elkhorn Ranchlands. If a forage reserve were to be included in the Elkhorn Ranchlands, then it would most likely benefit permittees in the North Billings project area, which immediately surrounds the Elkhorn Ranchlands, as predicted by the commentor.

The idea of a forage reserve within the North Billings project area runs counter to the purpose proposed by Badlands Conservation Alliance. The claim is made that a forage reserve "…would be significantly helpful in easing the impacts of livestock reductions as seen in the North Billings County Project Area…" To the contrary, within the constraints of the project area, the only way to make allotments available for a forage reserve is to first cancel or terminate an existing grazing permit within that allotment so that it can be reallocated as part of a forage reserve. The elimination or termination of an existing grazing permit in an allotment would not ease, but rather would add impacts to proposed livestock reductions.

It is likely that the commentor has confused potential actions of the adjacent Elkhorn Ranchlands project with those contemplated in the North Billings project. There is no dispute that a forage reserve has merits; however, implementation of one within the defined project area would require additional cuts in livestock and would cause additional impacts to affected permittees.

F-10 *In the discussion on Global Climate Change, it should be pointed out that IF cited modeling predictions of increased moisture, temperature and CO2 for the Project Area is reliable at all, that precipitation and that temperature increase is expected to come in extreme weather events, not necessarily conducive to greater forage production. Indeed, in an already stressed system, these extreme events in a landscape like western North Dakota may cause adverse conditions including lost moisture infiltration, erosion, etc.*

The Forest Service acknowledges that there are many theories and predictions related to climate change. Trying to determine the effects of global climate change on the project area is difficult at best. It is possible that extreme weather events may occur, and if they do it is reasonable to expect increases in erosion and other adverse effects.

F-11 *The SRT's recommendation IV-1: All parties should agree to share detailed (i.e., number and size of grazers, on and off dates, etc.) pasture specific records on an annual basis seems all the more essential to resolve issues. Ranching families will not last if the resource does not last. And, that would be a pity for all.*

The Forest Service agrees (Final Response to the SRT Reports, p.12) with the SRT's recommendation and concur with the commentor that this information is important for managing the allotments. A letter has been sent to the MGA detailing, as per the MGA Grazing Agreement, the required actual use information, and the need to complete year end reviews with each permittee to verify or amend the Annual Operating Instructions (AOIs) to reflect what actually occurred for the past grazing season (see Project Record, Correspondence Permittee, actual use letter to MGA dated June 28, 2011).

NORTH DAKOTA GAME AND FISH DEPARTMENT

G-1 *What should not be neglected, however, is the past work including your Rangeland Assessment that has been done in western North Dakota and neighboring areas (see short list appended at back).*

Information from the Little Missouri National Grassland Rangeland Assessment was used at the landscape scale, as per SRT recommendation, to help determine potential resource concerns in the project area.

G-2 *The DEIS should identify the tools that will be used to address this issue. In some cases such as riparian conditions, very specific tools have been identified. In others such as grassland structure the DEIS is silent, or simply lists a possibly all-encompassing, ill-defined tool such as "adjust authorized use". It would seem authorized use may include many tools in the grazing management tool box. More specificity is needed on this issue in the EIS and the final decision.*

Adjusting Authorized Use is a tool in and of itself and one of many in the grazing management toolbox (SDEIS, Chapter 2, Table 2.1). It refers to the number of AMs or AUMs, depending on the alternative, which is annually authorized to an allotment for livestock grazing. Adjusting Authorized Use can improve conditions for several different resource areas. Appendix D of the SDEIS identifies the effects of the different tools in the grazing management tool box. As with adjusting Authorized Use, one tool may benefit more than one resource. Chapter 3 Part 2 of the SDEIS includes an allotment by allotment analysis showing what resource is of concern, the initial and adaptive actions by alternative and the effects by resource by alternative.

G-3 *Although the DEIS indicates the project area is close to meeting seral stage objectives, it still falls short of meeting them. This should be addressed.*

Alternatives 3, 3A, and 4 contain initial actions such as modified rotations, June turnout for native species, Authorized Use reductions in the case of Alternative 4, etc. These actions among other things would allow plant vigor to increase, allow completion of critical plant growth structure, etc. which in turn provides the

opportunity to positively affect species expression and composition. Monitoring will determine, on an allotment by allotment basis, if the initial actions are moving towards desired conditions at an acceptable rate or if adaptive management needs to be initiated to further address resource issues. The SDEIS includes an allotment by allotment discussion of seral stages and whether or not the initial actions in each alternative are anticipated to improve resource conditions (SDEIS Chapter 3 Part 2).

G-4 *Prohibiting the use of tame grass hay on native grassland areas is one step that should be taken now if it hasn't been already.*

The Grasslands Plan addresses this concern on page 1-19…"Minimize feed storage and routine feeding of domestic livestock on NFS lands" (guideline). Table 2.1 in the SDEIS also identified this as a tool "Move winter feeding areas off of National Forest System lands".

G-5 *Regarding Kentucky bluegrass in particular, we believe that controlled research is necessary for effective adaptive management and that adaptive management must be targeted toward the issue. We also have reservations as to whether the proposed decision embraces the flexibility needed to address this issue.*

There is some reluctance to implement early season grazing of pastures with high amounts of Kentucky bluegrass mixed with varying amounts of native grasses due to the potential for premature use of the native component. In some cases we have passed or are nearing a threshold of returning potential dominance to the native climax vegetation. Thus, the degree of concern is not justified by existing plant composition because loss of native dominance is or is becoming a forgone event.

However, there is still reason to properly manage invasive dominated pastures because their contribution has the potential to decrease livestock reductions necessary to maintain existing native dominated communities and otherwise slow the spread of invasive species. Some research shows that livestock can become accustomed to actively selecting Kentucky bluegrass when it is most palatable (Brand, 2006, Sedivec 2006) and this should be actively investigated through close monitoring of grazing results under different proportions of invasive-native grasses.

G-6 *In 2009 the Department released an interim report on the collaborative hardwood draw monitoring initiated in the 1980s on the Little Missouri National Grassland. This report, not the draft which preceded it should be cited (Duxbury 2009). In addition we would like to point the earlier collaborative research conducted on hardwood draws using exclosures (McKenzie 2004). One of these exclosures and the long-term study exclosures installed by Rocky Mountain Research Station (Uresk and Boldt 1986) are actually in the project area.*

Information generated by the North Dakota Game and Fish (NDGF) report was used and Duxbury is cited in the SDEIS and Botany Report. The report also

supplied additional valuable literature citations. Data from sample cites in the project area resulting from the ongoing collaborative woody draw monitoring project between the NDGF and Forest Service was used in the assessment of existing woody draw conditions and in evaluating trends of these conditions.

Woody draw exclosures constructed by Uresk and Boldt (1986) that occurred in the project area were included in the woody draw analysis ((Project Record, Specialist Reports and Notes, Botany Report). One of the sites was Healthy while the second was At Risk but bordering on Healthy. Both sites were affected by dense invasive grasses of smooth brome and Kentucky bluegrass that likely inhibit improved conditions despite the exclusion of livestock.

The exclosures constructed by McKenzie occurred south and outside of the project area and were therefore not used in the analysis. However, observations of these sites indicated excellent or Healthy conditions without the burden of dense invasive grasses, and to some extent, were used as a reference of potential composition and structural condition.

G-7 *However it appears the Forest Service has not addressed both cow and calf size, instead having focused on changes in cow size only. We have always emphasized the need to address both. Given that the DEIS is a site specific document it would be helpful if cow and calf size was addressed on an allotment by allotment basis. In addition, it is unclear to us, if stocking rate was based on actual production or potential production; if it embraced the concept of structure heterogeneity as detailed in the Grassland Plan; or addressed slope as per identified by the NRCS and others.*

In Alternative 4 of the SDEIS the Authorized Use for each allotment is labeled as AUMs. An AUM is defined in the glossary as the amount of feed or forage required by an Animal-Unit (AU) for one month. Additionally, an AU is considered to be a mature 1,000-pound cow, either dry or with a calf up to six months of age, or their equivalent based on an average daily forage consumption of 26 pounds dry matter per day on an oven-dry basis. Based on this definition, the AUM can be either a cow with a calf or a dry cow, therefore as long as the calf is less than or equal to six months of age it is not accounted for in the Authorized Use value.

The carrying capacity analysis used to determine initial Authorized Use values for Alternative 4 has several assumptions described in the Carrying Capacity Analysis section in Chapter 3 Part 1, Range of the SDEIS. One of those assumptions is that forage production values reported for each mapping unit within the soil survey are based upon a Reference plant community which essentially is the potential plant community for an ecological site. This analysis was conducted based upon recommendations I-1 and I-2 from the SRT in accordance with the DPG Final Response to the Scientific Review Team Reports, 2006 pp. 3 - 5.

G-8 *Basic Record-keeping Relating to Livestock and Grazing Management is an issue that was brought to the forefront by the Scientific Review Team, although it has been a back-*

burner issue for a number of years. As indicated in the past we are fully behind the Scientific Review Team on this. It would appear that some permittees are better at keeping the Forest Service appraised as to what they are doing on the ground than others and that some grazing associations are less concerned with obscuring what is going on on-the-ground than others. We do not believe that such basic record keeping and record sharing is a discretional activity.

See response to comment F-11.

G-9 *It has been suggested that monitoring can bridge the lack of such records. We have long supported increased monitoring on the Grasslands. Monitoring however should not have to bridge fundamental and clearly correctable short-comings relating to record keeping on other fronts. This puts the whole onus and burden on monitoring that not only challenges your ability to see that it gets done but diminishes the likelihood of success. In addition such gaps and lapses in record-keeping undermine the very principles upon which adaptive management are founded.*

The Forest Service agrees that record keeping is important (see response to comment F-11). However, for this project it is the Forest Service's belief that the best available information will be on the ground monitoring which will indicate if Grasslands Plan goals and objectives are being met or resources are moving towards Grasslands Plan desired future conditions.

U.S. ENVIRONMENTAL PROTECTION AGENCY REGION 8

H-1 *However, since 50% of perennial streams are already properly functioning we suggest you do not constrain project goals and adaptive management strategies to meeting this condition. We recommend you include a commitment to continue implementing strategies for stream health improvements beyond 80% of perennial streams, as well as improving intermittent streams where possible.*

Grasslands Plan Goal 1a (3) identifies an objective of meeting or moving towards Proper Functioning Condition (PFC) on at least 80 percent of perennial streams. The Forest Service is not treating the 80 percent as the final target; it is the first part of this goal. As all the streams in the project area are intermittent, with the exception of the Little Missouri River, the different actions proposed in Alternatives 3, 3A, and 4 to address stream concerns are to improve intermittent stream function.

H-2 *EPA is concerned about the lack of water quality data or discussion in the DEIS. Cattle grazing has the potential to degrade water quality through increased sedimentation and loading of nutrients and pathogens. We recommend the adaptive management plan include monitoring for the following:*

Fecal coliform and total bacteria counts
Nutrient concentrations: and
Temperature

In response to this comment a section in Chapter 3 Part 1 on water quality has been added to the SDEIS. As noted in this analysis the reaches of streams that have a riparian functionality rating of Functional at Risk Downward or Nonfunctional are likely contributing the majority of fecal coliform due to impacted riparian vegetation. In contrast, the riparian vegetation associated with reaches that are rated at Proper Functioning Condition (PFC) are likely trapping sediment and thereby removing associated contaminants such as fecal coliform. Recent studies (Shirmohammadi and Montas, 2003; Pachepsky et. al., 2006; Sullivan et. al., 2007) indicate that vegetation filter strips are highly effective in removing nutrients and fecal coliform from overland flow and preventing these contaminants from entering the stream flow. Actions that increase riparian vegetation will directly decrease sediment transport as well as transport of sediment laden contaminants such as fecal coliform.

Based on the correlation between PFC and potential contribution of fecal coliform, monitoring will focus on whether At Risk Downward and Nonfunctional stream segments are moving towards PFC.

H-3 *However, we recommend that the Forest Service incorporate baseline water quality into PFC assessments for future projects.*

As identified in the Water Quality section in Chapter 3 Part 1 of the SDEIS, there are no perennial streams in the project area, with the exception of the Little Missouri River.

Part of the PFC assessment method (Prichard et al., 1998, 1999 (modified 2003) assesses the condition of riparian vegetation. The strong inverse relation between riparian vegetation and water quality (Shirmohammadi and Montas, 2003; Pachepsky et al., 2006; Sullivan et al., 2007) indicates that the condition of riparian vegetation can serve as a proxy for water quality and therefore minimizes the need to monitor water quality directly in streams.

Some monitoring is proposed for the main stem of the Little Missouri River at the confluences of Whitetail and Mikes Creek. See the water quality section located in Chapter 3 Part 1 of the SDEIS.

H-4 *The EIS should also include any streams within, or downstream of, the project area that are not supporting beneficial uses. Any water body on the Clean Water Act Section 303(d) list of impaired waters, or on the 303(d) monitoring list, should be identified along with the pollutants of concern for that segment.*

There are no water bodies within the project area listed on the Clean Water Act Section 303(d) list. All the streams in the project area are identified as Class III waters by the North Dakota Department of Health with the exception of the Little Missouri River, which is classified as a Class II stream (see North Dakota Century

Code, Chapter 33-16-02.1 *Standards of quality for waters of the State, Appendix I).* A reach of the Little Missouri River in McKenzie County downstream of the project area, from the confluence with Beaver Creek to the Highway 85 bridge crossing, has been monitored for water quality (North Dakota Department of Health, 2008, p. VI-30). This reach is rated as 'Fully Supporting But Threatened' for beneficial use (listed as recreation), due to levels of fecal coliform (North Dakota Department of Health, 2008, p. VI-30).

H-5 *The Little Missouri River has not been assessed for fecal coliform or other pathogens from it confluence with Government Creek to its confluence with Beaver Creek. A discussion of how the proposed project may impact the Little Missouri River impairment, as well as any other impaired or potentially impaired waters, is needed.*

In response to this comment a section on Water Quality has been added to the SDEIS.

H-6 *We recommend that a description of the potential impacts, positive and negative, of each tool on all the resources of concern be included in the document. Along with this information should be a commitment that a tool will not be selected for adaptive management use if it will result in negative impact to any resource.*

Appendix D of the SDEIS provides effects analysis of the different tools in the grazing management toolbox.

In the management of a multiple-use landscape, the selection of a tool(s) to address one resource concern may have negative impacts on another resource. This is the inherent nature of land management within a multiple-use agenda. Under the Grasslands Plan some acres are targeted for low vegetative structure, early seral plant composition, and emphasis of grazing. Other acres will be prioritized for high vegetative structure, late seral plant composition, and emphasis of some wildlife species. Across the landscape, tools will have beneficial and adverse effects. For example, fencing an area to help develop high vegetative structure will benefit wildlife species for which high structure is a critical habitat component to the determent of those species which need short vegetation such as prairie dogs. It is the degree to which this happens that is important, none of the tools identified in the analysis will be applied to an extent that it will have significant negative effects to any resource as that would be counterproductive.

H-7 *A firm commitment of resources for effectiveness monitoring should be included in the EIS. Adaptive management cannot be employed without full implementation of its associated monitoring schedule. Consequently, an environmental conservative default management plan should be defined in case adequate resources for monitoring cannot be secured.*

The success of adaptive management is based on monitoring for without monitoring information it is not possible to move forward with adaptive management actions if

called for. The Medora Ranger District and the DPG are committed to carrying out or obtaining the needed monitoring information through its own resources or in partnership with other entities such as NDSU and the MGA. However, despite the best intentions, events do happen which, in the short term, may affect our ability to meet the monitoring schedule associated with this project. These events are usually fiscal in nature and are at the discretion of the U.S. Congress; therefore, it is not possible to say that funding will always be available when needed to complete monitoring. Rarely has it happened that no monitoring has been completed, rather fiscal impacts have generally meant a reduced amount of monitoring would be completed until sufficient fiscal resources become available to establish full monitoring. If monitoring funds for this analysis become limited, the funds that are available will be concentrated on those allotments of greatest concern while initial actions continue to be carried out on the remaining allotments in the project area.

H-8 *The explanation of future decision points that would require NEPA analysis will also be beneficial in clarify what is and isn't considered within the bounds of adaptive management.*

Adaptive management for this project is bounded by the tools in the Grazing Management Tool box (SDEIS, Chapter 2, Table 2.1). The possibility of new management tools is recognized in the following statement from the Alternatives Considered in Detail, Alternative 3 section of the SDEIS, "It is possible that new rangeland management techniques may be developed during the life of this project. New techniques would be incorporated into the toolbox to the extent that their implementation is consistent with the effects documented in this EIS and its accompanying Record of Decision". If effects of a new tool are outside those identified in the SDEIS then a new NEPA process would need to be initiated to address that tool.

H-9 *We recommend that you remove, or explain more fully, the note that "hitting a trigger point doesn't necessarily mean a change is needed.*

Additional clarification has been added in the Monitoring, Trigger Points section of Chapter 2 of the SDEIS.

H-10 *We also recommend you include the trigger points in the allotment summary sheets for ease of reference and to ensure commitment.*

A copy of the trigger points identified in the Monitoring section of Chapter 2 of the SDEIS will be included with each individual Allotment Management Plan when they are written.

H-11 *Finally we recommend, as described above under "Water quality that you add water quality monitoring as a monitoring item in the Effectiveness Monitoring schedule (pg 2-20).*

Some water quality monitoring is proposed for the main stem of the Little Missouri River at the confluences of Whitetail and Mikes Creek. See the Water Quality section located in Chapter 3 Part 1 of the SDEIS. Also as noted earlier monitoring of PFC will be used as a proxy for monitoring water quality because there is a direct correlation of riparian vegetation providing a filter for removing nutrients and fecal coliform from overland flow.

Ha-1 *However, two segments of the Little Missouri River upstream of the project area, and two segments of the Little Missouri River downstream of the project area are listed as threatened and/or impaired for fecal coliform bacteria. The probable sources of impairment in the listed segments include livestock grazing or feeding operations, and Total Maximum Daily Loads (TMDLs) are needed for these listed segments (see the assessment summary table below).*

The TMDL development schedule is established by the State and these four segments are listed as 'Low Priority' in Table VI-3; 2008 List of Section 303(d) TMDL Waters for the Missouri Basin in North Dakota, page VI-30 (North Dakota Department of Health, 2008, p. VI-30).

Ha-2 *Due to the lack of assessment data for the area and our perceived need for baseline water quality data, we recommend a two-pronged monitoring approach:*

1. *Mainstem Little Missouri River, core indicator and regular E. coli monitoring; and*
2. *Magpie Creek, E. coli monitoring*

Water quality monitoring is proposed in the main stem of the Little Missouri River above and below the confluences with the intermittent streams supporting large project area watersheds. The proposed monitoring sites in priority order are Whitetail and Mikes Creeks. The watershed area supporting Whitetail Creek, with its main tributary Blacktail Creek, overlaps with a majority of the project area and therefore has been selected as the highest priority. Water quality monitoring for Magpie Creek will be done by monitoring PFCs (see response to comments H-2 and H-11). Additional information is located in the Water Quality section of the SDEIS and in Chapter 2.

Ha-3 *We recommend selecting mainstem [Little Missouri River] monitoring sites where water quality and flow data could be collected upstream and downstream of some of the larger tributaries. In order to assess potential grazing impacts from USFS allotments, spring sampling, when the tributaries may be flowing, may be the best time to collect the samples. If a tributary is flowing when the mainstem samples are being collected, then water quality and flow data should also be collected at the mouth of the tributary. Further, for E. coli, we recommend collecting at least 5 samples during a 30-day period to facilitate comparison with ND's water quality standards.*

The Forest Service agrees with the recommendation; please see the monitoring in the Water Quality section of Chapter 3 Part 1, and Chapter 2 of the SDEIS for further detail.

Ha-4 *Based on information from USFS, it is our understanding that Magpie Creek is a perennial stream. Therefore, E. coli water quality sampling should be conducted through the full recreational season (i.e., May 1 – Sept 30).*

The upper reaches of Magpie Creek are perennial, but the lower reaches are intermittent. See response to comment Ha-2.

Ha-5 *Data needs and a sampling approach should be identified based on ND's Assessment Methodology (AM) with a clear recognition of the critical balance between too much and too little data for making beneficial use determinations as described in the AM. This information appears in Appendix A of North Dakota's 2008 Integrated Report, found at: http://www.ndhealth.gov/WQ/SW/A_Publications.htm . We recommend developing monitoring and data quality objectives in close consultation with Mike Ell, Surface Water Program Manager for the North Dakota Department of Health.*

We will develop monitoring and data quality objectives in close consultation with Mike Ell, Surface Water Program Manager for the North Dakota Department of Health. Data collection personnel will receive training and become certified prior to any water quality sampling from Mike Ell and/or his staff. All established ND water quality sampling and laboratory testing protocols will be followed.

WESTERN WATERSHED PROJECT

I-1 *According to the Scientific Review Team:*
[S]tocking rates will still have to be reduced substantially if any appreciable ecological recovery of these grasslands is to occur. This is largely because we believe the majority of the SNG is substantially overstocked because of insufficient number of pastures to optimize graze/rest rotational schedules, extended grazing seasons, and too many and/or too large of animals. Utilizing tools such as combining allotments, cross fencing, water developments, prescribed burning, etc. will be required to lessen, but not eliminate, the need for stocking rate reductions on the SNG. Likewise, stocking rate reductions alone will not accomplish ecological restoration.

LRMP ROD, p. 5. Thus, Alternative 3 is plainly not in compliance with NFMA.

The above quote is from the 2006 Livestock Grazing Record of Decision for the Dakota Prairie National Grasslands (DPG). The quote is in reference to the Sheyenne National Grasslands. The proposed project is located on the Little Missouri National Grasslands.

The SDEIS evaluates each alternative to determine if it is in compliance with the plan (Chapter 3 Part 1). If the project is consistent with the plan then it is considered consistent with NFMA.

I-2 *In truth, the adjustments need to be in the direction of greater reductions in stocking rates than those presented in Alternative 4, due to faulty assumptions used in setting stocking rates for that alternative -- such as assumptions of normal rainfall during what is clearly a time of increasing draught conditions, the assumptions of good to excellent range conditions that are not supported by the evidence, and unrealistic utilization factors.*

The Forest Service disclosed the limitations of the data used in the carrying capacity analysis, see Chapter 3 Part 1, Range, Carrying Capacity Analysis section of the SDEIS. Assumptions associated with the Representative Value are normal growing conditions and reference plant community. In very general terms, the assumption of "normal" growing conditions could either under or over estimate production dependent upon the given climatic conditions for the year. The assumption of reference plant community could also under or over estimate production depending on the existing plant community for the ecological site. The Forest Service consulted with the USDA Agricultural Research Service to assure the initial estimated carrying capacity analysis was calculated correctly.

The analysis of this data provided a starting point for Authorized Use in Alternative 4. The Design Criteria identified in Table 2.4 Chapter 2 of the SDEIS provides an explanation of how AM/AUM adjustments to annual Authorized Use can occur from the initial Authorized Use value adaptively, if monitoring shows that Grasslands Plan goals and objectives are being met, are moving towards, or not. The monitoring for each allotment is described in the third table for each allotment in Chapter 3 Part 2 of the SDEIS. If drought occurs in any given year then the interim drought management strategy referenced in the Key Issues, Key Issue #6. Drought section of the SDEIS or the DPG drought management strategy (when it is finalized) would be employed which could result in less Authorized Use.

I-3 *The fact that 36.5% of the riparian areas are non-functioning, and another 5.4% are functioning at risk with a downward trend, is frankly obscene. It would appear from this deplorable condition that at least 42% of the pastures require indefinite rest! The same is true of the Green Ash Hardwood Draws, with nearly 50% showing clear signs of intense browse associated with over-grazing.*

The DPG is a unique set of national grasslands in that very little of the lands were public domain when the Grasslands where created. The DPG is mainly composed of lands that were once privately owned. Prior to coming under Federal ownership they were farmed and grazed for decades. The combination of prolonged drought, farming and grazing abuses culminated in the dust bowl era of the 1930s. Restoration of the lands started in the late 1930s when the lands came under Federal ownership. According to Box and Malechek (1987 in Krueger et al 2002), the

rangelands of the great plains have improved in quality from the early part of the 20th century due to programs to "correct maladjustments in land use" such as was authorized under the Bankhead-Jones Farm Tenant Act. The Grasslands Plan was developed to ensure the long-term health of the grasslands (Grasslands Plan 2002 ROD, p 10).

The Grasslands Plan (p. 1-11) stipulates, "For streams identified as "non-functioning" or "functioning at risk with a downward trend," begin corrective action within 3 years of stream inventories. Guideline." Chapter 3 Part 2 of the SDEIS identifies the proposed restoration treatments under Alternatives 3, 3A, and 4 for those reaches that are non-functioning or functioning at risk with a downward trend.

Steam conditions are fully disclosed in the SDEIS, and a restoration strategy is proposed for each. The following table summarizes restoration strategy by affected stream reach.

Table for FAR-D and NF Reaches

Allot/Pasture #	Stream (Reach #)	FAR-D (Miles)	NF (Miles)	Treatment
128-01	Whitetail (6)	1.07		Riparian exclosure
128-01	Whitetail (7)		0.19	Riparian exclosure
129-01	Magpie (5)	0.58		Riparian pasture/exclosure
129-01	Magpie (5)		1.55	Riparian pasture/exclosure
135-08	Mikes (2)		2.79	Riparian exclosures/5 pasture rotation
135-09	Mikes (2)		1.98	Riparian exclosures/5 pasture rotation
135-10	Mikes (1)		1.74	Riparian exclosures/5 pasture rotation
244-02	Whitetail (3)	0.51		Cross fence to develop a riparian pasture
256-02	Blacktail (4)		1.76	Riparian pasture and develop water
256-02	Trib to Blacktail (9)		0.45	Riparian pasture and develop water
256-03	Blacktail (4)		1.83	Riparian exclosure
258-01	Ash Coulee (2)	0.32		Riparian exclosure
258-02	Ash Coulee (2)	0.13		Riparian exclosure
277-02	Scairt Woman (2)		0.55	Monitor NF status to determine cause
282-04	Whitetail (11)		0.67	Manage water tanks
282-06	Magpie (6)		0.47	Riparian exclosure
282-06	Magpie (7)		3.84	Riparian exclosure
286-01	Betsy (1)		0.43	Fence woody draw
287-03	Trib to Blacktail (9)		0.65	Manage water tanks
289-03	Scairt Woman (2)		0.22	Manage water tanks/Deferred rotation
300-01	Magpie (1b)	0.12		Develop new water
301-01	Magpie (2)	0.14		Deferred rotation
	Totals	2.87	19.12	

Rest is a valuable tool for improving woody draw health and is proposed for use under the action alternatives (SDEIS, Chapter 3 Part 2); however, it is not a universal panacea for the woody draws in the project area. Complete removal of livestock grazing would have the undesired effect of assisting the further spread and

dominance of invasive grasses (SDEIS, Chapter 3 Part 1, Woody Draws) that can impede the regeneration of woody species (Lesica 2009).

I-4 *WWP considers the goal of the LRMP to attain PFC on 80% of streams, while tolerating non-functioning hydrologic conditions on 20% of streams, to be a clear violation of NFMA.*

The Grasslands Plan includes a management objective to meet or move toward PFC on at least 80 percent of the perennial streams (Grassland Plan, p 1-2). There is only one perennial stream in the project area, the Little Missouri River, which is functioning properly.

There are several reasons why the Grasslands Plan has made an allowance for streams that are not at PFC. First, the scientific literature is replete with examples of natural, presettlement incision of streams (for a few local examples, see Hamilton, 1967; Gonzalez 1987, 2001a, 2001b; Biek and Gonzalez, 2001). Natural causes of channel incision will continue regardless of land management. Incised channels commonly are not at PFC. Second, it is a misconception to believe that all streams should always function at PFC. Many desirable riparian species are dependent on episodic disturbances. Streams that evolve through episodes of disequilibria provide important opportunities for regeneration of cottonwood trees, for episodic movement of stored alluvium, and other natural phenomena, none of which is inherently bad or. Third, a multiple-use land-management agency must balance competing interests. For example, operation of a stock reservoir may fulfill certain management objectives, but may cause local impacts to stream reaches downstream of stock dams and thereby prevent the downstream reaches from attaining PFC.

The Grasslands Plan strikes a realistic and fully disclosed balance between competing interests within the framework of addressing multiple uses. Fourth, some riparian processes and features are relatively responsive to management actions; whereas others are not. Highly responsive parts of the system could fluctuate from functional at risk to fully functional in a matter of a single year. Others, for example the formation of a properly functioning floodplain within an incised stream system, could take decades to develop, even with the best land-management practices. Some degraded reaches may require years or decades to recover even if the affected riparian reach was completely rested. Finally, the DPG operates within an intermingled patchwork of land ownerships. Actions on neighboring lands can affect conditions on National Forest System lands. The Forest Service can strive to improve conditions NFS lands, but it does not control land-use activities on surrounding private lands.

The objective of attaining PFC on 80 percent of streams is realistic given factors beyond the control of the Forest Service. In summary, it is a misconception to believe that all streams can be and should be at PFC at all places at all times. It is incorrect to interpret the Grasslands Plan as "tolerating" non-functioning conditions on 20 percent of streams. To the contrary, the Grasslands Plan explicitly

states "For streams identified as "non-functional" or "functional at risk with a downward trend," begin corrective action within 3 years of stream inventories. Guideline" (Grasslands Plan p. 1-11). The implementation of restoration plans (see SDEIS Chapter 3 Part 2) shows that the DPG is not tolerant of these conditions.

I-5 *Perhaps it is necessary at this late date to remind the Forest Service that under the Clean Water Act of 1972, ALL waters of the United States were to be in a fishable/swimmable condition by 1979! You are already 30 years late, and it is a violation of federal law to sacrifice any streams to private interests, let alone 20% of streams. Where do you find the authority to sacrifice water quality and aquatic species in this manner?*

All of the streams in the project area, with the exception of the Little Missouri River, are intermittent streams. As such they are neither swimmable or fishable because they lack any discharge for extended periods of the year. There are no water bodies within the project area listed on the Clean Water Act Section 303(d) list for water quality impairment. See also response to comment I-4. The Little Missouri River is a perennial stream flowing through approximately 27 miles of the project area. This section of the river is both swimmable and fishable and it is not listed on the 2008 Section 303(d) list for water quality impairment.

I-6 *What existing conditions clearly demonstrate is that not all of the lands under consideration are suitable for grazing livestock. And it is not enough just to be "moving toward" PFC in areas that are so chronically degraded.*

The Final Environmental Impact Statement for the Dakota Prairie Grasslands Land and Resource Plan (Table B-20) indentifies that 884,730 aces of the Little Missouri National Grassland are capable of supporting livestock grazing and that of that 884,460 acres of the LMNG are suitable for grazing. The proposed project is located on the Medora Ranger District one of two ranger districts comprising the LMNG. Some of the 270 acres located on the LMNG that are not suitable may be present in the project area. However, for all practicable purposes the land in the project area is suitable for livestock grazing.

Chapter 1, Goal 1, Objective 3 of the Grasslands Plan (page 1-2) states that the Forest Service is to "Meet or move towards Proper Functioning Condition (PFC) on at least 80 percent of perennial streams". Alternatives 3, 3A, and 4 propose actions to move non-PFC streams in the project area towards PFC. Chapter 3 Part 2 of the SDEIS describes the rate the allotments may see improvement. Also see response to comment I-4.

I-6a *Riparian function and soil productivity are finite resources, and the longer you tolerate degraded conditions, the closer you come to irreversible wasting of public resources*

The Forest Service agrees that soil productivity is tied to finite resources. We agree that it is not acceptable to tolerate degraded conditions. We agree that to do so could irreversibly waste public resources. It is also important to note that these

conditions did not occur overnight and that overall conditions have been improving in the grasslands (see response to comment I-8). It is quite evident from the DEIS and SDEIS, that the existing condition of riparian areas has been thoroughly reviewed and presented. Alternatives 3, 3A, and 4 of the SDEIS (Chapter 3 Part 2) clearly specify, on an allotment-by-allotment basis, the strategies that will be used to reverse degraded conditions. Strategies are summarized in response to comment I-3. Therefore, it is clear that the Forest Service and the commentor share the same desire to fix degraded conditions and to prevent the irreversible wasting of public resources.

The SDEIS (Chapter 1, Issues Eliminated from Detailed Study, Soil Productivity) indicates that soil productivity has not been compromised.

I-7 *NFMA requires you to provide for diversity of native plant and animal species, not consider them, and not to wait until after you have lost that diversity to consider how to recover it.*

All of the action alternatives, over different timeframes, would improve resource conditions through a variety of initial management actions (Chapter 3 Part 2). These alternatives also provide a back-up plan, including monitoring and additional actions (adaptive management), if improvements don't occur at the desired rate. As affected resources presumably improve under the alternatives the existing diversity of plant and animal communities is assumed to increase. In doing this the project is meeting Grasslands Plan standards and guidelines and in so doing is consistent with NFMA's call for a "…diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives, and within the multiple-use objectives of a land management plan ..." (16 USC 1604 (g)(3)(B)).

I-8 *What has the cost in terms of diminished biological diversity been from allowing the Dakota Prairie Grasslands to be degraded to their present, deplorable state? Which species have been hardest hit?*

The DPG is a unique set of national grasslands in that very little of the lands were public domain when the Grasslands where created. The DPG is mainly composed of lands that were once privately owned. Prior to coming under Federal ownership they were farmed and grazed for decades. The combination of prolonged drought, farming, and grazing abuses culminated in the dust bowl era of the 1930s. Restoration of the lands started in the late 1930s when the lands came under Federal ownership. According to Box and Malechek (1987 in Krueger et al 2002), the rangelands of the great plains have improved in quality from the early part of the 20th century (i.e. the Dust Bowl era) due to programs to "correct maladjustments in land use" such as was authorized under the Bankhead-Jones Farm Tenant Act.

Past actions have altered the frequency, intensity and spatial patterns of the ecological processes of fire and herbivory that helped shape these communities historically. "These relatively recent changes have altered vegetation in this region

and, in turn, have altered the diversity and abundance of many plant and animal species (NGP FEIS, page 3-179)."

Some of the most impacted species include the prairie dog and grassland birds. The Grasslands Plan indicates that habitat for these species will be restored and managed through active and passive management (e.g. prairie dogs) and management of livestock grazing practices for grassland bird habitat. Specific to this project, the use of livestock grazing practices, as proposed in Alternatives 3, 3A, and 4 will be employed to move the structure distribution towards or meeting the objectives of the Grasslands Plan (see Chapter 3 Part 1, Herbaceous Structure). One small (<1 ac) prairie dog town occurs within the project area. The town will not be actively managed, the prairie dogs will be allowed to expand or contract as conditions dictate. See also response to comment I-24

Invasive grass species of Kentucky and Canada bluegrass, smooth brome, and annual brome, are the greatest continuing threat to the maintenance of native biological diversity on the LMNG. Several noxious weed species also contribute adverse affects, but unlike invasive grasses, noxious weed species are actively controlled. The action alternatives (Tables 3.28, 3.29, and 3.30) would positively affect plant composition to different degrees.

I-9 *The Most Threatened Birds of Continental America" as the "grassland" birds, including the following bird species endemic to or closely associated with grasslands.*

Endemics	Secondary (more widespread) Species	Secondary (more widespread) Species
ferruginous hawk	Mississippi kite	eastern meadowlark
mountain plover	Swainson's hawk	western meadowlark
marbled godwit	northern harrier	dickcissel
Franklin's gull	prairie falcon	Savannah sparrow
Wilson's phalarope	greater prairie chicken	grasshopper sparrow
long-billed curlew	lesser prairie chicken	Henslow's sparrow
Sprague's pipit	sharp-tailed grouse	clay-colored sparrow
Cassin's sparrow	upland sandpiper	Vesper sparrow
Baird's sparrow	burrowing owl	lark sparrow
lark bunting	short-eared owl	
chestnut-collared longspur	horned lark	

Of the endemic grassland bird species that you list, most may occur in the project area at times except the mountain plover, Cassin's sparrow, and McCown's longspur. Among the secondary species listed, Mississippi kite, greater prairie chicken, lesser prairie chicken, eastern meadowlark, and Henslow's sparrow do not occur. Dickcissels occur irregularly. The other secondary species may use the

project area. For more information on the avifauna of the LMNG, see: *Svingen and Martin (2004).*

I-9a *Robinson offers the following conservation measures (1) increase the number of prairie restoration sites, (2) maintain a network of grassland reserves, (3) remove encroaching woody vegetation, (4) maintain some areas that are not grazed or burned for at least three years, (5) remove drainage tiles to conserve wetlands, (6) develop grazing practices that provide both tall and short grass, (7) minimize early season mowing, (8) minimize early season mowing of Conservation Reserve Program lands, (9) aggregate Conservation Program lands into large areas, and (10) give special attention to coastal wintering grassland areas. Such recommendations for grassland bird conservation described by Robinson are not uncommon (see Knopf 1996). Please consider these measures in the FEIS, and express the impacts of the proposed alternatives and your decision on diversity in relation to the species mentioned* [in the previous comment]. .

Note: your question asks specifically about increasing the diversity of the grassland bird species you list. None of the alternatives is likely to increase the diversity of the grassland bird species within the project area; i.e. no alternative is expected to facilitate establishment/re-establishment of mountain plover, Cassin's sparrow, McCown's longspur, Mississippi kite, greater prairie chicken, lesser prairie chicken, eastern meadowlark, or Henslow's sparrow. However, this project in the glossary of the SDEIS defines diversity as:

"Diversity refers to the distribution and abundance of different plant and animal communities and species within the area covered by land and resource management plans. This term is derived from the National Forest Management Act (NFMA). This term is not synonymous with biological diversity."

This definition includes consideration of both distribution and abundance. Therefore our response will consider these factors as well.

Several of the recommendations you cite, while they may have merit, are not relevant to this project. For example, this project does not pertain to previously drained wetlands (see above, #5), nor does this project propose management of Conservation Reserve Program lands (see above, #8 and #9) or coastal grassland areas (see above, #10). The cited recommendations' that are relevant to this project include #1, #2, #3, #4, #6, and #7.

Recommendation #1, restoration of prairie sites is a part of Alternatives 3, 3A, and 4. On a small scale, some actions such as interseeding could directly help restore some sites by increasing the native species while decreasing the nonnative vegetative species. On a larger scale, other management tools propose reducing livestock use, which could have a number of positive impacts; restoring fire to the landscape could help restore a disturbance factor missing from the development found in true mixed-grass prairie; and utilizing grazing systems to alter the species composition to

enhance native plant species, to name a few. Some of these tools may require long time frames to achieve objectives.

Recommendation #2, maintaining a network of grassland reserves, would be accomplished by all proposed alternatives. The Little Missouri National Grassland is a Grassland Reserve (i.e. it is protected from agricultural conversion to cropland uses, urban development, etc.). This protection is, and will be, a benefit to all of the locally occurring grassland bird species that you have listed above. Several authors have pointed out the importance of the National Grasslands to grassland conservation, and the Little Missouri National Grassland in particular. For example, note that the Little Missouri National Grassland is designated as a "globally important bird area" by the American Bird Conservancy.

Regarding recommendation #3, removing encroaching woody vegetation, no such management is proposed under Alternatives 1 and 2. Alternatives 3, 3A, and 4, however, do include such provisions. Specifically, these alternatives include adaptive management measures such as prescribed burning and mechanical brush treatment (see SDEIS, Chapter 3 Part 2). If successful, the reduction in brush, shrub, and tree invasion would benefit grassland birds that are particularly sensitive to woody establishment (e.g. Sprague's pipit, Baird's sparrow and upland sandpiper). Conversely, reduction in woody vegetation may lower habitat quality of species such as sharp-tailed grouse and savannah and clay-colored sparrows. Reduction in tree coverage may also reduce nest and perch sites for species such as ferruginous and Swainson's hawks.

Recommendation #4, "maintain some areas that are not grazed or burned for at least three years," would occur, in part, under Alternatives 3, 3A, and 4. Those alternatives include adaptive management measures such as creation of exclosures, implementation of rest-rotation grazing, and multiple-year rest (see SDEIS, Chapter 3 Part 2). These potential actions would add to those sites within the project area that are already excluded from grazing and burning for at least three years. Such areas are currently limited to a few small exclosures, typically riparian sites. Alternative 1 would exclude livestock grazing entirely from the project area. The creation of long-term grazing and burning exclusion areas would be expected to increase vegetative litter accumulation; brush, shrub, and tree encroachment; and increase the dominance of invasive species such as smooth brome grass and Kentucky bluegrass. Of the bird species of interest that occur within the project area, none would be expected to benefit from such management long-term (i.e. for >10 years). In the shorter-term (1-10 years), species such as Northern harrier and short-eared owl would likely increase in distribution and abundance, as these birds use areas with thicker grasses and abundant vole populations. Other birds, such as Baird's sparrow and Sprague's pipit, would benefit until litter accumulation exceeded tolerable levels. Conversely, species such as ferruginous hawk, long-billed curlew, chestnut-collared longspur, burrowing owl, and horned lark would likely see reductions in both distribution and abundance very soon after such a policy was adopted.

Recommendation #6, develop grazing practices that provide both tall and short grass, would occur under all alternatives, though the relative mix of tall vs. short grass would vary considerably. As already explained, Alternative 1 would increase availability of tall grass due to the exclusion of livestock grazing. Species such as Sprague's pipit, Baird's sparrow, northern harrier, sharp-tailed grouse, and short-eared owl would benefit, at least initially. Availability of short grass, however, would be expected to decline. The effect on the locally-occurring grassland bird preferring short grass, such as ferruginous hawk, long-billed curlew, chestnut-collared longspur, burrowing owl, and horned lark would be adverse. Alternatives 3, 3A, and 4 both propose managing, utilizing various management tools, for the mix of tall vs. short grasses called for in the Grasslands Plan, though the time to reach Grasslands Plan objectives could vary considerably.

Recommendation #7, minimize early season mowing, would be implemented under all proposed alternatives. In fact, no mowing would occur under Alternative 1. Some mowing might occur under Alternatives 2, 3, 3A, and 4. See, for example, EIS Table S.2: "Hay or cut-&-leave crested wheatgrass areas". The Grasslands Plan, however, to which this project tiers, states (p. 1-13): "Delay mowing of grassland until July 15 or later to protect ground-nesting birds, including their nests and young broods. Project-level analysis will determine the earliest mowing date. Guideline". All ground nesting birds would benefit from this Grasslands Plan guideline. Many of the other species on your list would be little affected, due to the timing or location of their nests. Burrowing owls, for example, build their nests in underground burrows, whereas Swainson's hawks build their nests in trees. Neither site is particularly vulnerable to haying activities.

I-10 *It is not enough to simply point out that local communities depend on cows for their livelihood. Privately owned prairie grasslands were converted to agricultural uses long ago, to the detriment of native species like prairie dogs and the black-footed ferrets that depend on same. We did not create reserves of public lands so that they could be similarly converted to private uses -- we created them so that we would not lose species like the black-footed ferret, or the sharp-tailed grouse for that matter. If local economies are going to be adversely impacted due to managing public wildlands for public wildlife, then the blame is not on public lands managers. Nor is this justification for adopting a federal lands management policy that can be characterized as an official sanction of the tragedy of the commons.*

Under the Multiple Use Sustained Yield Act of 1960 the Forest Service is to manage the federal lands under its care for a multitude of different uses. The Grasslands Plan was developed to ensure the long-term health of the grasslands; help native plants and animals to recover and thrive; and contribute to economic diversity of local communities in a sustainable way (Grassland 2002 ROD, p 10-11). This project was developed to move the areas towards the goals and objectives in the Grasslands Plan. The analysis evaluates the environmental consequences of the proposed action and alternatives. Alternative 4 was developed to further reduce adverse effects on

structure. The Economics section located in Chapter 3 Part 1 of the SDEIS provides a discussion of the economic effects of the different alternatives.

I-11 *The drought strategies discussed in the DEIS are inadequate and not clearly presented.*

Additional information has been included in the SDEIS (see Chapter 1, Key Issues, Key Issue #6. Drought) in response to this comment.

I-12 *The Forest Service recently announced that it would begin managing public lands under its jurisdiction to maximize carbon sequestration and watershed restoration. Please discuss this recent public policy initiative in the FEIS, and provide a thorough analysis of the carbon sequestration potential represented by these grasslands in an un-grazed versus a grazed condition, and while you are at it you can factor in the reduced greenhouse gases that would result if local ranchers were actually forced to reduce their herds to levels that their own private ranchlands can support.*

The Forest Service is unsure as to what announcement or policy the commentor is referring to in regards to maximizing carbon sequestration. The commentor was contacted via e-mail requesting the specific reference for this comment but no responsewas received. While carbon management is important to the Forest Service the Chief of the Forest Service Tom Tidwell in November of 2009 told the Energy and Natural Resources Public Lands and Forests Subcommittee that "Carbon will not likely be the primarily objective of the Forest Service".

The SDEIS (Chapter 3 Part 1, Climate Change) provides discussion of carbon storage in an ungrazed situation. This section also provides some discussion on the relationship of healthy grasslands and carbon storage in properly stocked and managed grasslands.

The Forest Service agrees that livestock operations on private lands do contribute green house gases, however, determining and enforcing livestock carrying capacities on private lands is beyond the authority of the Forest Service.

I-13 *Certainly, anything short of dramatically reduced stocking rates on these particular allotments would be completely unacceptable. Balancing multiple uses does not authorize the Forest Service to sacrifice public uses to private ones. WWP believes that a modified Alternative 1 should be the chosen alternative in this case, revoking permits for those allotments where chronic degradation has resulted in non-functioning streams and potentially irreversible losses of biological diversity***.**

The Forest Service agrees that it has no authority to sacrifice public uses for private ones, however, as noted in response to comment I-10 it does, however, have a responsibility to provide for multiple use of the resources some of which are used by private entities such as mineral, timber, and grazing companies. The Grasslands Plan 2006 Livestock Grazing ROD, page 9, authorized grazing on the DPG, Chapter 3 of the SDEIS reveals the effects of different grazing alternatives for the proposed

project. The IDT evaluated existing and identified where resource conditions were not at the desired condition in the Grasslands Plan. Based on this the team developed corrective actions, as described in Alternatives 3 and 3A. The team developed Alternative 4 to provide an additional approach to improving grassland conditions while allowing grazing to continue.

As noted in response to comment I-8, the rangelands of the great plains have improved in quality from the early part of the 20th century due to programs to "correct maladjustments in land use" such as was authorized under the Bankhead-Jones Farm Tenant Act. All of the streams identified as non-functioning or functioning at risk were only for segments of the stream. The areas non-functioning or functioning are based on local conditions and circumstances. As noted in the SDEIS Riparian section livestock exclosures along Ash Coulee illustrates that desired conditions can be met and that removal of livestock grazing from the entire allotment is not required to improve conditions.

I-14 *WWP maintains that the DEIS does not represent a hard look at these environmental concerns, and is inadequate to comply with NEPA's full disclosure requirements. Please address these inadequacies in the final EIS. WWP is especially concerned over the precedent this decision represents in relation to other grassland units of the Dakota Prairie Lands. Among the issues that are not thoroughly analyzed in the draft EIS include impacts to wildlife diversity and habitat, especially as measured by visual obstruction readings, woody draw health, riparian conditions relative to referent conditions (PFC methodology), and the cumulative, often irreversible impacts of grazing on the diversity of native plant composition, especially with regard to undesirable invasive grasses, carbon sequestration impacts and potential (cumulatively across the Dakota Prairie Grasslands), and the actual costs associated with particular alternatives – not just the potential economic impacts on local private interests.*

The agency is unsure how this project represents a precedent in relation to other grassland units. This project analyzed the conditions on these specific allotments, and developed alternatives to reduce adverse effects as required by NEPA. Any future actions will also go through the NEPA process addressing the conditions and concerns specific to that area.

The DEIS and SDEIS fully disclose the effects of the action on the resources in the project area. The SDEIS has been reformatted to more clearly show the effects analysis at the project area level (Chapter 3 Part 1) and at the allotment level (Chapter 3 Part 2). Chapter 3 of the SDEIS contains the detailed analysis of these issues:

***Wildlife diversity and habitat especially as measured by visual obstruction readings*: The SDEIS, the Grasslands Plan, and the NGP FEIS recognize the role of habitat on wildlife diversity and habitat diversity, including how it may relate to sensitive species (see SDEIS, Chapter 2, Sensitive Species, Management Indicator Species, Raptors; and Chapter 3 Part 1, Herbaceous Structure) and sharp-tailed grouse**

(SDEIS, Chapter 3 Part 1, Sharp-tailed Grouse). Habitat diversity can be linked to species diversity through the visual obstruction readings (ibid.). This link is also recognized in the NGP FEIS on pages 3-72, 3-190, 3-240, and 3-480 to 3-493, in Appendix H of the NGP FEIS, and in the Grasslands Plan in the objectives and desired conditions to achieve those factors conducive to diversity (e.g. pp. 1-13 through 1-17, 1-19 to 1-20, 2-11 to 2-15, 2-18 to 2-23, etc). The relationship between habitat diversity and species diversity is analyzed in the NGP FEIS (see above references). Also see response to comment I-24.

***Woody draw health* is described in detail by allotment in the Woody Draw section of the DEIS and in Chapter 3 Part 2 of the SDEIS.**

***Riparian conditions relative to referent conditions (PFC methodology):* riparian condition, PFC ratings are described in detail by allotment in Chapter 3 Part 2 of the SDEIS.**

***Irreversible impacts of grazing on the diversity of native plant composition:* - As note in the response to comment I-8 grassland conditions are improving; therefore they are not irreversible. The DEIS and SDEIS evaluates the effects of the alternatives to further move the allotments towards the desired conditions both at the allotment scale and for the area as a whole.**

***Carbon sequestration* – is addressed in the DEIS on pages 3-179 and 180 and in the SDEIS in the Issues Eliminated from Detailed Study, Climate Change section.**

***Economics* - The marginal costs to the agency associated with improvements in each alternative are included in the SDEIS, Chapter 3 Part 1, Economics. Since there are other grazing allotments in the District's grazing program, administrative costs are not expected to change substantially through implementation of any of the alternatives.**

I-15 *Regarding invasive grasses, it is not enough for purposes of satisfying NEPA and NFMA to simply state that "[t]here is a need to look at ways to reduce/manage invasive grasses." The Forest Service needs to take a hard look at alternative ways to protect plant diversity from non-desired invasive species, and incorporate that analysis into this decision-making process. Obviously, the most effective means for stemming the flow of invasive species is to eliminate the vectors, which in this case is almost assuredly cattle grazing.*

As identified in the SDEIS there is a concern that a combination of the expansion of invasive grass species and current grazing strategies is adversely affecting the desired mosaic of seral stages and maintenance of native plant communities (SDEIS Chapter 2). The Forest Service took a hard look at invasive grasses at the broad scale (landscape) as well as in each allotment. Alternatives 3, 3A, and 4 propose an array of different initial actions to address invasive species. The grazing management tool box also contains numerous management tools that can be used to

address invasive species. See the Seral Stage section of Chapter 3 Part 1 of the SDEIS for a discussion on initial actions and their effects on invasive species. Chapter 3 Part 2 of the SDEIS provides an allotment by allotment discussion of the effects of the alternatives.

I-16 *The Dakota Prairie Grasslands LRMP calls for 5% rest on the landscape. According to the ROD, "[p]lan direction will be specifically implemented on individual grazing allotments through the development of AMPs…" (p. 9). The proposed decision is not in conformance with this approach, instead relegating rest options to the "adaptive management" toolbox. Furthermore, WWP believes that it is inappropriate to assume you are meeting the 5% standard based on levels of deferred rotation.*

The Grasslands Plan (Glossary, p. 45) defines rest as "To leave an area of rangeland ungrazed by livestock or unharvested by mechanical methods for at least one year (12 consecutive months)." Pastures, depending upon how many, their size, and length of season of use, managed under a two or more pasture rotation do receive rest. For example, in a two-pasture deferred rotation in an 8 month season, one pasture would be grazed May through August of the first year. In the second year, that same pasture would be grazed September through December. Therefore, after the grazing period in the first year, the first pasture would have 12 consecutive months of rest (September through August of the following year). Twice over rotations do not have the built-in individual pasture rest and need to be monitored to assure rest is being achieved through other means described below. The Grasslands Plan rest objective can be met in several different ways. The topography of the badlands of the North Billings project does not lend itself to uniform grazing. Lack of water also results in nonuse or "rest". The implementation of the adaptive management toolbox will add to the amount of lands being rested from livestock grazing. An analysis of pasture rotations by alternative showed Alternative 1 would provide 100 percent rest across the landscape with the project area every year after year two of implementation. Alternative 2 would provide at least five percent rest across the landscape within the project area. Alternatives 3, 3A, and 4 would provide at least eight percent rest across the landscape within the project area (see Project Record, Supporting Documentation, Range).

I-17 *Since the 2006 Grazing ROD states that all objectives will be met at the allotment level, it is inappropriate to evaluate or monitor compliance with objectives at the landscape level. Instead, they must be included as enforceable, mandatory terms and conditions in the allotment permits themselves.*

The Forest Service believes the commentor is referring to the part of the 2006 ROD where it states "[p]lan direction will be specifically implemented on individual grazing allotments through the development of AMPs through the Demonstration Project. Monitoring and evaluation of allotments will determine if the Grasslands Plan desired conditions are being met."

Objectives are concise, time-specific statements of measurable planned steps taken to accomplish a goal (Grasslands Plan p. 1-1). While in essence it is true that objectives will be considered at an allotment level, some objectives in the Grasslands Plan are intended to be measured at a landscape scale. For example composition and structure objectives were established for the geographic area scale (see Grasslands Plan pages 2-11 through 2-13 for example). So different scales of monitoring may be very appropriate even for allotment management plans. Differences in allotment size, specific habitat needs in the area, biological capability and other factors may determine which objectives should be measured in any given allotment.

The Forest Service has also agreed via the Demonstration Project that AMPs will be developed at the landscape or multiple allotment level (2006 ROD p. 16).
The Medora Grazing Association Grazing Agreement (as of October 20, 2009) is the document that allows the association to permit allotments within the project area. Allotment Management Plans are the tools that provide specific direction for each individual allotment on how to address Grasslands Plan goals and objectives, and are incorporated as a provision of the grazing agreement/permit.

I-18 *As proposed, the Adaptive Management toolbox is not sufficient to assure compliance with all relevant standards and guidelines. An adaptive management approach must allow for modification of terms and conditions as better information became available through scientific research and operational experience. According to adaptive management experts, this approach enables managers to operate in the face of uncertainty and to learn by doing, thereby leading to improved understanding and more-effective management over time.[1] In principle, learning in an adaptive management setting involves systematically testing—either operationally, scientifically, or both—different management alternatives to gain knowledge. The alternatives are developed on the basis of the best information available at the time, and, as management proceeds, techniques that do not work are modified or replaced by others.*

The SDEIS includes a section under each resource regarding applicable standards and guidelines and whether or not they will be met by alternative (SDEIS, Chapter 3 Part 1).

The Forest Service agrees in principle that adaptive management should allow for modification of management practices as better information becomes available. The grazing management tool box provides a host of different management tools that may be used to modify management actions if monitoring shows current actions for an allotment are not meeting desired results. The grazing management toolbox is not all inclusive and the possibility of adding new tools is recognized in the SDEIS (Chapter 2, Alternatives Considered in Detail, Alternative 3).

I-19 *Adaptive management shares a number of key features with best management practices—such as those articulated in the Government Performance and Results Act of 1993 and the Comptroller General's 2004 forum on high-performing organizations[2]—including*

identifying clearly defined, measurable, and results-oriented management objectives; designing and implementing a monitoring plan; making decisions based on management objectives; effectively managing partnerships while maintaining accountability to Congress and the public; and actively involving key stakeholders over time to engender public support. The monitoring you propose is not adequate to serve the purposes of adaptive management. Please conform you toolbox to these widely accepted principles.

The Grasslands Plan, Chapter 1, defines management objectives for the Dakota Prairie National Grasslands while Chapters 2 and 3 provided desired conditions for Geographic Areas and Management Areas. The Grasslands Plan Direction Specific to Project Area section in Chapter 1 of the SDEIS provides a summary of Grasslands Plan direction in relation to range resource management. Chapter 3 Part 1 of the SDEIS identifies the desired condition for different resources of concern in the project area. Chapter 2 of the SDEIS under the Monitoring section identifies the monitoring plan that will be used to monitor results of management activities implemented on the different allotments. Also included are trigger points which, if reached, result in review and potential additional management adjustments. The SDEIS, Chapter 3 Part 2 describes by allotment the type and frequency of monitoring in relation to the resource issue(s) for each allotment.

The Adaptive Management section in Chapter 1 of the SDEIS describes this project's approach to adaptive management and the role monitoring plays in adjusting management action if initial management actions are not meeting or moving towards desired resource conditions. The grazing management toolbox (SDEIS, Table 2.1) identifies available tools for this project plus the option of additional new techniques if such become available in the future. Monitoring results for this site-specific project will be considered in the wider Grasslands Plan monitoring (see Grasslands Plan, Chapter 4). If monitoring shows a need to expand the management options for this project beyond the tool box, then another assessment and/or decision may be to be initiated with the accompanying public involvement. The Forest Service believes that the approach to adaptive management presented in the SDEIS is creditable.

I-20 *Concerning sharp-tailed grouse, the MIS for this area, please discuss the cumulative impacts of grazing on sharp-tailed grouse population trends, utilizing the best scientific information available, and discuss the viability of sharp-tailed grouse in the project area specifically, and throughout the Dakota Prairie Grasslands are generally.*

The direct and indirect effects of the various alternatives on sharp-tailed grouse and their habitat may be found in the SDEIS, Chapter 3 Part 1, Sharp-tailed Grouse section. The SDEIS evaluates the cumulative effects of past, present and reasonably foreseeable actions on sharp-tailed grouse.

The viability of the sharp-tailed grouse is addressed through the Grasslands Plan. The Grasslands Plan identifies an objective of "Within 15 years, for threatened, endangered, sensitive, and MIS, demonstrate positive trends in population viability, habitat availability, habitat quality, and population distribution within the planning

area". The Grasslands Plan contains no obligation to conduct monitoring or surveying within a proposed project area although project data can be used to support Grasslands monitoring for threatened, endangered, sensitive, and MIS species. The Grasslands is implementing its Grasslands Plan Monitoring Strategy which is documented in annual reports incorporated here by reference. The SDEIS (Chapters 2 and 3) identifies that the action alternatives, under different timeframes, will improve different resources and in so doing help move the LMNG towards the above Grasslands Plan objective.

I-21 *While Alternative 1 clearly is the most beneficial alternative for sharp-tailed grouse, at least under some version of Alternative 4 the Forest Service could maintain that it is managing the area for the benefit of its management indicator species, as required by law.*

Thank you for the comment. The effects analysis of each alternative on sharp-tailed grouse is found in the SDEIS, Chapter 3 Part 1, Sharp-tailed Grouse section. Discussion about herbaceous structure (i.e. habitat) is found in the SDEIS, Chapter 3 Part 1, Herbaceous Structure section. Also see response to comment I-20.

I-22 *Why is there not a biological evaluation for the sharp-tailed grouse included as an appendix to the DEIS?*

Forest Service Manual (FSM) 2670.5 states that a "biological evaluation" be accomplished for ground disturbing activities for federally threatened, endangered, and Forest Service sensitive species – management indicator species are not discussed.

Sharp-tailed grouse is a management indicator species (MIS). FSM 2620.3, identifies that the purpose of MIS is "… to address issues, concerns and opportunities for plants, wildlife, fish, and sensitive species habitats through all planning levels." Consistent with this direction, the sharp-tailed grouse is addressed separately in the DEIS (page 3-152) and the SDEIS, Chapter 3 Part 1, Sharp-tailed Grouse section.

I-23 *Also, please include in the FEIS a discussion of the other grassland obligates for which the sharp-tailed grouse is an indicator species, and indicate whether the Forest Service has any information that would indicate such species are no longer viable.*

The plains sharp-tailed grouse is the management indicator species for the biological community associated with grasslands containing scattered shrubs and diverse vegetative structure (Grasslands Plan, Appendix H-2). The NGP FEIS, p 3-261 identified other species that utilize similar habitat for at least part of the year. These include but are not limited to American bittern, dickcisssel, LeConte's sparrow, Sprague's pipit, northern harrier, short-eared owl, mallard (nesting habitat), gadwall (nesting habitat), shoveler (nesting habitat), greater prairie chicken, prairie vole, Dakota skipper, Powesheik, skipper, Ottoe skipper, and regal fritillary butterfly.

Regulations for the establishment of MIS (36 CFR 219.19 and 219.20) do not imply that the population dynamics of MIS directly represent the dynamics of other species. However, in an effort to help assess the relationship between sharp-tailed grouse (MIS) and grassland obligates on the DPG, the Rocky Mountain Bird Observatory (RMBO) has monitored grassland birds across the DPG since 2004. RMBO has employed the point transect survey methodology within the Grasslands Plan long-term sharp-tailed grouse monitoring blocks identified for each unit of the DPG (Sparks and Hanni 2008). The 2008 report from this RMBO monitoring effort (Sparks and Hanni 2008) finds that certain local grassland birds need attention. These include the Baird's sparrow, Sprague's pipit, lark bunting, and the grasshopper sparrow. The attention is warranted to "reverse significant, long-term population declines or sustain vulnerable populations." However, viability is not assessed in Sparks and Hanni (2008). As noted above, the Sprague's pipit and Baird's sparrow was identified as a species that uses similar habitat that may overlap with sharp-tailed grouse habitat.

Further, the Grasslands Plan identifies an objective of "Within 15 years, for threatened, endangered, sensitive, and MIS, demonstrate positive trends in population viability, habitat availability, habitat quality, and population distribution within the planning area (p. 1-3 Grasslands Plan)." The Grasslands Plan contains no obligation to conduct monitoring or surveying within a proposed project area, although project data can be used to support Grasslands monitoring for threatened, endangered, sensitive, and MIS species. The Grasslands is implementing its Grasslands Plan Monitoring Strategy which is documented in annual reports incorporated here by reference. The SDEIS (Chapters 2 and 3) identifies that the action alternatives will improve different resources, and in so doing help move the LMNG towards the above Grasslands Plan objective.

The RMBO report found lark bunting and the grasshopper sparrow in the Bell Lake grouse monitoring block on the extreme western portion of the project area. Baird's sparrow and Sprague's pipit were not detected in this block. The North Billings block has not yet been sampled. However, the Forest Service wildlife biologist has observed Sprague's pipit within the project area in the spring while conducting sharp-tailed grouse lek surveys.

I-24 *In other words, are all native grassland species still viable in the project area, and if not, why not?*

It is the policy of the Forest Service (FSM 2670.32) to avoid or minimize impacts to plant and animal species whose viability has been identified as a concern. Consistent with Forest Service direction, the Northern Region developed a list of sensitive species for each of the units in the region. Sensitive species are defined in FSM 2670.5. Biological assessments/evaluations were completed for the proposed alternatives of this project (see Project Record, Specialist Reports and Notes, Wildlife and Botany Reports) and are summarized in the SDEIS, Chapter 2, Sensitive Species, Management Indicator Species and Raptors.

Species were typically evaluated on the basis of habitat since few specific surveys have been conducted in the project area. The analysis determined that viability of

no species is threatened within its range with the implementation of this project. Alternatives 3, 3A, and 4 would be beneficial for some of the grassland obligates, over time, especially with actions that would ensure a diversification of grassland habitats.

In addition to the Forest Service sensitive species list, to ensure a full suite of known native species where there may be conservation concerns we also referenced the "North Dakota Comprehensive Wildlife Conservation Strategy (Hagen et al 2004)." From this list and of those species potentially located in the project area, it is projected that the project area will be moving towards or meeting Grasslands Plan objectives, that none of the species range-wide viability would be adversely impacted under the action alternatives (Project Record, Specialist Reports and Notes, Wildlife Report, Appendix D; North Dakota Comprehensive Wildlife Conservation Strategy, 2005).

Some native grassland species have been lost in the planning area since settlement and are no longer present on the LMNG at this time. These include the grizzly bear, the wolf, the black-footed ferret, and bison (USDA 2000). The list may include the mountain plover as it was noted by T. Roosevelt during his stay in ND in 1885 (NGP FEIS Appendix H), but is currently not known to occur in ND. The bear, wolf, and bison species were lost early in the 20th century due to hunting pressure and predator control. The black-footed ferret and mountain plover were lost to the area due to the substantial reduction of black-tailed prairie dog habitat.

I-24a *You note that bison are a native species, and indicate that cows have taken their place, but the impacts of bison on soils, plant species, and riparian habitats are far more suited to healthy ecosystems than cows. In fact, it is not really feasible to provide for diversity of native plant and animal species in the absence of a keystone species like the bison.*

The Forest Service acknowledges that domestic cattle can and have impacted the ecosystem differently from bison NGP FEIS (3-234). Archer and Smiens (1991) conclude that "while grazing has been an important selection pressure in many ecosystems, man has substantially changed its frequency, intensity, extent, and magnitude with the introduction of livestock." See also Towne et al (2005). However, it is incorrect to state that a diversity of native plant and animal species cannot be provided for without bison. Fuhlendorf and Engle (2001) assert that cattle and fire can be used together in an ecosystem approach to restore heterogeneity to tall-grass and mixed grass ecosystems. The NGP FEIS (p 2-14) determined that "Cattle grazing can adequately achieve the desired future vegetation conditions." Stueter and Hidinger (1999) conclude "that conserving the soil, water, and biological resources of the mixed-grass prairie will be accomplished with sound grazing management, rather than determined solely by the choice between bison and cattle. Whether managing mixed prairie with bison or cattle, the stocking rate and grazing management will determine the long-term health of both the prairie and grazing animal." Through the use of various management tools, monitoring of resource conditions, and adaptive management decisions, improvement of habitat conditions for native and desired non-native species will be achieved over time.

I-25 *Historic records suggest bison were not evenly distributed across the prairie and left large areas ungrazed for one to several years. Bison historically moved nomadically in response to vegetation changes associated with rainfall and fire. The time lag for return movements provided deferment during the regrowth period for which according to both historic and archeological records may have ranged from 1 to 8 years (Malainey and Sherriff 1996 and others). This interval would have provided a natural "rest" interval and is consistent with spatial heterogeneity models that suggest stability in plant-herbivore interactions (Coughenour 1991). Today vegetation structure on public grasslands has been "homogenized," with little "short" or "tall" structure exiting. The dynamics of herbivory differ between that of wide ranging bison herds and present day domestic livestock grazing systems (Hartnett et al. 1997). For a particular area, herbivory by wide ranging bison herds was one of high intensity and short duration followed by a 2 to 3 year period of rest (Higgins 1986). In contrast, grazing by domestic livestock is characterized by high intensity over long duration followed by short lengths of rest, depending on the grazing system and management scenario. Grazing in terms of spatial extent has exhibited little change in extent with substantial portions of the current landscape (about 95%) grazed by domestic cattle.*

*WWP would like to see a native ecosystem (or "ecosystem management") alternative added to the FEIS that would allow the public to see how differently the project and planning area would function and appear if it were managed for native species instead of private livestock***.**

The SDEIS (Chapter 2, Alternatives Considered but Dropped from Detailed Analysis) considered an "Ecosystem Management" alternative but eliminated it from detailed study. It was eliminated for several reasons. First, the state would need to fully support and participate in such an alternative, and second, a similar response from the mixed-grass prairie can be gained by domestic livestock.
An alternative to allow for free-roaming bison was also considered, but eliminated from detailed study in the Northern Great Plains EIS (see 2003 WO appeal decision, starting at page 19). Since this EIS tiers to the Grasslands Plan FEIS there is no need to reconsider this alternative for this project (40 CFR 1508.28)

I-26 *The Forest Service should consider re-introduction of bison, at least on a demonstration project basis, for those allotments that would be eliminated under a modified Alternative 1 due to chronic adverse environmental impacts from over-grazing by cattle.*

See response to comment I-25

As noted before conserving the soil, water, and biological resources of the mixed-grass prairie can be accomplished with sound grazing management, rather than determined solely by the choice between bison and cattle; therefore this alternative was not considered in detail. The SDEIS identifies specific resource concerns and alternative ways to address those concerns through grazing management (SDEIS, Chapter 3 Part 2).

I-27 *Finally, the DEIS does not adequately disclose the costs associated with the proposed increases in infrastructure in Alternative 3. Please provide full disclosure on this, as well as the costs associated with increased resource damage associated with the excessive stocking rates that would result from this alternative.*

The Environmental Consequences – Economics, Direct and Indirect Effects section in Chapter 3 Part 1 of the SDEIS reveals the total costs of proposed infrastructure by alternative as well as other information. Documents in the project record contain costs by allotment by alternative.

The costs associated with the proposed increase in infrastructure for Alternative 3 is estimated at $47,917/year and are included on pages 3-253 and 3-254 of the DEIS. These costs are also included as expenditures in the agricultural support industry for the analysis of impacts to local jobs and labor income. Given that Alternative 3 would continue existing stocking levels with application of tools to improve range conditions there is no reason to expect costs from increased resource damage.

IKE HECKER

J-1 *Another key issue of the woody draws lack of regeneration is the droughts we have had in the past years – We may get some rains but as soon as a lot of the young saplings just get started to grow we get dry weather and the saplings do not have a chance of continuing to grow. With the management of the grazing in the pastures now we do not harvest the forages off as much as we did 40 years ago, so the draws are more septable to new growth trees.*

It is normal for the vast majority of woody seedlings to perish during their first year of growth due to competition with other plants for limited moisture resources. However, woody draw communities have persisted under climate extremes of drought and late spring freezes for thousands of years and only a small fraction of one percent of germinated seedlings are required to survive and advance to later growth stages for maintenance of the woody community. Drought occurs at an annual frequency of 17 percent (Koch 2003) to 27 percent (Smart and Sedivec, no date) in the northern Great Plains and green ash saplings may require ten or more years before attaining sufficient root growth and leaf area to become well established. Therefore, the majority of all saplings experience periods of drought during their initial years of establishment. The occurrence of relatively high sapling numbers in sample sites rated as Healthy attests to their ability to tolerate these conditions, as does high sapling numbers reported by other researchers from high condition or minimally disturbed sites (Project Record, Specialist Reports and Notes, Botany Report).

Lower levels of current grazing compared to past or historic levels identified by the commenter are not disputed. Comparison of aerial photographs suggests current plant cover in the uplands is greater than it was in 1939 at the end of a severe drought period. However, a disproportionate amount of time that livestock spend in

woody draws compared to the total pasture acreage is a factor contributing to the low rate of successful woody species recruitment in many sites. A lack of recent tree and shrub recruitment and structural complexity was attributed to high levels of livestock disturbance as evidenced by direct observations of livestock in the draw, or heavily used trails, mechanical damage, and high amounts of manure. Further evidence of livestock as the principal cause of low woody species recruitment was observed in sites with a range of topographic characteristics that influenced livestock accessibility. For instance, steep slopes above the drainage bottom, or steeply downcut drainages with minimal evidence of livestock trailing and browsing often contained an increased number of seedlings, saplings, and young trees. Increased trail networks and mechanical damage along more level areas of the drainage contained fewer or no young trees and saplings despite greater soil depths and moisture inputs from the surrounding slopes that should contribute to a greater density of regeneration.

J-2 *We can not afford to take a cut in numbers of cattle- We bought these ranches on a Preference number what we believe we can run – and by figuring in so much per animal as far as costs and income weather we can make a living with the numbers as we are to run.*

The Forest Service recognizes that some ranchers have built their operations on a combination of their own private forage and federal forage; however, grazing permits convey no right, title, or interest held by the United States in any lands or resources (CFR 36 Parts 200-299 Parks, Forests, and Public Property, 223.3 (b)). The Forest Service does recognize the contribution that grazing permits make to ranch operations and the local economy. The Forest Service also recognizes that some resources are not meeting the desired condition described in the Grasslands Plan. The Responsible Official has considered the potential effects on the 12-county economic impact area and the actions needed to move the resources toward the desired condition.

J-3 *Alternative 4 – Allotments 128 page 3-37 The 35 acre proposed enclosure to keep cattle out to try and help the head wall cutting will not work to solve the problem. The badlands are very fragile and it is a natural occurring process threw the year as freezing – rain thawing and gully washers to the frozen chunks of ice coming down the creek at a force that would cost a substantial amount of finances to slow the water down and prevent head wall cutting.*

The initial action of installing a riparian exclosure will not address the headwalling occurring in allotment 128 on Whitetail Creek. I don't believe that livestock grazing is a causal factor for this occurrence. Yet if this exclosure is implemented I'll lose approximately 22 AUMs every year. Finally I don't feel its economically feasible to implement this tool especially if it's not going to address the issue.

The establishment of exclosures in other nearby streams (e.g., Ash Coulee) has shown that channel morphology and riparian vegetation respond quickly and

desirably when livestock are excluded from riparian areas. The control of all riparian disturbances possible and the installation of structures to control stream power are specifically intended to halt, retard, and possible reverse channel cutting and headwall erosion.

The commentor may be correct in suggesting that the causal factor for channel incision is not related to livestock grazing. However, livestock grazing practices need to be managed to address resource concerns. While we may not know the cause of incision, the long-term, ongoing erosion, caused by headwall migration, is another matter. Livestock access and use of the riparian zone has exacerbated resource conditions and contributed to resource damage.

The Grasslands Plan (p. 1-11) provides specific direction to devise strategies to address resource concerns on riparian reaches that are rated FAR-D or NF. A small exclosure fence is a far more economically feasible tool than the other obvious alternative--removal of livestock from the entire pasture. The exclosure directly addresses the issue by attempting to restore riparian vegetation, by removing the largest threat to vegetation establishment (i.e., livestock), and by eliminating livestock trailing and hoof damage to stream banks.

There is no proposal in the four alternatives to reduce grazing because of the installation of a 35-acre exclosure. Proposed Authorized Use reductions in Alternative 4 are intended to improve upland conditions and to provide additional high vegetative structure for wildlife needs. AUMs for the allotment will be adjusted through the AOI to take into consideration the riparian forage removed from livestock use due to the exclosure.

J-4 *Alternative 3 and 4 – I am totally against combining two herds [cow/calf and two year olds] into one herd. In most of the pastures there would NOT be enough water to water them all. Also have concerns with implications of rest rotation due to the size of pasture 128-01.*

The Forest Service agrees that this was overlooked in the development of Alternative 3. A meeting was held with the permittee on January 14, 2010 to further discuss this comment. The SDEIS Chapter 3 Part 2 has been updated to reflect this meeting. In Alternatives 3 and 3A, the initial actions have been changed to continue a complementary modified deferred rotation without specifically stating how many herds of livestock will be ran.

J-5 *I feel in the last 25 years the woody draws have tremendously improved as far as new saplings and young formations of trees. Trees are also growing up and out the sides of the draws tremendously.*

Based on measurements between 1988 and 1998 from long-term monitoring plots across the LMNG, Duxbury (2009) estimated a 29 percent decrease in the density of all green ash trees greater than 1-inch dbh, and an almost 50 percent decrease in

trees less than 4 inches dbh (Project Record, Specialist Reports and Notes, Botany Report). A subset of thirteen sample sites located in the project area indicated a slight but relatively insignificant decrease in the density of trees greater than 1-inch dbh between 1993-2008 (SDEIS, Chapter 3 Part 1, Woody Draws, Existing Condition, Trends in Woody Draw Structure). The density of saplings less than 1-inch dbh fluctuated during the four measurement dates, but there was a 63 percent decrease from a high of 827 saplings/acre in 1993, to 305 saplings/acre in 2008. The data therefore conflicts with the perception of appreciably increased tree density or woody draw development. Average tree density measurements from Healthy sample sites across the project area were considerably less than those reported by other researchers from relatively high condition sites (Project Record, Specialist Reports and Notes, Botany Report) suggesting that Healthy ratings of the analysis were relatively liberal and well below potential conditions.

Comparison of historic and current aerial photographs did not substantiate the perception that woody draw communities are appreciably expanding across the landscape (SDEIS, Chapter 3 Part 1, Woody Draws, Existing Condition, Trends in Woody Draw Extent and Project Record, Specialist Reports and Notes, Botany Report - Appendix D). Although there was field evidence of green ash trees expanding into discontinuous shrub patches situated adjacent to some woody draws, or expanding slightly up-drainage at the head of woody draws, these sites were not sufficiently developed or extensive to support the perception of tremendous woody draw expansion. Additionally, the small acreage of these sites does not compensate for the occurrence of poor conditions among less than Healthy sites, or apparent regression of several sites towards shrub/grass communities.

The above paragraphs have discussed green ash woody draws. Other woody communities relevant to the project area include Rocky Mountain juniper, silver sagebrush, and snowberry. The Forest Service acknowledges that Rocky Mountain juniper and several woody shrub species are expanding into upland grass communities due to wildfire control and livestock grazing induced changes in the herbaceous layer (SDEIS, Chapter 3 Part 1, Woody Draws). See also response to comment K-55.

J-6 *I also know that a developed spring is more economical than a well as long as the spring produces enough water for the herd of cattle. When you have a developed water tank at a spring the cattle will have a trail to and from the spring - they may loaf around at the spring during the heat of the day but they will not be wallowing around in the creeks and muck it all up if they have a spring tank that is cleaned out from occasion to occasion. I believe that a developed spring has less impacts than removing the spring development and having a natural seep that livestock could access and disturb.*

The Forest Service agrees that a developed spring can be more economical than a well as long as the spring produces enough water for the herd of cattle. However, the Grasslands Plan does identify the need to maintain and protect riparian areas (Grasslands Plan pp. 1-2, 1-9, 1-10, 1-13, 1-19). A meeting was held with the

permittee on January 14, 2010 to further discuss this comment. The SDEIS Chapter 3 Part 2 has been updated to reflect this meeting. In Alternatives 3, 3A, and 4 the above mentioned spring developments will not be removed but will be fenced out. This provides a control mechanism for the water development.

J-7 *In one of my pastures in section 9 t 143 r 100 the proposal is to fence the spring and put a well in up on top to draw the cattle away from the spring. The beavers are full time cutting trees down in this area both full grown and in between growth trees. The blame is on the cattle from what I see the beaver are doing way more destruction that the cattle ever will in this area. In the past years the beaver have clear cut approximately two acres and are continuing to do so. Until the beavers are enilated to control the trees will not have a chance of regrowth.*

Beaver have been actively harvesting many trees from this site while leaving or avoiding tall shrubs such as water birch. Many aspen have been harvested but are re-sprouting and potentially improving desirable forage for several wildlife species similar to habitat improvement practices that involve aspen cutting to promote sapling growth. The degree that beaver are harvesting aspen re-sprouts in the affected site is uncertain. However, assuming beaver are adversely affecting woody draw habitat, a degree of compensation is conferred through increased riparian habitat and a mosaic of habitat types across the landscape.

Across this particular allotment, 31 percent of woody draws were Healthy while 69 percent were At Risk. Excluding the site in question would minimally change these proportions to 33 percent Healthy and 67 percent At Risk. Assuming that beaver are responsible for all site disturbances and changing the condition rating to Healthy would increase the proportion of Healthy sites in the allotment to 38 percent. This is appreciably less than desired conditions and it is evident that management actions are needed to increase the proportion of Healthy woody draws.

With respect to livestock impacts in the affected site, trailing is occurring along the drainage and adjacent slopes to and from the developed spring and water tank evident livestock browsing of green ash saplings and shrub layers was evident. As discussed in the methodology sections of the DEIS, SDEIS, and Botany Report (Project Record, Specialist Reports and Notes), adverse woody draw impacts attributed to livestock were emphasized for condition ratings while ignoring adverse affects such as beaver or tree diseases to as great an extent as possible. Another woody draw in pasture 5 of the commenter's allotment was rated Healthy despite past beaver activity because the site currently meets desired conditions and experiences a low degree of livestock disturbance. Woody draws in Allotments 130, 133, and 134 with numerous beaver-harvested aspen were also rated Healthy because livestock related disturbances were relatively light. Other woody draws in the project area with beaver activity were rated At Risk because extensive livestock browsing of re-sprouting saplings and/or trailing disturbances associated with the use of water from beaver ponds was observed.

Fencing the spring in question is an Adaptive Option that would not be initially implemented. Additional or recent site observations indicate little potential for improved woody draw conditions as a result fencing the spring due to continued water availability from several beaver ponds and relatively high rates of overflow from the spring (SDEIS, Chapter 3 Part 2, Allotment 126, Effects - Woody Draws). Fencing a portion of the upstream woody draw would have a greater potential for improving woody draw conditions and riparian habitat along the drainage. Adding an upland water tank in the allotment would also contribute to decreased use of the site in question, as well as use along Whitetail Creek with additional water a short distance downstream of the spring.

J-8 *I am in agreement to extend a water pipeline to the edge of pasture in the north east section of pasture number 128-01and 02. Up by my corrals. There is a dam in the 01 pasture but it dries out and then the cattle have to hang out along the creek area of whitetail creek. And the cattle in pasture number 02 have to walk approximately a mile to the water tank and cause washing as they have to walk threw a draw to get there as a cut across. If water would be brought in by an existing pipeline not very far from here it would help the resources look so much better and distribute the grazing in more pen areas where it gets grazed sporadically.*

The Forest Service agrees with this comment, however, this action is located in the adaptive options in Alternatives 3, 3A, and 4 (SDEIS, Chapter 3 Part 2). Therefore, the action would not occur unless monitoring showed that the initial actions aren't meeting or moving the resource towards the Grasslands Plan desired future conditions.

J-9 *Also in pasture 126-06 [should be 126-04, believed to be typographical error] there is a spring that the proposal is to fence it out and bring in a pipling – I would be in favor of the proposal as long as they use the existing pipeline I have and not drill another water well. Bu I do not favor fencing out the spring. If the water well would go with out water for some reason as they have for me in the past the spring would be replacement water till u get well up and running again.*

The proposed action under Alternative 3 calls for constructing a pipeline-fed water tank away from a developed spring adjacent to several woody draws. Use of an existing water source would be preferable to the cost of drilling a water well. The spring development would be fenced to decrease use of the area and potentially improve woody draw conditions, but the development would be retained for potential use during emergencies as the commenter describes. Leaving the spring unfenced would allow continued livestock use of the site, perpetuating current conditions.

J-10 *Also in the magpie pasture in allotment 300 there is a fence enclosure gap going down to the magpie creek so the cattle can drink water. I do not see the difference of the cattle as the ones outside the enclosure gap that have the full access to the creek and also drink water from it. They are doing as much damage if not more but have the full length of the*

creek to push dirt in to the water – With water gap u have the cows cosigned to a very small area so the damage is not wide spread.

The Forest Service IDT met with the permittee on January 14, 2010 to further discuss this concern. It was decided to modify the initial action in Alternative 3 to rehabilitate the entrenched livestock trails inside the waterlot, create a water gap in the far northeast corner, and harden the watering area to restrict livestock access.

J-11 *A very big concern now is the abundance of noxious weeds taking over since we can not graze all the pastures like we used to. Years ago the cattle kept a lot of the noxious weeds like burdock and Canada thistle under control by eating it and not letting it go to seed and now with the regulations which are suppose to e better the weed issue is getting out of complete control.*

The Forest Service agrees that a big concern is the abundance of noxious weeds; however, the spread of noxious weed species is not solely due to not grazing pastures like they use to be grazed. The SDEIS has identified that the increase in oil and gas activity, recreation, wildlife, livestock, livestock feeding, etc. have all lead to the increase in the number of species and spread of noxious and invasive species on the Medora Ranger District (MRD). As pointed out in the Issues Eliminated from Detailed Study, Noxious Weeds section in Chapter 1 of the SDEIS, "Noxious weeds are a scourge to the prairie ecosystem. They displace and crowd out native plants, modify wildlife habitat, reduce livestock forage, adversely impact watersheds and riparian areas, and are costly to control. Over the years in the Dakotas, federal agencies, state and local governments, county weed boards and local grazing associations have expended millions of dollars and countless hours to eradicate or control noxious weed populations."

The Forest Service is not opposed to using livestock in an integrated pest management approach in controlling noxious weeds and invasive species, but this management needs to be done in a sustainable way to continue to work towards Grasslands Plan goals and objectives (Grasslands Plan, p. 1-20). Further detailed management of noxious weeds on the DPG can be found in the Noxious Weed Management Project FEIS, 2007.

MEDORA GRAZING ASSOCIATION & BILLINGS COUNTY IDENTICAL COMMENTS

K-i *The Association also incorporates by reference all of the previous comments and appeals submitted by MGA as a member of the Heritage Alliance of North Dakota over the last 12 years.*

All of the previous comments and appeals submitted by MGA as a member of the Heritage Alliance of North Dakota over the last 12 years have been addressed through the NEPA process in the creation of the Grasslands Plan. The underlying

basis for the Grasslands Plan has been decided, upheld on appeal and affirmed through the discretionary review process not only once, but twice (see 2002 ROD, 2003 WO appeal decision, 2003 Discretionary Review, 2006 ROD, 2007 WO appeal decision, 2007 Discretionary Review).

K-ii *Billings County reserves the right to provide supplementary information and further incorporates by reference the voluminous comments and appeals submitted by Billings County as a member of the Heritage Alliance of North Dakota over the last 12 years.*

All of the previous comments and appeals submitted by Billings County as a member of the Heritage Alliance of North Dakota over the last 12 years have been addressed through the NEPA process in the creation of the Grasslands Plan. The underlying basis for the Grasslands Plan has been decided, upheld on appeal and affirmed through the discretionary review process not only once, but twice (see 2002 ROD, 2003 WO appeal decision, 2003 Discretionary Review, 2006 ROD, 2007 WO appeal decision, 2007 Discretionary Review).

K-1 *The North Billings County Allotment Management Plan Draft Environmental Impact Statement (AMP DEIS) is only the most recent chapter in the controversy regarding management of the Little Missouri National Grasslands. The issues found in the AMP DEIS have their genesis in the Dakota Prairie Grasslands Land and Resource Management Plan (DPG LRMP) revision started in 1997 with the publication of the notice of intent to prepare an EIS. Relevant to these comments, the issues include: (1) capability of the LMNG to produce high structure (tall grass) vegetation; (2) rangeland resource conditions; (3) whether the high structure vegetation goals will result in significant reductions in livestock grazing; (4) the validity of visual obstruction ratings (VOR) measured by the Robel Pole as a way to measure range resource conditions and as a proxy for biological diversity; (5) impacts of the "so-called larger livestock; and (6) the validity of agency data being used to make decisions involving livestock grazing, such as proper functioning condition (PFC) assessments for riparian areas; range condition assessments, and conditions of woody draws*

Commentor is correct in that these issues have been continually brought forward, and continually addressed throughout the Northern Great Plains FEIS planning process, appeals to the 2002 and 2006 Records of Decision, the Scientific Review Team (SRT) report and the Forest Service Response to it, and the Demonstration Project creation itself. The SRT itself responded both to some of the original questions, plus those brought forward by the commentor (as part of the Heritage Alliance of North Dakota). Refer to the 2006 ROD pages 3-6 for a summary of those responses. Both the 2002 and the 2006 RODs were upheld on appeal (2003 and 2007 WO appeal decisions) and affirmed with the Secretary of Agriculture's discretionary reviews (2003 and 2007 Discretionary Reviews). Those project records are now incorporated by reference. Thus validated, the Grasslands Plan is the guiding document for management of the Little Missouri National Grassland.

K-2 *Despite express direction in the Livestock Grazing Record of Decision (Livestock Grazing ROD) in December 2006, the AMP DEIS fails to put in place a process to test these issues and to avoid livestock grazing reductions.*

The commentor misrepresents the direction in the 2006 ROD. As stated on page 8 of that document "[t]his Demonstration Project will take the LRMP to the ground, and implement, monitor, validate, and where necessary, change it. It moves the argument away from the hypothetical and esoteric, to practical field application."

The Demonstration Project states at page 16 "[s]elected AMPs will be developed and implemented, working through the processes described in this document. Goals, objectives, standards and guidelines related to livestock grazing will be assessed. If adjustments are needed, Grasslands Plan amendments will be proposed." It goes on to say "[G]oals and objectives may also be modified or changed to meet on-the-ground conditions and/or capabilities. One goal will be to maintain or improve current on-the-ground conditions to maintain, to the maximum extent possible, a grazing program at current levels and provide sufficient habitat for grassland species. Site-specific amendments to the DPG Plan to incorporate these changes will be done, as needed."

The DEIS and SDEIS evaluated the capability of the area to meet the goals, objectives, and standards and guidelines and found the lands were capable of meeting the Grasslands Plan direction (SDEIS, Chapter 3 Part 1).

The Demonstration Project also states at page 17 "[T]here will be no cuts in permitted AUMs without monitoring showing that livestock are principally responsible for not meeting the desired condition, and that the cuts are the only ecologically practicable and economically feasible means available for meeting the desired condition. In these situations the Forest Service will work with the grazing associations to minimize livestock grazing reductions."

The analysis evaluated the existing condition of each allotment and identified those resources of concern. The analysis evaluates whether or not livestock grazing was principally responsible for not meeting the desired condition (SDEIS, Chapter 3 Part 2). The EIS evaluated Alternatives 3 and 3A which were developed with the grazing association, and Alternative 4 which was developed to further address grassland structure. In addition, all the alternatives include a design feature that says "if stocking rate adjustments are needed, annual reductions will generally not exceed ten percent; and if monitoring shows that resource objectives are being met before full implementation of the AM/AUM reduction has occurred then no further reduction in AUMs will be needed."

Based on the above, the EIS has put in place a process to evaluate the plan direction and to minimize livestock grazing reductions either by alternative, or by incorporating a phased-in approach to reductions with associated monitoring.

Multiple places in the 2006 ROD discuss minimizing, not avoiding, reductions and working to keep a grazing program at current levels and/or at the permitted AUMs, but these are all in concert with sufficient habitat for grassland species and other multiple uses. In fact, in Alternatives 3 and 3A the Forest Service has already given the benefit to the MGA members in this analysis by not implementing the recommendation by the SRT to adjust for cow size (see Final Response to the SRT Reports, 2006, pp. 14-15) or following the Grasslands Plan guideline I-6 (Grasslands Plan, p. 1-19) to adjust for variations in liveweight in some situations. When the permitted AUMs are calculated, allotments in the project area are typically over their preference number as expressed in AUMs (see Table 3.4 in the SDEIS).

K-3 *The AMP process was intended to put in place a process to test the LRMP assumptions, goals, objectives, standards and guidelines. Instead the AMP DEIS adopts all of the goals, objectives, standards, and guidelines as rigid mandates notwithstanding the explicit direction to consider amending the LRMP, if grazing reductions will otherwise occur or if appropriate.*

The commentor misstates the 2006 ROD and Demonstration Project language. As noted in K-3 the Demonstration Project states at page 16 "Goals, objectives, standards and guidelines related to livestock grazing will be assessed. If adjustments are needed, Grassland Plan amendments will be proposed." It goes on to say "[G]oals and objectives may also be modified or changed to meet on-the-ground conditions and/or capabilities."

Commentor also misstates that there is explicit direction to consider amending the Grasslands Plan if grazing reductions will otherwise occur or if appropriate. If Grasslands Plan amendments are needed, they will be proposed. This is independent of any potential reductions. In fact, the language discusses keeping the current level of grazing to <u>the maximum extent possible</u> (emphasis added) while providing sufficient habitat for grassland species.

Through the North Billings analysis, the specialist considered the capability of the land to meet the resource objectives and goals. In other words, the specialists looked to see if the land is capable of meeting the Grasslands Plan goals and objectives. The analysis determined that yes the land is capable of meeting the goals and objectives and that no amendments to the Grasslands Plan were deemed to be necessary.

K-4 *Billings County and the Medora Grazing Association (MGA) recommend revision of the AMP DEIS, especially Alternative 3 to make it truly an alternative agreed upon by MGA and the Forest Service as the preferred alternative.*

The goal of the cooperative effort between the Medora Grazing Association and the Forest Service was to produce a proposed action (2006 Grazing ROD, page 17, (7)) not a preferred alternative. A proposed action is one way of achieving the purpose and need for a project. A proposed action may or may not be a preferred

alternative. As documented in the Project Record and SDEIS (Appendix A), the Forest Service worked extensively with the MGA board and individual permittees in the development of Alternative 3.

The revisions would:

- *Revise adaptive management goals to include the objective of not reducing livestock grazing until all other possible alternatives were exhausted;*

  Adaptive management doesn't have goals. It is a process, as described in the Adaptive Management section in Chapter 1 of the SDEIS, which allows for flexibility in changing management actions if needed to meet or move towards desired resource conditions as identified in the Grasslands Plan. In addition, the commentor misinterprets the Demonstration Project in this statement. To be consistent with the Demonstration Project, the Forest Service will "…maintain or improve current on-the-ground conditions to maintain, to the maximum extent possible, a grazing program at current levels and provide sufficient habitat for grassland species." (2006 ROD, page 16 provision 4). Exhausting all other possible alternatives before reducing livestock grazing may not allow for maintaining or improving on-the-ground conditions to provide sufficient habitat for grassland species. Analysis on how the alternatives presented in the SDEIS meet multiple use Grasslands Plan goals, objectives, standards and guidelines and varied ways of using adaptive management to achieve them are found throughout Chapter 3 and in the specialists reports (Project Record, Specialist Reports and Notes).

- *Revise the AMP DEIS to test the scientific issues that are still in controversy, including but not limited to the capability of the allotments to produce high structure without leading to significant grazing reductions, validity of PFC criteria for North Dakota and whether they should be altered; historical distribution of woody species and trend and the ecological thresholds where woody species encroachment may adversely affect habitat for ground nesting birds; and actual carrying capacity calculated following NRCS guidelines rather than the theoretical data and modeling in the AMP DEIS, and inclusion of all lands in the forage production calculations;*

  This suggestion was considered but not given detailed study as an alternative (SDEIS, Chapter 2, Alternatives considered but Dropped from Detailed Analysis) because the suggestions primarily address how to analyze effects, not how to manage livestock grazing.

  However, the SDEIS includes additional discussion regarding these comments. Additional discussion regarding the capability of the allotments to provide high structure may be found in the Herbaceous Structure, Desired Condition, Capability section in Chapter 3 Part 1 of the SDEIS; including discussion of how the level of livestock grazing affects structure and that reductions in livestock grazing are the only ecological practicable way to increase structure.

Additional discussion on the application of PFC criteria for North Dakota may be found in the Riparian, Methodology section in Chapter 3 Part 1 of the SDEIS. No changes were found to be warranted.

Additional discussion on the historical distribution of woody species and how encroachment of woody draws may affect ground nesting birds may be found in the Woody Draws, Existing Condition, Trends in Woody Draw Extent section in Chapter 3 Part 1 of the SDEIS and in the Project Record, Specialist Reports and Notes, Botany Report - Appendix D. See also response to comments J-5 and K-55.

Additional discussion regarding carrying capacity calculations may be found in the Range, Methodology, Carrying Capacity Analysis section in Chapter 3 Part 1 of the SDEIS.

- *Consider revisions needed in the DPG LRMP to ensure that reducing grazing is the last option, rather than the first, and specifically removing the no net increase limit with respect to range structures.*

The Grasslands Plan doesn't specify grazing reductions as a first or last option in managing resources on the Dakota Prairie Grasslands nor does it contain any direction in regards to no net increase limit with respect to range structures. Also note grazing reductions were not the first option for managing resources in this project area (refer to description of alternatives in Chapter 2 of the SDEIS), and that range structures are included in the action alternatives.

The no net increase limit on range structures was in the Draft Grasslands Plan. It should be noted that this language was changed between the draft and the final Northern Great Plains EIS and has been repeatedly pointed out to the commentor. In fact in the April 17, 2007 letter responding to the Heritage Alliance of North Dakota (HAND), of which the commentor is a member, appeal of the 2006 Grazing ROD, the issue of no net range improvements is again explained with a lengthy list of other times that this has been clarified for the commentor (Project Record, Supporting Documentation, L-103 (4/17/07 2006 ROD appeal transmittal letter), p. 7). That decision was upheld by both the Washington Office and a discretionary review by the Department of Agriculture.

The Grasslands Plan guideline for range infrastructure is "Use nonstructural range management techniques such as water management, herding, ridings, and mineral management to achieve desired conditions. If nonstructural management methods are not successful, then new structural development may be used to achieve desired conditions" (Grasslands Plan, pp. 2-15, 2-22).

Commentor does acknowledge this change to the no net increase limit in their comment number K-33.

K-5 *The commentor reserves the right to provide supplemental information following review of the Project File made available on October 13, 2009, once the extent of the reductions can be estimated and once the data being developed by North Dakota State University is compiled.*

The commentor reserves a nonexistent right. Comments are officially accepted per the regulations and process outlined in 36 CFR 215.6 (Comments on proposed actions). Commenting during this timeframe allows the commentor to appeal a decision based on this analysis under 36 CFR 215. However, at the Deciding Officer's discretion comments received after this time frame may be reviewed. If received in a timeframe that allows it for this project, additional comments or information will be reviewed and will become part of the project record.

K-6 *DEIS Incorrectly Characterizes History and Management Mandates of National Grasslands, AMP DEIS at 3-8.*

The AMP DEIS omits the statutes and executive orders governing the management of the LMNG. The federal lands within the boundaries of the LMNG were acquired or reserved for the Little Missouri Land Utilization Project. The Presidential Executive Orders reserving the public domain lands stated that these lands for "reserved for use and development by the Department of Agriculture for soil erosion control and other land utilization activities in connection with the Little Missouri Project, LA-ND 1." Ex. Orders 7673, 7674, 2 Fed. Reg. 1512 (1937). The objectives of the Land Utilization Project were: A prevention and control of erosion; conservation and development of water resources; demonstration areas of proper livestock grazing; control of destructive animal life; and relief of unemployment with conservation project". The Bankhead-Jones Farm Tenant Act (ABJFTA"), 7 U.S.C. "1010-1013, did not change these objectives but rather implemented them, and further stated as its purpose: "To promote more secure occupancy of farms and farm homes, to correct the economic instability from some present forms of farm tenancy, and for other purposes." 50 Stat. 522 (July 22, 1937). These purposes are also set out in the acquisition purposes and complaints of condemnation pursuant to which much of the lands within the LMNG were acquired. These original statutory objectives define the management parameters for the LMNG.

Chapter 1 of the SDEIS has been reorganized and updated to show the relevant federal laws and regulations that govern the management of livestock grazing on the Little Missouri National Grasslands (LMNG).

Management of the LMNG is governed under the provisions of the Bankhead-Jones Farm Tenant Act, the Forest and Range Renewable Resources Planning Act, the National Forest Management Act and Forest Service Regulations 36 CFR 213 (Administration of Lands under Title III of the Bankhead-Jones Farm Tenant Act by the Forest Service) and 36 CFR 222 (Range Management) and other laws relating to the National Forest System lands.

Specifically, 36 CFR 213 provides the management direction for the administration of National Forest System lands under Title III of the Bankhead-Jones Farm Tenant Act. 36 CFR §213(b) states "the National Grasslands shall be a part of the National Forest system and permanently held by the Department of Agriculture for administration under the provisions and purposes of title III of the Bankhead-Jones Farm Tenant Act." Further, the Bankhead-Jones Farm Tenant Act provides:

> ***"The Secretary [of Agriculture] is authorized and directed to develop a program of land conservation and land utilization, in order thereby to correct maladjustments in land use and thus assist in controlling soil erosion, reforestation, preserving natural resources, protecting fish and wildlife, developing and protecting recreation facilities, mitigating floods, preventing impairment of dams and reservoirs, developing energy resources, conserving surface and subsurface moisture, protecting the watershed of navigable streams, and protecting the public lands, health, safety, and welfare, but not to build industrial parks or establish private industrial or commercial enterprises" (Section 31, Title III, Bankhead-Jones Farm Tenant Act of 1937, as amended in 1962, 1966, and 1981)."***

Section 213(d) states "the resources shall be managed so as to maintain and improve soil and vegetative cover, and to demonstrate sound and practical principles of land use for the areas in which they are located." Section 213.3 addresses protection, occupancy, use, administration, and exercise of reservations. This section basically states that the rules found in 36 CFR §213 govern the management of these lands. Section 213.4 addresses prior rules and regulations. It states "Except as provided in §213.3, the rules and regulations heretofore issued for land utilization projects are hereby superseded as to all such projects administered by the Forest Service, but not as to such projects administered by other agencies."

The comment above also states that the DEIS omitted discussing the 1937 Executive Orders which the comment claims "define the management purposes of the LMNG". However, the United States Constitution vests Congress with the authority over all federal lands. Agencies must administer lands under their jurisdiction consistent with those acts of Congress. For the National Grasslands, Congress through the Bankhead-Jones Farm Tenant Act and other laws discussed above has set for the management purposes and objectives of the federal lands. As such, the SDEIS has appropriately set forth those statutes directing management of the national grasslands.

K-7 *The Forest Service published the notice of intent to prepare an EIS and sought scoping comments for the LRMP revision in 1997. 62 Fed. Reg. 8680 (1997). Public comments for the DEIS were filed on or before February 2, 1999. 63 Fed. Reg. 68245 (1998). The comments demonstrated that the draft DPG LRMP would reduce livestock numbers from 29% to 49% with significant economic impacts. See e.g. Comments by the Heritage Alliance of North Dakota (HAND) and attached reports (Feb. 2000).*

As early as 1996, the LRMP planning team had established as an internal goal of reducing livestock grazing by about one-third. The email from the Nebraska National Forest Supervisor Mary Peterson responding to projected reductions of 35% stated: "The cowboys in ND have big 'cow chips' on their shoulders. They are still afraid (and probably realistically so) their cattle numbers will be reduced." Ex. 1, e-mail to NGPPR FEIS Planning team from David Cawrse forwarding email message from Mary H. Peterson April 1, 1996. The state and local governments and the affected grazing associations objected, raising a number of issues that remain scientifically controversial. After the close of the comment period on the DEIS in February, 2000, the Forest Service heatedly denied that that such grazing reductions would occur. Between 2000 and the present, there have been several efforts to resolve the policy conflicts and scientific controversies in order to avoid or reduce the adverse economic and social impacts. The first was through roundtable meetings sponsored by the North Dakota Governor. This process did not yield any agreement but was the first step in persuading the Forest Service that its underlying resource data used to justify the significant reductions in livestock grazing, were flawed.

This comment does not specifically apply to the North Billings project, but rather to the Grasslands Plan. However, several errors are contained in the statements above that warrant comment. Comments to the livestock grazing portion of the Grasslands Plan are found on pages 154 through 184 of the Addendum for the FEIS and LRMPs 2001 Revisions. Throughout this section Dr. Lacey is quoted (interestingly enough with varying degrees of potential reductions i.e. 30 to 55 percent on p. 159). In the responses, the errors in Dr. Lacey's assumptions are described. Chief of which is the assumption that potential reductions in livestock grazing for other multiple uses would be an additive rather than a synergistic process where multiple resources value can be obtained from a specific piece of land (see Addendum p. 159 for example).

In the 2002 ROD, the Scientific Review Team process to determine how the grazing portion of the plan might be implemented and its effects was created (2002 ROD p. 5). The group of sample allotments considered in the SRT process closest to the project area was Group 6. The average reduction for those allotments, using data better utilized at a landscape analysis, was six percent (see undated power point slide from SRT report). The SRT points out the data used in the test AMPs, while the best available for the study's purposes, lacked the required level of resolution needed to develop, implement, and monitoring of individual pasture AMPs (final response to the SRT p. 3). The SRT recommended using NRCS order 2 soil surveys and associated ecological site information, which is what was done for this project.

In summary, the resource data used in both the Grasslands Plan and the North Billings process, while different, are appropriate for the scale and kind of analysis conducted. The Forest Service, while acknowledging the controversy over various estimated reductions, has not agreed that the underlying resource data used was flawed, as commentor claims. Nor was the purpose of the Grasslands Plan to reduce livestock grazing, rather the analysis focused on the potential impacts of and to

livestock grazing in order to balance multiple uses. The use of the term significant reduction in livestock grazing is subjective as used by the commentor.

K-8 *Prior to February 2000 the Forest Service claimed, just as it does in the AMP DEIS, that resource conditions on the LMNG were deteriorating due to grazing. Based on the public comments on the DEIS and the Governor's Roundtable, the Forest Service significantly revised the EIS, changing the data bases and analytic tools entirely. The LRMP nevertheless retained the disputed goals, objectives, standards and guidelines despite significant questions about the capability of the LMNG lands to meet those objectives. The Forest Service still concluded that grazing would only drop by 9%.*

Most of this comment does not apply to the North Billings site specific project as it is in reference to the revision of the Grasslands Plan. The Grasslands Plan is not in question here nor is the assumptions behind the analysis at that level (see 2003 and 2007 Appeal Decisions and 2003 and 2007 Discretionary Reviews).

The nine percent identified in the comment is correct, however, this was a DPG-wide estimate. The Grasslands Plan 2006 ROD, page 12, put this into context. It states that "…the Forest Service has estimated an average DPG wide nine percent reduction [6] in grazing levels based on the 20 year average authorized use". The footnote states "[6]The [NGP] FEIS also explains the estimated AUMs were for alternative effects comparisons. Actual stocking levels will be determined in the site-specific allotment management planning process. (See FEIS, page 3-90 through 3-91)." See also response to comment C-3.

K-9 *Given the extent of the changes in the FEIS released in July 2001, the Forest Service provided a six-month comment period ending on January 31, 2002. Based again on the comments by the HAND and the State of North Dakota, the Regional Forester in consultation with USDA Under Secretary Mark Rey determined that it was necessary and advisable to review the FEIS and LRMP as they apply to livestock grazing. The Regional Forester severed the livestock grazing issues from the DPG LRMP and the 2002 Record of Decision (ROD) and directed the DPG to form a Scientific Review Team (SRT) to address the controversies, particularly to determine if the DPG LRMP could be implemented without significant livestock grazing reductions. The documents pertaining to the suspension of the LRMP implementation show that the SRT was to "review the Forest Service sample design, verification of stocking rate and forage production, underlying scientific issues regarding wildlife habitat and vegetation management, including consistency with rangeland health and other principles of range management and vegetation, and the Plan Revision management objectives, direction, standards and guidelines."*

This comment does not specifically apply to the North Billings project, but rather to the Grasslands Plan revision process.

However, several errors are contained in the statements above that warrant comment. As noted in the 2002 ROD, the Regional Forester decided to "phase in"

the livestock grazing portion of the Grasslands Plan (see discussion below). This was an attempt to stem the controversy over the Grasslands Plan from some sectors of the public over perceived uncertainty of effects and perceived adverse economic effects on local communities (2002 ROD, p. 5). Nowhere does it state this was necessary, but was yet another step – in line with the extremely rare step of opening the Northern Great Plains FEIS to a six-month extended public comment period (2002 ROD, p. 14) – to work with the interested and concerned publics on multiple use management. This was after extensive efforts since the beginning of the planning process in 1996 (2002 ROD, p. 14). (Also see SRT team process and Demonstration Project).

The Regional Forester did not sever the livestock grazing issues from the 2002 ROD; he identified a "phase in" approach to address the disagreement between estimated reductions (Grasslands Plan 2002 ROD, p.5). The commentor is correct in stating that the Regional Forester identified that a SRT would be created, however, the statement "…to determine if the DPG LRMP could be implemented without significant livestock grazing reductions" is incorrect. The Grasslands Plan 2002 ROD, page 5 states "Completion of these sample allotments will be like taking the new plan out for a "test drive. The intent of this "test drive" is to determine if the grazing portion of the plan can be implemented and to verify that grazing levels are similar to those projected in the Revised Grasslands Plan FEIS".

The commentor doesn't identify "The documents pertaining to the suspension of the LRMP implementation…" or provide a cite(s) so it is not possible to consider the context in which it is made. It's also important to note that the implementation of the Grasslands Plan was not suspended in regards to livestock management, interim direction was provided (2002 Grasslands Plan ROD, p. 5) which established the SRT process.

See response to comment K-10

K-10 *The central question was whether the LRMP could be implemented without significant livestock grazing reductions. The SRT concluded that given the quality of the data used by the Forest Service in the FEIS and LRMP, or the DRAGON Team data used in the "test drive" of the AMPs, it was impossible to determine the outcome. SRT at 14.*

The statement that the central question was as stated above is incorrect. Please refer to the "Final Response to the Scientific Review Team Reports" dated October 10, 2006, page 1. The SRT was asked to address two questions:

1) Can the Grasslands Plan be implemented?
2) Are the grazing levels in the sample AMPs similar to those projected in the FEIS?

The SRT agreed the LRMP could be implemented with "…the general qualifier that the outcome is uncertain" (2005 SRT Report, p. 32).

The last statement of the comment doesn't appear on SRT page 14 as stated. This statement is also not pertinent to the proposed project as it is in reference to actions implemented to address the question regarding if the grazing portion of the Grasslands Plan could be implemented.

K-11 *The SRT report concluded that it could not answer several key issues due to the lack of adequate data and questions about protocol consistency. SRT at 9, 32. This was true with respect to assumptions that were said to support grazing reductions, estimates for site capability to produce high structure, trend and condition of woody draws, Id. at 10-11; VOR readings by Robel Pole, Id. at 12-14; and PFC assessments, Id. at 23. While the Forest Service's much-touted "test drive" of the LRMP showed no greater than 9% reductions, it relied on the DRAGON team data that the SRT concluded were invalid for allotment management decision. Id. at 9. Moreover, the test drive did not address limits imposed by the LRMP on range project construction, the amount and timing of rest in a grazing system, the lack of accurate vegetation production and condition data, and lack of soils data. The Forest Service used 2002 Dragon Team@ data, rather than the data used in the FEIS, so the test drive did not fairly assess the impacts of the LRMP goals, objectives, standards, and guidelines on livestock grazing levels. Nor could the Forest Service support its assumptions of minimal impact on livestock grazing due to the flaws in the DRAGON team data and lack of data on actual use that was not provided by the Forest Service to the SRT.*

This comment is referring to the SRT process that was initiated to determine if the Grasslands Plan could be implemented, see response to comment K-10. The outcome of this process was a series of issues and recommendations by the SRT. The 2006 Final Response to the Scientific Review Team Reports identifies the Forest Service's response to those recommendations. This project followed the applicable recommendations in accordance with the Forest Service Final Response to the SRT Reports, 2006. Appendix C of the SDEIS provides a summary of how each recommendation was addressed.

Again, it is necessary to correct misstatements from the commentor. The SRT did not conclude that it could not answer several key question due to lack of adequate data and protocol consistency (see SRT report, p. 9 and 32), except to the extent of which no pasture specific grazing records with actual use numbers and weights of livestock could be provided to them by the Grazing Associations. Different data sets are appropriate to be used at different scales of analysis. So the data used to analyze the landscape at the Grasslands Plan level may, or may not, be applicable at a site-specific level. This does not make the assumptions and analysis in the Grasslands Plan invalid, as answered by the SRT when HAND asks the team a similar question about data after their report (see 2006 ROD p. 3-6). See also the actual statements made, and the Forest Service response to them to address VOR and PFC (SRT report and Forest Service response to the SRT report), as commentor misunderstand these points as well.

Moreover, the commentor misstates what the SRT says about the DRAGON data (see SRT report, p. 9). However this is a moot point for this site-specific project as the applicable SRT recommendations were followed (see SDEIS, Appendix C). Again, refer to the lengthy number of times the commentor has been corrected on the no net gain in grazing improvements (Project Record, Supporting Documentation, L-103, p. 7).

Refer to response to comment K-10 regarding the questions the SRT was chartered to answer.

Actual use has traditionally been difficult to impossible for Forest Service to obtain from its agent, the Medora Grazing Association. As requested by the SRT, which would include pasture by pasture numbers, live weight of cattle, class of livestock, and actual dates where the livestock were moved, this information is not provided by the MGA, possibly because its members have not been asked for this detailed information by the MGA. Annual Operating Instructions/Allotment Worksheets, which is the general plan for the year before grazing begins, or billing information often does not represent the actual on-the-ground data needed from the permittee to the Forest Service. This indeed, as noted by the SRT, greatly complicates management determinations and activities.

K-12 *The SRT evaluation of grazing management and resource conditions was also frustrated by the lack of livestock use and monitoring data on the federal lands. Id. at 16-17. In fact, the Forest Service refused to provide the SRT with the actual use data, which it received from each grazing association each year. Due to the false statements that there were no data, the SRT concluded that it was not possible to determine if the DPG LRMP could be implemented without significant livestock grazing reductions. SRT Report at 14.*

The Forest Service agrees with the first sentence in this comment (Final Response to the SRT Reports, 2006 pp. 12 and 13).

Implying that the MGA is indeed providing actual use to the Forest Service is incorrect. During the SRT evaluation, the Forest Service supplied the livestock use information that was available to them from the grazing associations. On the MRD, yearly grazing permits were provided from MGA that show the number and class of livestock and their grazing season for the permit year up until the year 2000. AOIs were also used to describe livestock use for the SRT evaluation, but until 2001 these have been spotty. AOIs are also done early in the year and are just a best guess of what the permittee will be running for the given year. Updates provided to the Forest Service by the MGA as the season progresses are spotty at best.

Since the SRT made recommendations in their Final Report, 2005 (see SRT Issue IV-1, p. 16 and SRT Issue V-1, p. 18) it's apparent that the SRT believed that the information provided them to evaluate livestock use was inadequate for their review. The Forest Service did not refuse to provide the SRT with the actual use

data; it supplied what was provided by the MGA, which were total animal months per allotment or permit. This doesn't constitute actual use.

The following information identifies the MGA's position on actual use. A letter dated August 31, 2004 was sent to MGA that requested actual use data which consisted of: the date when livestock enter a pasture, the number of livestock, any stocking adjustments during the grazing period, and the date when the livestock left a pasture. At the September 1, 2004 monthly MGA board of directors meeting the issue was discussed, and the minutes reflect the board of directors' response: "The Board is not in agreement that actual use numbers should be provided. They fully expect the USFS to use these numbers to institute further reductions on allotments, over and above the reductions that are proposed in the new Grasslands Plan. Permittees will remember that the USFS used a 20-year average of aum's to figure the "10-15% reduction" included in the new Grasslands Plan. That 20-year average used the years of 1980-1999, which contained some very, very dry years." The MGA board of directors meeting minutes of March 2, 2005 identify that the Forest Service District Ranger again requested actual use numbers for 2004. The MGA responded that they had the requested data completed with the exception of one allotment. The information provided to the Forest Service was animal months by allotment or permit and not what was specified in the August 31, 2004 letter.

Between the DEIS and the SDEIS the Forest Service conducted a review of MGA files for actual use information. The review found the same AOI and grazing association permit information that was supplied by MGA and some additional information documenting changes to some of the AOIs. There was no evidence of the MGA conducting a year end review of their members' grazing use after completion of the grazing season. See response to comment F-11. The 2005 SRT Report at page 14 did not conclude that it was not possible to determine if the DPG LRMP could be implemented without significant livestock grazing reductions. It only provided issues and recommendations. See also response to comment K-10.

K-13 *The exclusion of this data means that even now, there has been no correlation between livestock numbers, previous management, and current conditions. Nor can the AMP DEIS fairly estimate the economic impacts.*

Information regarding actual use would aid in the analysis of past effects of grazing systems and whether or not those effects would continue, or not, based on the alternatives. This is also described in the NRCS National Range and Pasture Handbook (1997) as part of the method to establish an initial estimated stocking rate for an operating unit. In addition, actual use would aid in disclosing the potential effects of the alternatives to the permittee by comparing actual use to preference and/or the Authorized Use under the alternatives.

In lieu of actual use the interdisciplinary team used the three year (2005-2007) average MGA permitted use and/or AOIs to compare to the Authorized Use under the different alternatives. The three year average MGA permitted use is

information taken from grazing association grazing permits which are completed prior to turn out. The AOIs/Allotment worksheets were used to help describe under current management how an allotment is managed as far as rotation and type/class of livestock. As noted before, the AOIs and the information they contain are completed in the winter or early spring by the permittee before turn-out. They represent the permittees "best guess" at that point in time as to the number of animals they'll run, rotations, etc. in the coming grazing season. In lieu of actual use, this is the best information available to use in the analysis.

This information was used in the analysis to evaluate the effects of past grazing systems and whether or not trends would likely increase, decrease, or stay the same based on the alternatives and the comparison to the three year average MGA permitted use from the grazing association grazing permits, as well as preference. It is important to note that one of the three years in the average was a drought year in which grazing reductions were implemented. This information is provided strictly for comparison purposes to more sharply define differences between the alternatives (see the Affected Environment – Range, Existing Condition, Actual Use section in Chapter 3 Part 1 of the SDEIS).

Economic analysis is based in part on the information described above not actual use, as this was the information provided by the MGA.

K-14 *Contrary to the representations made by the Forest Service, the ranger district offices had annual reports of livestock use on the National Grasslands. Ex. 3, Schneider Decl. &20. The Forest Service does not prescribe any form for such reports but livestock numbers on federal lands are provided to the agency. While the format may have varied and the compilation would have been time-consuming, the fact remains the data existed and the Forest Service chose not to provide it. The AMP DEIS attempts to perpetuate the same falsehood by now disparaging the grazing association record keeping as "unreliable". AMP DEIS at 3-15. The thinly concealed accusation of lying needs to be excised from the AMP DEIS.*

The Forest Service utilized the data provided by the MGA in its analyses (see the Affected Environment – Range, Existing Condition, Actual Use section in Chapter 3 Part 1 of the SDEIS). However, as noted in response to comments K-12 and K-13 this data is not actual use. The SDEIS provides a more detailed discussion of permits, permitted use, and actual use (Affected Environment – Range, Existing Condition, Grazing Permits and Actual Use sections in Chapter 3 Part 1 of the SDEIS).

K-15 *Relevant to the AMP DEIS, the SRT concluded that it was not clear whether the sites classified for high structure were capable of producing the high structure, Id. at 10, whether the VOR measurements were done pursuant to valid and consistent protocols, Id. 12-14, or that high structure necessarily correlated to vegetation condition. Id. at 14.*

The commentor appears to be referring to the SRT Report. Analysis completed for the North Billings project found these areas were also capable of providing high structure (SDEIS, Chapter 3 Part 1, Herbaceous Structure, Desired Condition, Capability). The VOR measurements were done based on an approved protocol and were completed by the district wildlife biologist and other trained district personnel. Note that the Grasslands Plan has standards and guidelines for both high structure and seral stages (see examples throughout the Grasslands Plan Ch. 1 through 3). High structure and seral stage are not necessarily correlated. Also see response to comments K-41 and K-95.

K-16 *The SRT also concluded that the PFC measurements for riparian areas may be ill-suited for North Dakota and recommended that the Forest Service revise the criteria for the Great Plains soils and climate. Id. at 23. The SRT generally raised questions about consistency in the use of protocols and the lack of monitoring data***.**

The first statement is incorrect. The SRT did not conclude that PFC measurement may be ill-suited for North Dakota. The SRT commented that the PFC assessment is potentially inadequate. The SRT recommendation was to determine if PFC rating is applicable to North Dakota, to use multidisciplinary teams, and to develop a training manual and process. The SRT recommendations do not in any way, invalidate the PFC protocol. The DPG responded to these points, first in June 2005 and again in October 2006. See Dakota Prairie Grasslands, Final Response to Scientific Review Team Reports, October 10, 2006, pp. 19-20; available on-line at: http://www.fs.fed.us/r1/dakotaprairie/projects/livestock_grazing/corrected_final_srt_response.pdf. Furthermore, the SRT did not comment on the quality or amount of PFC data used in this project as the PFC data used to establish existing conditions in the North Billings County project area were collected from 2004 (see Brooks, 2005) through 2007. The SRT did not review these data and made no judgment of these data.

K-17 *At the conclusion of the SRT process, it was clear to all that the issues in scientific controversy remained very much in contention. Livestock Grazing ROD at 13. In order to address these controversies and still move forward, the Forest Service adopted a "demonstration pilot project" now called Demonstration Project in the Livestock Grazing ROD. Id. This process, which was supported by the grazing associations, called for the Forest Service in close cooperation with the grazing associations to develop AMPs that would test the validity of the LRMP assumptions, goals, objectives, standards and guidelines, and when appropriate revise the plan simultaneously with the AMP. The project level development would allow the Forest Service to assess whether the DPG LRMP requires or will lead to major grazing reductions and examine ways to avoid them. It would also offer the opportunity to test the validity of the scientific assumptions in the DPGLRMP*

The SRT states "[i]t is the opinion of the SRT that the perceived problems associated with the current FEIS and LRMP stem largely from differences among

affected parties in value systems rather than scientific shortcomings." (2006 ROD p. 4)

Commentor misstates what the Demonstration Project requires. The Demonstration Project states "[t]he pre-NEPA process would be completed in careful consultation, coordination, and cooperation with the grazing associations representing their members working in concert with the Forest Service." (2006 ROD p.16) "The purpose of the demonstration project would be to develop and implement integrated allotment management plans pursuant to a collaborative process with the respective grazing associations that share in the management of grazing on the National Grasslands, to determine if Grasslands Plan Goals and Objectives are achievable or need modification, and monitor progress towards meeting the resource objectives." (2006 ROD p. 15)

"During this time, selected AMPs will be developed and implemented, working through the process described in this document. Goals, objectives, standards and guidelines related to livestock grazing in the Grasslands Plan will be assessed. If adjustments are needed, Grasslands Plan amendments will be proposed." (2006 ROD p. 16). Nowhere in the Demonstration project does it state that AMPs would be developed to test the validity of the Grasslands Plan. If plan amendments are found to be needed (see discussion in response to comment K-3) then they could be proposed simultaneously, however, none were found to be needed for this project area.

The Forest Service obligation under the Demonstration Project is to provide "[o]ne goal will be to maintain or improve on-the-ground conditions to maintain, to a maximum extent possible, a grazing program at current levels <u>and provide sufficient habitat for grassland species</u>". (2006 ROD p. 16, emphasis added).

The Forest Service does agree that implementing the AMPs, as with all projects, and the related monitoring will help assess the on-the-ground conditions as they relate to the Grasslands Plan goals and objectives. This may lead to a refinement in methodology and goals and objectives over the long term.

K-18 *The Livestock Grazing ROD and the Demonstration Project "kicked the can down the road" in the sense that the ROD did not resolve the scientific issues first raised in the LRMP process and which could not be resolved in the SRT process. Instead, the Demonstration Project process is established to test on a project level basis whether the goals, objectives, standards and guidelines can be achieved without livestock grazing reductions and what additional measures can be instituted maintain grazing levels.*

The underlying basis for the Grasslands Plan has been decided, upheld on appeal and affirmed through the discretionary review process not only once, but twice (see 2002 ROD, 2003 WO appeal decision, 2003 Discretionary Review, 2006 ROD, 2007 WO appeal decision, 2007 Discretionary Review). As stated by the SRT, the perceived problems with the Grasslands Plan and its FEIS stem from differences

over values rather than scientific shortcomings (2006 ROD p. 4). Therefore, the first sentence misstates the reason for the creation of the Demonstration Project, and again rejects the findings of the SRT.

Commentor misstates the purpose of the Demonstration Project. "The purpose of the demonstration project would be to develop and implement integrated allotment management plans pursuant to a collaborative process with the respective grazing associations that share in the management of grazing on the National Grasslands, to determine if Grasslands Plan Goals and Objectives are achievable or need modification, and monitor progress towards meeting the resource objectives." (2006 ROD p. 15).

The Forest Service obligation under the demonstration project is to provide "[o]ne goal will be to maintain or improve on-the-ground conditions to maintain, to a maximum extent possible, a grazing program at current levels and provide sufficient habitat for grassland species" (2006 ROD p. 16).

Given the lack of scientific controversy over the goals, objectives, standards and guidelines in the Grasslands Plan, the point of the Demonstration Project is more to work cooperatively with our partners to determine how to meet the Grasslands Plan.

There actually is no language in the demonstration project that discusses additional measures that could be instituted to maintain grazing levels. However, this is routinely done in the course of AMP development. Refer to the Alternatives Considered in Detail section in Chapter 2 of the SDEIS for a description of how the alternatives were developed.

K-19 *HAND appealed the Livestock Grazing ROD to secure specific direction that economically viable ranching operations be a plan objective and that the Forest Service reexamine all of the standards and guidelines, except those clearly mandated by statute, such as the Endangered Species Act. While both the Chief and Under Secretary affirmed the Livestock Grazing ROD, the Under Secretary gave the Forest Service explicit direction that is also relevant to the AMP DEIS.*

| *"I am also directing the grasslands supervisor to continue to work with cooperators and partners such as the North Dakota grazing associations, North Dakota State University, Dickinson State University, the Agriculture Research Service and the Natural Resource Conservation Service to refine and supplement the Dakota Prairie Grasslands vegetation monitoring techniques".*

This is the correct quote from Undersecretary Rey's discretionary review letter. Ongoing projects are occurring throughout the Dakota Prairie Grasslands to look at and refine vegetation monitoring techniques. See also response to comments K-65 and K-124.

|

As the Forest Service and its cooperators and partners work to reach agreement how to refine and supplement the VOR and other vegetation monitoring techniques to promote rangeland health, I direct the supervisor to strongly consider the vegetation monitoring techniques suggested by the NRCS.

This is the correct quote. Refer to the Forest Service Response to the SRT Reports, (Project Record, Supporting Documentation, L-97 and SDEIS, Chapter 3 Part 1, Range, Methodology, Carrying Capacity Analysis regarding how the NRCS data was used in this project.

I support that approach [DPP] and expect that, should the results of the Demonstration Project indicate that modifications are needed, a plan amendment process will be initiated as soon as possible.

This is the correct quote from Undersecretary Rey's discretionary review letter. Monitoring completed on implemented AMPs for the North Billings and other AMP projects will provide the basis to determine if Grasslands Plan amendments are needed (Grasslands Plan 2006 ROD, p. 16, pt 3). However, the analysis completed for North Billings determined that the Grasslands Plan goals and objectives are achievable; therefore modification to the Grasslands Plan is not needed. Monitoring progress towards meeting the resource objectives is an integral component of the proposed action.

The Pilot Project provides for no cuts in the grazing unless monitoring shows the cuts are necessary to achieve the goals of the plan, and the Forest Service demonstrates the cuts are the only effective means for achieving plan goals. Please keep this office updated on a quarterly basis concerning the results of the Demonstration Project.@ Memorandum of USDA Under Secretary August 13, 2007.

This is the correct quote from Undersecretary Rey's discretionary review letter. However, it is best understood by adding in the sentence above this quote which is "The terms of the Demonstration Pilot Project should be implemented in a fashion consistent with the Management Plan and its appendices." (Mark Rey discretionary review of the 2006 Livestock Grazing Decision 8/13/07).

In fact, Alternative 3 has no initial reductions in Authorized Use, which is the proposed action developed in careful consultation, coordination, and cooperation with the MGA (see SDEIS Appendix A and Project Record, Permittee Correspondence). Alternative 3A which is a modification to the proposed action based on MGAs comments also does not include initial reductions in Authorized Use. Alternative 4 includes initial reductions in Authorized Use in many of the allotments. The Responsible Official will consider the analysis in the SDEIS to determine if livestock are principally responsible for not meeting desired conditions, and whether or not cuts are the only ecologically practicable and economically feasible means available for meeting the desired condition.

K-20 *The Medora Ranger District (MRD) started the AMP revision in early 2005 well before the conclusion of the SRT process, adoption of the Livestock Grazing ROD and Demonstration Project, or the conclusion of the appeal review in August 2007. The alternatives were developed in 2006 and revised in 2007. The data appear to have been largely based on evaluations done in 1998-1999, 2004 and 2005.*

The Forest Service is unclear on exactly what the commentor means by the start of the AMP revision. Field data collection for this project started in 2004 prior to the conclusion of the above mentioned processes. The IDT collected field data to describe existing condition from 2004 to 2008 (see the Methodology and/or Existing Condition sections for each resource in Chapter 3 Part 1 of the SDEIS). The range staff held their first round of permittee meetings during the fall of 2005; these were followed by meetings in the summer of 2006 (SDEIS, Appendix A). The last round of meetings was held in the winter of 2007 (SDEIS, Appendix A). Alternative development was initiated in 2006 (Project Record, Process Documentation, IDT Meeting Notes, B-12), and was completed sometime after January 2010 (Project Record, Process Documentation, IDT Permittee Meeting Notes, B-54). As the different processes listed by the commentor were completed, the results were adapted into the Forest Service's planning process for this project.

K-21 *Most of the AMP process occurred before notice of intent was published in May 2008, 73 Fed. Reg. 28098 (May 15, 2008). NEPA requires an agency to integrate the NEPA process as early as possible. 40 C.F.R. "1501.2, 1501.7 (scoping), 1502.7 (EIS preparation). Instead, the NEPA notice came more than three and a half years after the MRD began the AMP and certainly after most of the major decisions had been made, including delineation of the alternatives. The draft of Appendix A is dated February 2008, showing that the MRD had established all of the alternatives and had its carrying capacity calculations completed.*

The Forest Service is not certain what the commentor means by "most of the AMP process"; however, Forest Service planning is generally done at two levels, the programmatic grassland plan level and the site specific project level. The Grasslands Plan establishes Grassland-wide goals, objectives, grassland-wide standards and management area standards. Suitable areas were identified for land uses across the Forest; these were identified as management areas. Management area goals, objectives and standards provide guidance for project level planning and decision-making, but are not site-specific enough to fulfill the requirements for project level analyses required by the NEPA.

Project level planning is done in the framework of the Grasslands Plan. It may be necessary to conduct field inventory and data collection and analysis before the Forest Service proposes an action during scoping. This inventory and data collection and interpretation of this data may take months or years. It is not until the agency determines that action is needed and takes steps pursuant to the National Environmental Policy Act that a proposal exists. The CEQ requires that scoping be done as early in the process as practicable and that it would not be appropriate to

conduct scoping until the impacts of a particular action (proposal) are confined to specific sites (40 CFR §1501.7. §1502.4; §1508.25).

The Forest Service is not certain what the commentor means by the statement "*…the NEPA notice came more than three and a half years after the MRD began the AMP and certainly after most of the major decisions had been made,…*" but certainly no NEPA decision had been made before scoping. Scoping began on May 23, 2008, the DEIS was released on July 1, 2009, comment on the DEIS ended October 12th, 2009.

Moreover, the "AMP process" the commentor refers to is traditional determinations of existing condition versus desired condition needed to develop a proposed action. Note the meetings that occurred prior to scoping were with the permittees and the Grazing Association, as we said we would do as part of the Demonstration Project (see 2006 ROD p. 16-17).

The commentor also misstates the full direction in the NEPA regulations. 40 CFR 1501.2 says "[a]gencies shall integrate the NEPA process with other planning at the earliest possible time to insure that planning and decisions reflect environmental values, to avoid delays later in the process and to head off potential conflicts." To have released the proposed action, which was being developed with the MGA earlier, would have been premature.

Commentor correctly identifies 40 CFR 1501.7 as scoping, which first requires a proposed action (see above). The time taken to evaluate the scope, gather necessary background data, and work with the permittee and comply with the SRT recommendations are all part of the needed prework described in this section of the regulations.

K-22 *Billings County and MGA filed scoping comments that raised the same issues repeated in these comments. The major issues, virtually all of which were entirely ignored, in the AMP DEIS, are:*

Billings County scoping response raised the issues identified below, that are taken verbatim from the county's June 23, 2008 letter. The MGA response to scoping dated June 26, 2008 was a series of questions which did not address the comments below (Project Record, Scoping Period Comments, D-6, 7, and 9).

+

Integrate Demonstration Project parameters and Under Secretary guidance into the AMP and EIS;

As stated elsewhere, this project is in full compliance with the Demonstration Project (see response to comments K-25, 26, 27, 28, and 35) as written, and the Under Secretary's guidance (see 2006 ROD, 2007 Discretionary Review and response to comments K-19 and K-122).

+

Revise proposed action to reflect genuine collaboration;

The MGA and Billings County seem to have a one sided interpretation of collaboration which roughly interpreted is that all their recommendations (see response to comments K-127 and K-34) must be included for collaboration to have taken place. This is not the Forest Service's understanding of collaboration; however, the proposed action reflects nearly all of the recommendations provided by the MGA, see response to comment M. Based on MGA's comments Alternative 3A was created for the SDEIS to reflect those specific actions the MGA felt the Forest Service should or should not have included – see SDEIS, Appendix A. See also response to comments K-26, 27, 28, 35, and L (Schneider 4 and 5).

+

Revise AMP process to test whether LRMP objectives standards and guidelines are achievable;

The Grasslands Plan and its accompanying RODs has twice been appealed and upheld and the Regional Forester's decision was upheld in full by the Washington Office (2003 and 2007 WO Appeal Decisions) and in the Secretary of Agriculture's discretionary review (2003 and 2007 Discretionary Reviews). There is no direction in any of that documentation directing the Forest Service to test whether objectives standards and guidelines are achievable nor is there any direction at the site specific project level carry out such tests. There are also no recommendations from the SRT process to test LRMP objectives standards and guidelines at the project level. Also the SDEIS indicates the landscape is capable of reaching Grasslands Plan goals, objectives, standards and guidelines (SDEIS, Chapter 3 Part 1). The issue is how to change management to meet the Grasslands Plan.

+

Revise AMP to identify LRMP amendments;

As previously noted The Grasslands Plan and its accompanying RODs have twice been appealed and upheld. The Regional Forester was and is willing to consider possible amendments to the Grasslands Plan as the need arises. However, a decision has to be made on this project and AMPs written, implemented, monitored and then evaluated to determine if additional adjustments to the Grasslands Plan are needed. As stated before no adjustments to the plan were noted during this project analysis.

+*Disclose and address how to resolve scientific controversies; Scientific controversies regarding LRMP assumptions and data not resolved*

See response to comments K-11 and K-111

+

Develop data and protocols to conform to SRT Recommendations;

+ *Failure to develop PFC and Robel Pole protocols;*

+ *Correct deficiencies in carrying capacity elements;*

The protocols for PFC are well established and clearly articulated in Prichard et al., 1998, and Prichard et al., 1999 (revised 2003). There is no additional need to develop additional PFC protocols. The SDEIS provides a thorough discussion of the carrying capacity analysis including how it was calculated, whether others use the method utilized in this analysis, outcome of peer review, other methodologies that are available and why they were or were not used, the SRT recommendations, and a discussion of the MGA recommendations (Range, Methodology, Carrying Capacity Analysis section of Chapter 3 Part 1 and Appendix A of the SDEIS)

+ *Information Data Quality Act issues; and*

+ *Any proposed grazing reductions require quality monitoring data needed to integrate the requirements of the Livestock Grazing ROD and the Demonstration Project.*

The Demonstration Project states that "Monitoring will be needed to establish whether or not desired conditions have already been achieved before consideration of livestock numbers or AUM adjustments". The SDEIS describes the existing resource conditions based on existing monitoring data collected over the past several years at both the geographic and allotment level (see the Methodology and/or Existing Condition sections for each resource in Chapter 3 Part 1 and the Existing Condition section for each allotment in Chapter 3 Part 2 of the SDEIS. It describes whether or not the allotment(s) meets desired conditions based on the monitoring data and goes on to describe whether or not livestock grazing was a factor. The SDEIS also includes a description of the monitoring to be conducted in the Monitoring section of Chapter 2 and by allotment in the third table for each allotment in Chapter 3 Part 2 of the SDEIS.

K-22a *The County requested cooperating agency status in June 2008 but the Forest Service has done its best to delay to the point where it is less meaningful and also violates NEPA rules and guidance. The CEQ governing rules for cooperating agency status define a cooperating agency to include a state or local agency or tribe that has jurisdiction or special expertise with respect to environmental impacts. 40 C.F.R. '1508.5. The CEQ guidance memoranda issued in 1999 and expanded in 2002, which were cited in the Billings County cooperating agency request, also apply to requests from non federal agencies for cooperating agency status. CEQ Memorandum Designation of Non-Federal Agencies To Be Cooperating Agencies in Implementing the Procedural Requirements of the National Environmental Policy Act (ANEPA@) July 28, 1999. Billings County clearly met the criteria set out in the CEQ rules and explained in the 2002 memorandum by CEQ Director James Connaughton entitled Cooperating Agencies in Implementing the Procedural Requirements of the National Environmental Policy Act (Jan. 30, 2002). Failure to grant the requests or delays in responding contradicts decisions in Wyoming federal court setting aside an EIS when the agency failed to act on the cooperating agency request, Wyoming v. U.S. Dept. of Agriculture, 570 F. Supp.2d 1309, 1334 1335 (D. Wyo. 2008); or failed to involve the cooperators in the development of alternatives, Intl. Snowmobilers Assn. v. Norton, 340 F. Supp.2d 1249, 1262, (D. Wyo. 2004). In both cases, the EIS and the agency decision were set aside for failure to involve cooperating agencies.*

The actual chronology is as follows:

- **June 23, 2008 – Billings County Commission hand delivers commissions scoping comments followed by hard mail copy. Contained in comments is a request for cooperating agency status.**
- **July 2, 2008 – Letter from Medora Ranger District to Billings County Commission stating that commission's comments were not signed and requesting signed copy so Medora Ranger District could consider their cooperating agency request.**
- **August 6, 2008 – Medora Ranger District received a signed copy of Billings County Commission comments.**
- **January 26, 2009 – Letter from Medora Ranger District responding to request for cooperating agency status.**
- **March 3, 2009 – Billings County Commission's responses to 1/26/09 letter.**
- **April 13, 2009 – Letter from Medora Ranger District to Billings County Commission's containing draft MOU for commission's review and comment. The letter notes that the County would need to identify a representative who would serve as signatory for the County (Part E, number 7 of MOU).**
- **May 29, 2009 – Medora Ranger District receives draft MOU back from Billings County signed by commissioner Arthaud but with Part E, number 7 of MOU blank.**
- **June 9, 2009 – Letter from DPG Supervisor to Billings County Commission noting reception of signed draft and transmittal of final MOU for signature. Letter noted the need for identification of county contact person, to be filled in block 7, and need for that person to meet requirement of paragraph 6 of the MOU.**
- **July 8, 2009 – Grasslands Supervisory receives signed MOU from Billings County Commissioner James Arthaud.**
- **July 16, 2009 – Letter from DPG Supervisor to Billings County Commission noting receipt of the signed MOU by Billings County. It also notes that the person identified as the county contact doesn't meet MOU requirements (Part E numbers 6 &7) and requests submittal of a different contact person.**
- **August 20, 2009 – Letter from C.E. Brooks and Associates, P.C. to Horst Greczmiel, Associate Director CEQ on failure of Forest Service to grant cooperating status to Billings County Commission.**
- **September 18, 2009 – Letter from Grasslands Supervisor to Billings County Commissioner identified that the Forest Service had not rejected the signed MOU and clarified that only thing lacking was identification of a County representative without a conflict of interest or appearance thereof.**
- **October 8, 2009 – Letter from Joan Jurgens (Billings County Representative) to Grasslands Supervisor w/ signed copy of MOU.**
- **October 29, 2009 – Letter from Grasslands Supervisor to Joan Jurgens identifying that the principle contacts are now acceptable to Forest Service, that he had signed the MOU which was attached to the letter.**
- **November 12, 2009 – Letter from Grasslands Supervisor to Joan Jurgens identifying meeting between Forest service and County representatives w/ and**

attached set of notes for the counties review. Note identify County would supply their information to Forest Service by December 23, 2009.

- **December 30, 2009 – Forest Service received an Economic Report from Billings County.**
- **January 22, 2010 – Forest Service response to Billings County Economic Report and cover letter.**
- **March 25, 2010 – Meeting between Forest Service and Billings County economist to discuss Forest Service and County's reports.**
- **April 2, 2010 - Letter from District Ranger Ron Jablonski to Joan Jurgens. The letter transmitted a copy of Forest Service meeting notes, from March 25, 2010 meeting with Billings County. The letter also requested any edits or additions the County may have.**
- **April 15, 2010 – Letter District Ranger Ron Jablonski to Joan Jurgens. The letter transmitted the latest draft of the Forest Service economic report and a summary document, which identified information from the Billings County economic report, included in the Forest Service draft. The letter also requested that Billings County provide any proposed edits by April 30, 2010.**
- **July 22, 2010 – Letter from District Ranger Ron Jablonski to Joan Jurgens identifying that he had decided to add Alternative 3A to the North Billings analysis. Enclosed with the letter was a copy of the new alternative and a request to notify the Forest Service if the new alternative would affect the Billings County economic analysis.**
- **July 27, 2010 – E-mail from Jeff Adams to Joan Jurgens identifying that District Ranger Ron Jablonski had granted Billings County's request for additional time to review Alternative 3A.**
- **July 30, 2010 – E-mail from Joan Jurgens to Jeff Adams thanking Forest Service for granted extension to review Alternative 3A.**
- **August 13, 2010 – E-mail from Joan Jurgens to Jeff Adams. Dr. Bangsund indicates that changes in livestock reductions would change the assessment but Alternative 3A doesn't not appear to change reductions set forth in the DEIS.**
- **August 27, 2010 - Letter from District Ranger Ron Jablonski to Joan Jurgens transmitting copy of Forest Service Final Economic Report.**
- **September 20, 2010 – Letter from District Ranger Ron Jablonski to Joan Jurgens identifying that the carrying capacity analysis for the North Billings project had been updated with new NRCS ecological site production information. Enclosed with the letter was the updated carrying capacity information. The letter also requested an updated copy of the Billings County economic repost if this new information changed their report.**
- **October 14, 2010 – Letter from District Ranger Ron Jablonski to Joan Jurgens identifying that the Forest Service Economic Report had to be updated and transmitted a copy of the report.**
- **January 24, 2011 - Letter from District Ranger Ron Jablonski to Joan Jurgens identifying that some minor editing errors had been discovered in the Forest Service economic report. The letter also transmitted a copy of the Final Forest Service Economic Report.**

The agency has complied with 40 CFR 1501.6

The MRD did not send the first Memorandum of Understanding until after the AMP DEIS was released.

This is an incorrect statement. In a letter dated April 13, 2009 District Range Ron W. Jablonski sent a draft Memorandum of Understanding (MOU) to Jim Arthaud, Chairman Billings County Commissioners. The DEIS was made available to the public on July 1, 2009.

K-23 *Billings County has broad authority to protect the public health and welfare of county residents. N.D.C.C. '11-33-02. Assuring access to land for livestock operations and ensuring that the land is wisely managed is included in the county mandate and reflected in the Billings County Comprehensive Plan. See pp. 4, 7 (ABillings County supports maintaining or increasing the level of livestock grazing on federal and state lands, protecting water rights, increasing the tourism industry in a manner compatible with private property rights and local self-determination, and promoting socially and ecologically responsible oil and gas exploration, development, and production.@). Protecting the interests of its citizens that depend on the national grasslands for their livestock operations and ensuring that the vegetation is well-managed to reduce the risk of fire are objectives that are essential to the public welfare of Billings County. Under North Dakota law Billings County has broad powers to provide for the development and zoning of all lands within its boundaries, to provide for a transportation system, law enforcement, and other services. N.D.C.C. "11-33-01, 11-33-03. The county implements its authority in numerous ways, including acquisition of real and personal property, rights-of-way and easements, land use planning and zoning, approving construction within the county, and providing for the maintenance and construction of roads within the county, emergency management, development of natural resources within the county. N.D.C.C. "11-11-14; 11-33-01; 11-33-03. Pursuant to its authorities, Billings County adopted a Comprehensive Plan. http://www.billingscountynd.gov/BillingsCountyComprehensivePlan.htm. The plan establishes policies and direction for land management throughout the county.*

Billings County commissioners actively participated in the development of the DPG LRMP as well as the related issues pertaining to fire suppression and control, access within the LMNG, and energy development projects. These activities reflect the county=s obligation Ato serve the health, safety, morals, public convenience, general prosperity, and public welfare of the citizens of Billings County.@ Comprehensive Plan at 6.

The Forest Service recognizes that Billings County has prepared the Billings County Comprehensive Plan. Billings County Comprehensive plan was considered in the development of the Grasslands Plan (Grasslands Plan FEIS p. 3-403). In addition, as noted in response to comment K-6 management of the LMNG is governed under the provisions of the Bankhead-Jones Farm Tenant Act, the Forest and Range Renewable Resources Planning Act, the National Forest Management Act and

Forest Service Regulations 36 CFR 213 (Administration of Lands under Title III of the Bankhead-Jones Farm Tenant Act by the Forest Service) and 36 CFR 222 (Range Management) and other laws relating to the National Forest System lands. The United States Constitution vests Congress with the authority over all federal lands. Agencies must administer lands under their jurisdiction consistent with those acts of Congress. For the National Grasslands, Congress through the Bankhead-Jones Farm Tenant Act and other laws discussed above has set for the management purposes and objectives of the federal lands. As such, the SDEIS has appropriately set forth those statutes directing management of the national grasslands.

K-24 *Expertise regarding the proposed actions/relationship to the objectives of regional, State and local land use plans, policies and controls, 40 C.F.R. "1501.1(d), 1501.7, 1502.16(c). Billings County has land use planning authority and substantial background in national grassland management, the Dakota Prairie Grasslands (DPG) Land and Resource Management Plan (LRMP), and the related issues pertaining to livestock grazing management. Billings County commissioners are knowledgeable about the management issues, vegetation and habitat, access rights and needs, and the history and background of agriculture in the county. The MGA has played an integral part of this custom and culture and the range management issues to be addressed in the EIS. The management of the grazing allotments administered by the MGA members has an important role in the economy and the custom and culture of Billings County. See Comprehensive Plan at 3, 4 (ABecause federal lands grazing accounts for over one-half of all livestock grazing in the County, continued federal land grazing is of paramount importance to maintain the ranching industry and the custom and culture of ranching in Billings County.@), 5 (A[T]here are no substitutes for the base industries of energy and cattle production. Consequently, the current uses of natural resources must be maintained in order to keep the custom, culture, and economic stability of Billings County intact.@).*

Billings County has the requisite expertise with respect to the resource issues, including water, vegetation, land use, zoning, and transportation and with respect to economic and social issues to be a cooperating agency. 40 C.F.R. '1506.16.
Yet the Forest Service has done all that it could to delay action on the county's request. Waiting more than 8 months to respond to a request is not good faith compliance with the CEQ guidance regarding cooperating agencies, especially since the MRD was writing the EIS while delaying its response to the request. Had Billings County been involved as a cooperator, it would have been able to identify the significant costs to the agriculture sector and the communities at large, starting with reductions traceable to carrying capacity calculations. Previous comments by other range and resource experts attributed additional reductions to high structure objectives in the DPG LRMP and restrictions on structural range improvements, such as water development. See e.g. HAND Comments 1999, 2002, and appeal of 2007 and exhibits.

Agriculture is an important component of the county economy and culture and this is recognized in the Billings County plan. The county participated in and helped to fund the HAND economic analysis done in 1999 which displayed the effects of very similar level of grazing reductions. HAND Comments 1999, Leistritz 1999. The economic impact

analysis is a much more inclusive analysis of the impacts than what was found in the AMP DEIS.

See response to comment K-23.

K-25 *The 2006 Livestock Grazing ROD is part of the DPG LRMP and the proposed North Billings AMP Revisions project must be consistent with the planning decisions made by the Forest Service in the ROD. 2006 ROD at 2; 16 U.S.C. &1604(I); Neighbors of Cuddy -Mtn. v . U.S. Forest Service, 137 F.3d 1372, 1376 (9th Cir. 1998).*
If the AMP DEIS project does not conform to these livestock grazing planning decisions, the proposed action may not go forward unless it is modified for consistency, or if the DPG LRMP and the ROD are contemporaneously amended. 36 C.F.R. '219.8(e). As currently proposed, the AMP Revision project is inconsistent with the livestock grazing components set forth in the ROD, and the Forest Service must either modify the proposed action to make it consistent with the DPG LRMP, amend the plan to allow for the proposed action, or reject the proposed action altogether. Id.

Commentor is correct in their summarization of 36 CFR 219.8 (e) – that is, a selected action must be either consistent with the Grasslands Plan (and other laws and regulations) or the Grasslands Plan must be amended to make it consistent. Since that rule has been pulled, the National Forest Management Act (NFMA) contains the parent language to the cited clause "[r]esource plans and permits, contracts, and other instruments for the use and occupancy of National Forest System lands shall be consistent with the land management plans. Those resource plans and permits, contracts, and other such instruments currently in existence shall be revised as soon as practicable to be made consistent with such plans. When land management plans are revised, resource plans and permits, contracts, and other instruments, when necessary, shall be revised as soon as practicable. Any revision in present or future permits, contract, and other instruments made pursuant to this section shall be subject to valid existing rights" (U.S.C Title 16, Chapter 36, Subchapter I part 1604 (h)(3)(i).

The 2000 Planning Rule, republished in December 18, 2009 in the Federal Register to be in effect until the next planning rule, states in 36 219.10 " All site-specific decisions, including authorized uses of land, must be consistent with the applicable plan. If a proposed site specific decision is not consistent with the applicable plan, the responsible official may modify the proposed decision to make it consistent with the plan, reject the proposal; or amend the plan to authorize the action."

Alternative 3 meets the standards in the Grasslands Plan. In addition Alternative 3 is designed to meet the goals and objectives with the initial actions and adaptive management measures. However, it may take longer for Alternative 3 to move toward the desired conditions in the Grasslands Plan than Alternative 4.

K-26 *The MRD has failed to implement the Demonstration Project format, even though required by the Livestock Grazing ROD and disposition of the appeals in August 2007.*

Instead, the MRD claims that it is implementing the Demonstration Project, AMP DEIS at 1-5 - 1-6, although as shown below in these comments, the DEIS misses many of the key elements that the Demonstration Project was to consider.
The following analysis of each Demonstration Project provision shows how the DEIS fails in any substantial respect to comply and for that reason, the AMP DEIS needs to be entirely revised or a supplement prepared that conforms.
A. Careful consultation with the Grazing Association
The Demonstration Project Proposal specifically provides:
[AMPs] will be developed at the landscape or multiple allotment level. The Pre-NEPA process would be completed in careful consultation, coordination, and cooperation with the grazing associations representing their members working in concert with the Forest Service.
Livestock Grazing ROD at 16.
The individual allotment AAMPs will be developed from information contained in the selected alternative@ of the AMP Revisions project, DEIS at ix-x. In response to the requests for additional time to comment, the District Ranger wrote MGA setting out the times that the Forest Service discussed the AMP DEIS, a significant number of which occurred during the MGA monthly meetings. See e.g. Jablonski Letter of Sept. 17, 2009 at 2-3. But the quantity of meetings is not a substitute for quality. The DP requires true collaboration, not just a meeting where the Forest Service tells the permittee what will be done, without regard to the objections and concerns expressed by the MGA members.

The Forest Service believes that the Demonstration Project has been followed. The commentor is correct in stating that the Forest Service agreed to implement the Demonstration Project (2006 ROD, p. 10). (NOTE: The Forest Service is unclear as to what exactly the commentor means by disposition of the appeals in August 2007, but for clarification the Regional Forester's decision was upheld in full by the Washington Office (2007 WO Appeal Decision) and in the Secretary of Agriculture's discretionary review (2007 Discretionary Review).
The commentor appears to have identified one "key element" from the Demonstration Project. The Forest Service fully believes it has implemented careful consultation, coordination, and cooperation (Project Record, Process Documentation, Permittee Meeting Notes, B-51 – B-54; SDEIS, Appendix A; and Project Record, Correspondence Permittee, J-23). See also response to comments K-27 and K-28.

The September 17, 2009 letter to the MGA did have many notations that kept the board of directors apprised of progress towards the revision of AMPs within the project area. It also included notations about the three different sets of permittee meetings each of which covered a significant span of time. These meetings included the affected permittee, the base property lessor if applicable, their representative MGA director, and Forest Service personnel.

A lot of input was taken from the individual permittees in development of the proposed action (Project Record, Process Documentation, Permittee Meeting Notes, B-51 – B-54), and ultimately included in the proposed action (see response to

comment M). In many cases there was compromise back and forth between the permittee and the Forest Service. As noted in the permittee meeting notes (Project Record, Process Documentation, Permittee Meeting Notes, B-51 – B-54) and on in Appendix A of the SDEIS, individual permittees were informed that if they had any concerns and/or questions to feel free to call the MRD or their MGA director. The Forest Service range personnel were up front with the individual permittees that not all of their desired recommendations would be carried forward for a variety of reasons. The Forest Service is confident that the meetings were of sufficient quality and quantity to adequately consider and discuss MGA members' objections and concerns.

The collaborative approach outlined in the Demonstration Project actually refers to the difference between the traditional method of the Forest Service and grazing association and individual member (as described above) or an inclusive collaborative approach such as Coordinated Resource Management as described in the 2006 ROD page 16. See also response to comment K-35.

K-27 *In the pre-NEPA process between 2005 and 2008, the MRD met with the individual MGA members on three occasions. Of these three sets of meeting with the members, the Forest Service sought input from the permittees during only the first set of meetings. Exhibit 3, Declaration of Clint Schneider (Ex. 3, Schneider Decl.) &&3-7. At the first set of meetings, the MGA members set out their recommendations for managing each allotment, such as flexibility in the operation of a rest or deferred grazing system, flexibility for turn on and off dates, development of water or reconstruction of existing water development or fences. See Ex. 2, Comparison of MGA Recommendations and Alternative 3 of AMP DEIS.*

The Forest Service did meet with the MGA and its members on three occasions between 2005 and 2007. The Forest Service disagrees with the statement that "the Forest Service sought input from the permittees during only the first set of meetings". The notes taken at the second and third set of permittee meetings dispute this statement (Project Record, Process Documentation, Permittee Meeting Notes, B-51 – B-54; SDEIS, Appendix A). Furthermore, after reviewing Exhibit 2, it was determined that most of the highlighted MGA recommendations were either included in the proposed action or dropped for one of several different reasons, see response to comment M and SDEIS, Appendix A, Table 3 for further details.

K-28 *While the Forest Service promised to seriously consider them, the agency returned months later, to say that the MGA recommendations were "unacceptable" to the IDT were excluded. No substantive reason was given other than the biologist or the archeologist disagreed. A comparison between what was requested and what the Forest Service presented as the draft Appendix A for Alternative 3 demonstrates that the Forest Service rejected many of the MGA member recommendations, especially those that would facilitate distribution away from sensitive resources and would avoid grazing reductions. Thus, the objective of collaboration and working together was quickly squelched. Nor*

was there any change in this attitude after the Livestock Grazing ROD and Demonstration Project were adopted.

All permittee requests were seriously considered by the Forest Service and weighed against identified issues in each individual allotment. The Forest Service was up front with the individual permittees and identified that not all of their requests would be carried forward for a variety of reasons (Project Record, Process Documentation, Permittee Meeting Notes, B-51 – B-54). This is confirmed, as well, by Clint Schneider's Declaration #4 which states "At the end of the first set of meetings the Forest Service said they would take these recommendations back to the planning team. They were specific that the association members may get what they wanted or may not." During the second set of permittee meetings requests made by permittees that were dropped or altered were discussed and explained with the individual permittee. Typically, these requests had to be changed because of a particular resource need, which was fully explained to the permittee. A review of Exhibit 2, revealed that most of the highlighted MGA recommendations were either included in the proposed action or dropped for one of several different reasons, see response to comment M and SDEIS, Appendix A, Table 3 for further details.

The Forest Service disagrees with the statement, "Thus, the objective of collaboration and working together was quickly squelched. Nor was there any change in this attitude after the Livestock Grazing ROD and Demonstration Project were adopted", see response to comment K-26.

K-29 *As a result, Alternative 3 of the AMP DEIS reflects what the Forest Service wanted, not what was recommended and agreed to by MGA members. Ex. 3, Schneider Decl. &&4-5. This does not satisfy the ROD which required the Forest Service to develop an alternative that was agreed to by both the MGA and the Forest Service nor did this process actually achieve consultation and collaboration, as represented in the AMP DEIS. Ex. 3, Schneider Decln &&7-8; DEIS at 1-5.*

Forest Service worked extensively with the MGA board and individual permittees in the development of Alternative 3 (SDEIS, Appendix A). The proposed action reflects nearly all of the recommendations provided by the MGA, see response to comment M. Based on MGAs comments Alternative 3A was created for the SDEIS to reflect those specific actions the MGA felt the Forest Service should or should not have included (see SDEIS, Appendix A). Also see response to comments K-22, 26, 27, 28, 35, and Schneider 4 and 5.

K-30 *The rigid attitude of the Forest Service further made it clear that no changes in Alternative 3 would be "acceptable". By the third permittee meeting, fewer members attended since it was clear that their participation would not result in an alternative that the MGA members could support. Id. &7.*

The Forest Service disagrees with this comment. The SDEIS, Appendix A demonstrates that the Forest Service continued to work with the permittees and

consistently identified that the Forest Service was willing to continue to entertain any concerns, comments, or suggestions. At the second set of meetings the Forest Service even offered the opportunity for individual permittees to challenge identified issues on their individual allotment (Project Record, Process Documentation, Permittee Meeting Notes, B-52). The IDT field reviewed all identified challenges. In the case of one allotment the IDT did determine that the resource goal was obtained.

A review of the Forest Service permittee meeting notes reveals that all but six permittees attended the third set of meetings (Project Record, Process Documentation, Permittee Meeting Notes, B-53). Attendance at the third set of meetings did not indicate that "…it was clear that their participation would not result in an alternative that the MGA members could support." The six permittees did not attend because of scheduling conflicts, personal health issues, and conveyance of two allotments from Federal to private ownership. These missed meetings were resolved through telephone conversations, no resource issues were identified so third meeting wasn't truly necessary, and in one situation the third meeting was not followed up on.

K-31 *A comparison of Alternative 3, Appendix A from the notes of each permittee meetings regarding the initial recommendations illustrate the clear fact that the Forest Service did not develop an alternative that MGA supported. Requests for water development, flexibility for on and off dates, and other structures were omitted entirely. Ex. 2. In many cases, the Alternative 3 imposes removal of water developments or fences based on "no net increase" in range structures without any agreement by the permittee.*

The Forest Service disagrees with the comment. A review of Exhibit 2, revealed that most of the highlighted MGA recommendations were either included in the proposed action or dropped for one of several different reasons, see response to comment M and the SDEIS, Appendix A, Table 3 for further details.

If an initial action proposed to remove a water development, it was either because a resource issue was identified or the IDT was following direction from the Grasslands Plan. The Grasslands Plan contains no direction related to "…'no net increase' in range structures…" (see response to comment K-4), nor was it used as a reason to preclude any range structure.

K-32 *The reliance on the no net increase in range structures is also misplaced. It is not required by any law or regulation. The Livestock Grazing ROD requires the Forest Service to consider amendments and this is one such amendment that should have been considered.*

This comment has been previously addressed in response to comment K-4. There is no need to consider amending the Grasslands Plan regarding no net increase as it does not exist in the Grasslands Plan.

K-33 *The FEIS allows structural improvements when needed to meet the LRMP. DPG LRMP FEIS A-33. When this direction is read with more recent direction to take all measures to avoid livestock grazing reductions, it is clear that the MRD erred in not accepting all of the MGA member recommendations.*

The Forest Service agrees that structural improvements can be used to help manage livestock, see response to comment K-4.

Alternatives 3, 3A, and 4 utilize a variety of nonstructural and structural practices (See SDEIS, Table 2.13 and Chapter 3 Part 2) as initial actions. Both are also included in the grazing management toolbox (SDEIS Table 2.1) for potential future use if needed.

The Forest Service assumes that the commentor is referring to the 2006 Grazing ROD, more specifically the Demonstration Project when referring to "more recent direction". This direct doesn't say "to take all measures to avoid livestock grazing reductions". Under point 9 of the Demonstration project it states "There will be no cuts in permitted AUM's without monitoring showing that livestock are principally responsible for not meeting the desired condition, and that the cuts are the only ecologically practicable and economically feasible means available for meeting the desired condition". It should be noted that Alternative 2 has no grazing reductions. Alternatives 3 and 3A have no initial grazing reductions.

It is correct that not all recommendations were carried forward in Alternative 3, however, there is no requirement to do so. Response to comment M provides explanations of why certain recommendations were not carried forward in the proposed action.

It is correct that not all recommendations were carried forward in Alternative 3, however, there is no requirement to do so. Response to comment M provides explanations of why certain recommendations were not carried forward in the proposed action. Additionally, Alternative 3A was added to the SDEIS and it does accept all the MGA recommendations.

K-34 *The MGA recommendations were not extreme nor would they have adversely affected resource conditions. Thus, the summary rejection by the Forest Service is arbitrary and capricious and appears to have been a deliberate effort to impose unnecessary reductions in livestock grazing.*

The commentor seems to imply that recommendations from the MGA were for the most part rejected. This is incorrect, in fact, most comments were incorporated into the proposed action. Recommendations not included are addressed in response to comment M.

Based on MGAs comments Alternative 3A was created for the SDEIS to reflect those specific actions the MGA felt the Forest Service should or should not have included (see SDEIS, Appendix A).

The commentor doesn't provide any information that would allow the Forest Service to judge the commentor's statement that rejected recommendations would not adversely affect resource conditions.

This comment is associated with Alternative 3 the proposed action. Under this alternative there are no initial reductions in livestock grazing. Adjustments in Authorized Use is one of the tools in the grazing management tool box which may be implemented if initial actions identified under this alternative do not provide acceptable improvement in impaired resource conditions.

K-35 *The AMP DEIS states that MGA expressly agreed to the adaptive management alternatives, citing an email from MGA. AMP DEIS at 1-5. In fact, the Forest Service gave MGA an up or down choice, coordinated resource management planning (CRMP) or Adaptive Management. Ex. 3, Schneider Decl. &10. The Forest Service did not present the choice as adaptive management versus the Demonstration Project. Id. The AMP DEIS and the District Ranger incorrectly imply that MGA chose not to adopt the Demonstration Project methodology. It was never presented as such. Id. Because the Demonstration Project is part of the ROD, the Forest Service could not legally evade these procedures, even if the AMP process was well along by December 2006, which it was not.*

The commentor confuses the Demonstration Project options regarding how the Forest Service and MGA would develop a Proposed Action i.e Traditional vs. Collaborative approaches such as CRM,(see Grasslands Plan 2006 ROD p. 16) with using an adaptive management feature in the proposed action. Including adaptive management allows for management flexibility in meeting or moving towards Grasslands Plan goals and objectives without revisiting NEPA.

The Forest Service started working on the North Billings project in 2005 and the range staff held their first meetings with individual permittees starting in mid-November of 2005. In September of 2006 the Livestock Grazing Record of Decision (ROD) for the Dakota Prairie Grasslands was signed. The ROD stated "Either the traditional method of the Forest Service and grazing association and individual member or an inclusive collaborative approach, such as Coordinated Resource Management (CRM) will be used" (Grasslands Plan ROD, 2006 p. 16). The Forest Service met with the MGA on December 6, 2006 (Project Record, Supporting Documentation – Range, L-23) to review the recently signed ROD and discuss the traditional method or a CRM. Up to this point the Forest Service had been working with the individual permittee, their respective directors, and the MGA on the North Billings project which is the traditional method.

The Forest Service discussed with the MGA what a CRM was and also reviewed the course it had been following which was a traditional approach. The MGA Board of Directors Regular Meeting Minutes December 6, 2006 state "Another approach is to continue with the way we are doing things now, which is the Forest Service, permittee and Director meeting and discussing the issues for each allotment." This is the traditional approach identified in the 2006 Grasslands Plan ROD on page 16. On January 10, 2007 the Forest Service met with the MGA board of directors at their regular meeting. At the meeting the MGA declined the CRM and identified that they wanted to continue to use the process we had been following in creating the proposed action. The Forest Service documented this decision in a letter to the MGA dated January 29, 2007. The letter states "At the January 2007 meeting the board decided to follow through with the adaptive management alternative as a proposed action and to continue on as we have been doing business/process with the North Billings Range EIS". The Forest Service also provided the MGA with the opportunity to correct the notes, the MGA did not respond with any corrections.

The Forest Service believes that at this point the MGA chose the approach in which the proposed action would be jointly developed consistent with the Demonstration Project (2006 ROD, p. 16).

On March 5, 2008 (Project Record, Supporting Documentation – Range, L-25; Forest Service range staff notes from MGA Meeting March 2008) the Forest Service again briefed the MGA on how utilizing at adaptive management approach to the NEPA for this project differs from how NEPA has been done in the past in relation to creation of AMPs. This was done because several of the MGA board of directors had changed. They again confirmed that they wanted to continue with the concept of adaptive management in the creation of the proposed action.

On April 3, 2008 the MGA sent an e-mail to the Medora Range staff again agreeing with the use of adaptive management. All during this timeframe the Forest Service continued to work individually with the MGA members and board of directors in the creation of the actions for each allotment that would become the proposed action (SDEIS, Appendix A and Project Record, Process Documentation – Permittee Meeting Notes, B-51 – B-53).

K-36 *Even now, MGA does not object to adaptive management, if actually implemented correctly. Alternatives 3 and 4 do not and cannot however implement adaptive management, when the controversies regarding the objectives and how to measure progress remain unresolved.*

Alternatives 3, 3A and 4 are adaptive management based alternatives; the concept of adaptive management is explained in the Adaptive Management section in Chapter 1 of the SDEIS. Resource objectives are defined in Chapter 1 of the Grasslands Plan. The Final Response to the SRT Reports addresses the Forest Service's response to different methods of measurement. The SDEIS in Chapter 2

contains the monitoring plan and Chapter 3 Part 2 identifies the specific monitoring and frequencies that will occur for each allotment.

While there undoubtedly is still controversy over issues that have been decided in the Grasslands Plan (see WO appeal resolution letters from 2003 and 2007, and the Secretary of Agriculture's discretionary review letters from 2003 and 2007 which uphold the Grasslands Plan decisions), it is not all scientific controversy. In fact, the SRT in response to question of adequacy of the data for the Northern Great Plains FEIS states "[i]t is the opinion of the SRT that the perceived problems associated with the current FEIS and LRMP stem largely from differences among affected parties in value systems rather than scientific shortcomings."

K-37 *While the Forest Service does not have adaptive management guidance, the Department of the Interior developed guidelines two years ago. Adaptive Management: A Technical Guide (DOI 2007). A critical aspect of adaptive management is the need for agreed upon and measurable objectives. DOI Guide at 3. Adaptive management is less feasible when there is significant disagreement on the objectives and standards. Thus, embracing adaptive management is premature at best unless there are adaptive procedures to test the scientific controversies and LRMP goals, objectives, standards and guidelines, so that all issues are subject to adaptive management.*

See response to comment K-36.

The IDT reviewed the guide cited in this comment. Commentor misstates the DOI guide. The statement is "specifying objectives and tradeoffs that capture the values of stakeholders" (DOI Guide, p. 3). This is what was done during the Grasslands Plan revision process. The MGA chose not to participate in a CRM process which would have involved other stakeholders in the public lands. (see response to comment K-35). The adaptive management described in the EIS is appropriate for the purpose of adaptive grazing management as opposed to adapative management in terms of a structured decision making process in lieu of NEPA, as the commenter seems to suggest. (DOI Guide).

K-38 *In the AMP DEIS, adaptive management assumes that the LRMP objectives, standards and guidelines are set in stone and the question is how to achieve them. This ignores the fact that the objectives, standards and guidelines are very much in dispute, and the first question is whether they can or should be achieved.*

WO appeal resolution letters from 2003 and 2007 and the Secretary of Agriculture's discretionary review letters from 2003 and 2007 uphold the Grasslands Plan decisions. Grasslands Plan objectives, standards and guidelines are not in dispute. As commentor correctly points out in K-25, the selected alternative must be consistent with the Grasslands Plan or the plan must be amended to make it so. The SDEIS indicates that the land is capable of meeting the Grasslands Plan, so the reasoned approach would be to change management to aid in achieving the multiple use objectives. Also see response to comment K-36.

K-39 *ROD and Demonstration Project Direction Provisions Not Followed*
1. AMPs will be developed and implemented, working through the processes described in this document. Goals, objectives, standards and guidelines related to livestock grazing in the Grasslands Plan will be assessed. If adjustments are needed, Grassland Plan amendments will be proposed. Livestock Grazing ROD at 16.
As explained above, the Forest Service rejected most of the MGA recommendations because IDT members for biology or archeology did not agree or they were not consistent with the LRMP. As a result, the AMP DEIS does not assess the achievability of the goals, objectives or standards and guidelines or whether they should be revised to avoid livestock grazing reductions. Thus, there is no determination as to the need for adjustments in the goals, objectives, standards and guidelines. This is a material and fatal omission.

The Forest Service disagrees with the statement that most of the MGA recommendations were rejected, see response to comment M and SDEIS, Appendix A.

The SDEIS includes Alternative 3A which includes all of the MGA's recommendations. The SDEIS also addresses the consistency of the different alternatives with Grasslands Plan direction (SDEIS, Chapter 3 Part 1). The SDEIS indicates that the land is capable of meeting the Grasslands Plan so there is no need to adjust Grasslands Plan goals, objectives, standards and guidelines.

K-40 *The AMP DEIS assumes erroneously that the DPG LRMP is to be implemented as it was written in 2002, thereby ignoring the 2006 Livestock Grazing ROD and the incorporation of the SRT recommendations and the Demonstration Project. This assumption excises the SRT process, the reports, and the Livestock Grazing ROD adoption of the Demonstration Project system. Because the AMP DEIS omitted this critical step and must be significantly revised.*

Appendix C of the SDEIS identifies how the SRT recommendations were used in this analysis. Detailed discussion and documentation of the consultation and work done with the MGA to develop the proposed action (Alternative 3) is found in the DEIS at 3-10 and 3-11 and SDEIS in Appendix A. Chapter 3 Part 1 of the SDEIS addresses the provisions of the Demonstration Project.

K-41 *The consequences of not providing for reconsideration of the goals, objectives, standards and guidelines are manifest. The AMP DEIS states that the high structure VORs are not met in most cases. See e.g. DEIS App. A-49-53, 47, 49 -71, 73-90. Only three of the 41 allotments are said to meet the high structure objectives. There is, however, no process to determine whether the land can produce the vegetation structure to meet the assigned VOR.*

Six allotments were determined to be meeting herbaceous structure conditions: 132A, 239, 241, 243, 248, and 282.

Long term monitoring of the LMNG has determined that the identified habitat types are biologically capable of producing High structure. See SDEIS, Chapter 3 Part 1, Herbaceous Structure, Desired Condition.

K-42 *Nor do we have confidence in the conclusion that the allotments fail to meet high or even moderate structure objectives since much of the underlying work was done before the SRT concluded that the VOR data were suspect.*

SRT did not review the VOR data specific to this project nor did they determined that it was "suspect". The SRT did not conclude that the VOR data for the SRT process was "suspect." Instead, they asked the DPG to analyze data by stations versus using the transect average: SRT Recommendation II-2 (Final Response to the SRT Reports, p 14): "Robel pole data should be summarized by frequencies of readings rather than by averaging readings". The DEIS incorporates SRT Recommendation II-2 on pages 3-134 and 3-135. The SDEIS incorporates SRT Recommendation II-2 (SDEIS, Chapter 3 Part 1, Wildlife and SDEIS, Chapter 3 Part 2). Transect and station analyses are provided in this document.

K-43 *The same deficiency applies to the PFC readings of the riparian areas. The AMP DEIS concludes that the riparian areas are functioning at risk (FAR) or non-functioning (NF). But the AMP DEIS never considered adjusting the PFC criteria or redoing the readings after developing a process and training to ensure consistency in the readings. SRT also criticized the use of one person rather than review of the data by an IDT. Id. at 23.*

The DEIS (p. 3-57) identifies that intermittent and perennial streams in the project area range from PFC to non-functional, it does not conclude that all the riparian areas are either FAR or NF. The Affected Environment – Riparian, Existing Condition section of Chapter 3 Part 1 of the SDEIS clarifies that all the streams in the project area are intermittent with the exception of the Little Missouri River. Tables 3.9 and 3.10 in the SDEIS summarize the miles of stream by PFC rating and provide the individual PFC rating by allotment.

The methods used to collect PFC data for the SDEIS conform to the written protocols (see Prichard et al., 1998, 1999 (revised 2003)) and comply with the recommendations that the SRT made in 2005. The comments (i.e. "deficiency"), made by the SRT in 2005, were made in reference to some data that were collected in 1997 and 1998. Those comments did not apply to the data used in this project.

The SRT never criticized the data collected for this project. The SRT criticized the manner in which some PFC data were collected in 1997/98 for the Little Missouri Rangeland Assessment, which was a separate endeavor conducted more than a decade ago by other personnel. All the PFC data used to determine existing condition in the North Billings project were collected with interdisciplinary teams (See Brooks, 2005, p. ix and individual PFC checklists in the Project Record, Supporting Documentation – Riparian, L-26).

K-44 *The AMP DEIS instead assumes that the only impediment to achieving the VOR structure and PFC is livestock grazing and does not address site capability or the need to revise the plan*

The DEIS and SDEIS do not assume that the only impediment to achieving the structure objectives is livestock grazing. The DEIS on page 3-128 and the SDEIS (Chapter 3 Part 1, Herbaceous Structure, Introduction) recognizes other factors, however, livestock grazing is the most significant and wide-spread management activity that affects grassland structure (NGP FEIS, p. 3-239). Site capability is previously addressed in response to comment K-41.

This allegation is also not correct in relation to PFC. The DEIS and SDEIS clearly states situations where degraded riparian conditions are related, in part, to factors other than grazing, (e.g. in the DEIS Allotment 135, p. 3-62; Allotment 282, Fantail Creek, p. 3-67; Allotment 282, Whitetail Creek, p. 3-68; Allotment 289, p. 3-69), (SDEIS, Chapter 3 Part 2). Where livestock are the sole or principal cause of degradation, that fact is either explicitly stated or deduced from discussion. The PFC checklists, part of the Project Record, provide additional details documenting livestock impacts to riparian areas. The allegation regarding site potential is incorrect. All riparian segments are evaluated with respect to site potential as a standard part of the PFC protocol. There is no indication that a revision to the Grasslands Plan is needed for evaluating riparian health. The Dakota Prairie Grasslands has already addressed the recommendations of the SRT regarding PFC (see Dakota Prairie Grasslands, Final Response to Scientific Review Team Reports, October 10, 2006, pp. 19-20; available on-line at: http://www.fs.fed.us/r1/dakotaprairie/projects/livestock_grazing/corrected_final_srt_response.pdf.) The DEIS and SDEIS fully considered the recommendations of the SRT to the degree that any of these recommendations apply to the North Billings project.

K-45 *Nor does the AMP DEIS consider the other recommendations by the SRT.*

Appendix C of the SDEIS details how the applicable SRT recommendations were used in this analysis.

K-46 *One goal will be to maintain or improve current on the ground conditions to maintain, to the maximum extent possible, a grazing program at current levels and provide sufficient habitat for grassland species. Site specific amendments to the DPG Plan to incorporate these changes will be done, as needed. Id at 16.*
The AMP DEIS omits this goal entirely. Nor does the AMP DEIS propose an amendment to the LRMP to adopt this goal and objective. Ironically, the AMP DEIS, which effects a reductions from 13% and most between 25 and 45% based solely on a new calculation of stocking rates, proves the accuracy of the HAND comments made more than 10 years ago. AMP DEIS 3-36 to 3-51.

The commentor correctly cites this portion of the Demonstration Project. This goal, by virtue of being in the 2006 ROD, is a goal of the project. So the project does not

need to specifically adopt this goal. Since Alternatives 3 (the proposed action) and 3A have no initial reductions in Authorized Use, these alternatives do discuss and disclose how the project balances keeping the grazing program near current levels while maintaining or improving on-the-ground conditions and providing sufficient grassland species habitat. Even under Alternative 4, reductions are gradually staged in, no more than 10 percent a year (DEIS Table 2.3, SDEIS Table 2.4), and monitoring occurs to validate these decisions and resource conditions throughout Alternatives 3, 3A, and 4.

The DEIS on pages 3-52 and 3-54 identifies that under Alternative 4 reductions would range from 0 to 45 percent of preference with an average of about 20 percent excluding those allotments with no reductions. Note the 20 percent was a typo in the DEIS which should have been stated as "about 23 percent".

After the DEIS was published new NRCS production information became available. Initial estimated carrying capacity was recalculated using the updated information. Under Alternative 4 reductions in Authorized Use ranged from 0 to 44 percent with an average reduction of 20 percent (SDEIS Table 3.5). The table below summarizes the information from Table 3.5.

Percent Reduction	Number of Allotments
0-10	11
11-20	15
21-30	8
31-40	7
41-44	1

K-47 *The AMP DEIS reductions are solely due to recalculation of the carrying capacity and do not consider additional reductions for compliance with LRMP goals, objectives standards and guidelines, including high structure, VOR readings, PFC, maintenance of woody draws, or retention of a natural setting.*

Alternative 4 sets Authorized Use based on initial estimated carrying capacity. The alternative is built on the premise that reductions in Authorized Use in combination with other initial actions (see SDEIS, Chapter 3 Part 2) will meet or move impacted resources towards Grasslands Plan goals and objectives. Monitoring will be conducted to determine if suitable progress is being made. If adjustments are needed, the Design Criteria (SDEIS, Table 2.4) provides an explanation of how AM/AUM adjustments may occur. At that time all of the tools in the tool box are available to address the concern, further reductions is only one of many tools.

Also see response to comment K-7, where Lacey's additive math error is discussed in terms of the Grasslands Plan.

K-48 *The AMP DEIS also foregoes structural range improvements in favor of livestock grazing reductions. The AMP DEIS reliance on the Tool Box does not address this issue.*

Alternatives 3 and 3A do not utilize grazing reductions as an initial action to address impacted resources. Grazing adjustments are one of the adaptive tools in the toolbox that may be used if other identified actions don't move impacted resources towards Grasslands Plan desired future conditions. Alternative 4 utilizes the initial estimated carrying capacity to establish Authorized Use along with various other range improvements to address identified resource issues (see SDEIS, Chapter 3 Part 2).

The grazing management tool box is a repository of management tools that can be used to address resource issues (see SDEIS, Chapter 1, Adaptive Management) if monitoring shows initial management actions aren't meeting or moving impacted resources towards Grasslands Plan desired future conditions.

K-49 *Scientific Review Team (SRT) recommendations will be incorporated into and implemented through the Final ROD and the livestock grazing allotment management planning process Id at 16.*
The SRT process yielded a number of recommendations, which are not a part of the AMP DEIS. The AMP DEIS does not discuss the SRT recommendations in detail nor does it adopt the recommendations explicitly.

The Forest Service adopted the SRT recommendations as described in the Forest Service Final Response to the SRT. How the team met the applicable recommendations are detailed in the SDEIS Appendix C.

K-50 *The Forest Service has stated that it is implementing the SRT recommendations. AMP DEIS at 1-4 to I-5; I-10. The adoption of SRT recommendations is selective at best, such as the claimed use of NRCS methodology to calculate carrying capacity and dropping the floristic quality index.*

See SDEIS, Appendix C.

K-51 *SRT recommended that the Forest Service reconsider the criteria for what is PFC in North Dakota. SRT at 22-23 (A Determine if PFC rating is applicable to North Dakota, use multi-disciplinary team to conduct PFC ratings, and develop a training manual and process.) The SRT also questioned the PFC data used by the Forest Service since it was not clearly developed using a team approach. Id. The SRT recommended that the Forest Service use interdisciplinary teams and extensive training. Id.*

The PFC ratings are based on the local site potential and capability (Prichard et al., 1998, pp. 6-7). Therefore, even though the protocol is standardized, the evaluation of individual attributes is made by an interdisciplinary team with knowledge of local site potential and capability. The PFC method has been used across the United

States and internationally. Its universal applicability is possible because evaluations are made relative to the potential of each locality.

The use of interdisciplinary teams is a standard part of the PFC protocol (see Prichard et al., 1998, p. 1; Prichard et al., 1999 (revised 2003), p. 1). The DEIS used data collected by interdisciplinary teams, including that of Brooks (2005, p. ix), and Forest Service personnel in the summers of 2006 and 2007 (see PFC field checklists, Project Record, Supporting Documentation – Riparian, L-26) to determine existing condition.

The PFC method has already developed standard manuals (Technical Reference 1737 series issued by the Bureau of Land Management). Also, states in the western United States have training cadres already developed to provide local training assistance. The Montana/Dakota training cadre is the local training cadre. Two of the members of the MT/ND training cadre (Kurt Hansen and Mark Gonzalez) are current or past members of the Dakota Prairie Grasslands with decades of experience studying local streams and rangelands. The necessary training resources are already well established for North Dakota.

See also response to comment K-43.

K-52 *The AMP DEIS continues to use the same PFC criteria and data without revision for North Dakota riparian areas and uses the earlier data without regard to questions about its reliability and consistency. See e.g. App. A-7 (citing to 1998-99 and 2004 readings), A-11, A-14. Notwithstanding the SRT recommendations, the AMP DEIS does not consider revision of PFC to reflect the Great Plains. This has significant consequences since the AMP DEIS concludes about 47% of the riparian areas are functioning at risk or not functioning.*

See response to comments K-16, K-43, and K-51. The 2004 PFC surveys were conducted with an interdisciplinary team (Brooks, 2005, p. ix). The 2004, 2006, and 2007 field investigations were used to define existing conditions. All these surveys were completed with interdisciplinary teams. Some 1997-98 data were cited in the DEIS to indicate trend in riparian conditions. The 1997-1998 data were not used to establish existing condition in the project area.

The PFC surveys are based on knowledge of local site potential and conditions, therefore the PFC surveys follow the protocol. A revision of the PFC protocol for the Northern Great Plains is not indicated. The PFC is a valid means of documenting and assessing existing conditions on the Great Plains and has been used in Montana, North Dakota, South Dakota, Nebraska, and Wyoming all of which are part of the Northern Great Plains.

K-53 *The AMP DEIS also ignores the criticism of the scientific validity of the PFC data due to variable protocols used by Forest Service employees and the lack of credible data. The allotment summaries make scant effort to document that livestock grazing is principally*

responsible for the non-functioning or at risk classification. The premise appears to be that livestock grazing is always the causal factor, even though the AMP DEIS does not even mention let alone analyze the impacts of big game use or energy development. The allotment summaries refer to roads but impose the burden of correction on the livestock grazing program.

The first sentence of this comment is unclear regarding which criticism is being ignored and also fails to specify the nature of any deficient data. The PFC protocol is a qualitative assessment that is based on quantitative science (Prichard et al., 1998, p. 1). See response to comments K-43 and K-51,

The allotment summaries are not intended to assign "blame" or responsibility for riparian degradation. The detailed description of livestock impacts to individual stream reaches is included in individual PFC checklists (see Project Record, Supporting Documentation – Riparian, L-26). The DEIS (pp. 3-57 through 3-70) and the Watershed Report (Project Record, Specialist Reports and Notes) also document livestock impacts in detail in an allotment-by-allotment fashion. Numerous photographs in the Project Record also document impacts that are clearly attributable to livestock, such as cattle trailing, hoof shear, pedestalling, and browsing. Also, see memoranda in the Project Record Gonzalez, May 17, 2006; Gonzalez, June 2, 2006; Gonzalez, July 26, 2006; and Gonzalez, August 2008. Chapter 3 Part 2 of the SDEIS also identifies where livestock are principally responsible for stream conditions.

The statement that livestock grazing is always the casual factor is incorrect. Individual PFC checklists (see Project Record, Supporting Documentation – Riparian, L-26) discuss impacts from livestock and other factors. Please see response to comment K-44 above. Big game use is discussed on page 3-96 of the DEIS and energy development on page 3-84. See also response to comments K-57 and K-99.

K-54 *The SRT recommended removal or reduction in brush encroachment which was harming sharp-tailed grouse and other ground nesting bird habitat, once the Forest Service established monitoring protocols and objectives. SRT at 31.*

The context of the SRT report concerning woody expansion (2005 SRT, Appendix B, p.47) occurs outside the project area on the Sheyenne RD where it is recognized that woody expansion may be affecting prairie chickens. Whereas, on page 16 of the 2005 SRT Report, the SRT panel states "sharp-tailed grouse are fairly tolerant of expanding woody plant communities" and Appendix H of the Grasslands Plan describes the sharp-tailed grouse as the management indicator species "for the biological community associated with grasslands containing scattered shrubs and diverse vegetative structure." At this time, woody expansion is not recognized as a limiting (or controlling) factor in regards to habitat quality for sharp-tailed grouse and other ground nesting avian species on the LMNG. The DPG Response to the SRT Recommendation III-2 (Final response to the SRT Reports, p. 11) states that

prairie grouse are most responsive to changes in residual herbaceous vegetation then woody vegetation (Vodehnal et al 2007).

K-55 *The AMP DEIS does not address the SRT recommendation that the Forest Service document historical distribution of woody species, the trend, and set clear objectives. SRT at 21. The SRT concluded that the Forest Service did not have good information regarding trends and dominance of woody species. Id. It also found that the expansion of woody species could degrade habitat for ground nesting birds, including sharp-tailed grouse, when the woody species reach a specific ecological threshold. Id.*

Of the different types of woody draw communities in the project area the condition of green ash (American elm) / chokecherry woody draws was of concern. Other woody communities listed by the SRT that are most relevant to the project area include Rocky Mountain juniper, silver sagebrush, and snowberry. Ponderosa pine and bur oak listed by SRT do not occur in the project area, while quaking aspen, cottonwood, and willow are of limited extent, are not identified as distinct resource issues, or are adequately covered as inclusions among woody draw and riparian habitat conditions.

The SDEIS discusses woody draw trend (Chapter 3 Part 1, Woody Draws, Existing Condition, Trends in Woody Draw Extent) noting an estimated 5 percent expansion of green ash woody draws across the project area landscape. Field observations indicated that green ash trees were expanding up-drainage in some communities, or establishing within outlying shrub patches situated away from the primary woody draw community.

The Woody Draws, Desired Condition section in Chapter 3 Part 1 of th SDEIS identifies the desired condition for woody draws.

See response to comment K-54 for discussion on woody draw expansion and effects on ground nesting birds.

K-56 *The AMP DEIS fails to address this issue entirely and instead concludes that the woody species in draws throughout the project area are deteriorating due entirely to livestock grazing. AMP DEIS at 3-95. In several cases, MGA members proposed removal of brush species and these were omitted and rebuffed. App. A-11, 24, 36. The AMP DEIS also promotes increasing woody species without regard to ecological threshold issue.*

The DEIS at 3-95 (SDEIS, Chapter 3 Part 1, Woody Draws, Factors Affecting Existing Condition of Woody Draws) identifies several factors such as fires, disease, climatic effects, and wildlife other than livestock use which affect woody draw condition.

A review of the MGA comments in Exhibit 2 and Forest Service permittee meeting notes in regards to *App. A-11, 24, 36* revealed that the permittees did not propose removal of brush species.

The SDEIS does not promote increasing woody species. Desired conditions of the woody draws on the Little Missouri National Grassland are identified in the Woody Draws, Desired Condition section in Chapter 3 Part 2 of the SDEIS. Appendix D of the SDEIS identifies grazing management tools that may be used to reduce woody species such as prescribed burns or mechanical and also identifies the effects these tools may have on livestock grazing, etc.

K-57 *Given the lack of historical distribution and trend data, it is equally reasonable that other factors affect the woody tree species, including big game grazing. The AMP DEIS ignores the role of big game throughout the DEIS by not addressing the extent of game foraging on woody species and in riparian areas. For example, the AMP DEIS concludes that deer have less impact since five deer are equal in weight to one cow. AMP DEIS at 3-96. But there is no information about the number of deer and elk compared to livestock nor when they are in the allotment.*

Historical trend is addressed in response to comment K-55.

The Forest Service agrees with the commentor that factors other than livestock use have an effect on woody draw condition. These other factors were addressed in the DEIS on pages 3-96 and 3-97. The commentor has misquoted the referenced cite from the DEIS, below is the complete text.

Wildlife such as deer and beaver can adversely affect woody draw conditions but the affects are generally not as severe as occurring with livestock due to lower animal numbers, smaller size, and less forage intake. In terms of carrying capacity, approximately 5 mule deer are equivalent to one mature cow in the amount of forage consumed (NRCS, 2009). Gubanyi et al. (2008) found whitetail deer densities of about 70 deer per square mile caused adverse impacts to vegetation structure and species composition of woodland communities in southeast Nebraska, but mule deer densities have averaged only 6.6 deer per square mile in portions of the project area during 1991-2007 (NDGF, 2008). In contrast, livestock stocking in the project area is generally on the order of 200-300 head per square mile, with each head harvesting the equivalent of approximately five deer.

The SDEIS (Chapter 3 Part 1, Woody Draws, Factors Affecting Existing Conditions of Woody Draws) has included additional information regarding big game effects on woody draws.

K-58 *The carrying capacity issue was not disclosed to MGA until virtually three years after the commencement of the AMP revision process in February of 2008. Ex. 3, Schneider Decl. &14. The AMP DEIS concludes that the project area is overstocked, AMP DEIS at 3-12-3-13, but fails to disclose and analyze how the carrying capacity calculations will translate into grazing reductions. Ordinarily, a conclusion that an allotment is overstocked means an immediate reduction.*

The Forest Service disagrees with the commentor's contention that carrying capacities were not disclosed to the MGA until three years after the commencement of the AMP revision process. The MGA should be well aware that the grazing agreement between the MGA and the Forest Service specifically states, "The AMP will contain, as a minimum, the following: …Estimated livestock carrying capacity for the allotment…" (Grazing Agreement and Rules of Management between Medora Grazing Association and United States Department of Agriculture Forest Service, 2009, II. F. 2. c.) which although is in a different location in the 2009 grazing agreement, has been in previous agreements as well. In the summer of 2006, during at least nine of the permittee meetings in the second round, the Forest Service shared that a carrying capacity analysis would be conducted (Project Record, Process Documentation, Permittee Meeting Notes, B-52). The MGA Board of Directors Regular Meeting minutes dated January 10, 2007 and October 3, 2007 document that the Forest Service had informed the MGA board of directors that a carrying capacity analysis would be conducted. At the third round of permittee meetings held during the winter of 2007 an informational sheet was provided to each individual member that summarized by pasture and land ownership the initial estimated carrying capacity of the allotment (Project Record, Process Documentation, Permittee Meeting Notes, B-53). The Forest Service explained to each individual permittee and their representative MGA director how the analysis was completed.

The DEIS at pages 3-14 through 3-19 does not have any language that concludes that the project area is overstocked.

Even though the initial estimated carrying capacity information was provided to the permittees as noted above, it was not used in the creation of the proposed action (Alternative 3). The initial estimated carrying capacity was used in Alternative 4 to determine a starting point for Authorized Use along with other proposed initial actions to address identified resource issues. Table 3.5 in the SDEIS identifies the percent reduction in Authorized Use under Alternative 4.

K-59 *Nor does the AMP DEIS explore alternative actions to avoid such reductions. Vague references to toolbox and adaptive management pertains to achieving LRMP goals, objectives, standards, and guidelines rather than increasing carrying capacity.*

The DEIS in Chapter 2 identifies two alternatives which do not use reductions. Alternative 2 maintains stocking at preference levels. Under Alternative 3 initial actions maintain stocking at preference. The SDEIS has added another Alternative i.e. 3A whose initial actions do not include reductions in Authorized Use. The purpose of adaptive management is clearly identified in Chapter 1 of the DEIS at pp. 1-10 and 1-13 through 1-15. The toolbox and its role is identified on pages 2-14 and 2-15 of the DEIS. The function of an adaptive management approach is provide a flexible approach to meet or move towards Grasslands Plan goals, objectives, standards, and guidelines. There is no direction in the Grasslands Plan to increase carrying capacity. However, it should be noted that by moving impacted resources

to Grasslands Plan desired condition forage production would likely increase thus potentially providing additional forage for a variety of different uses including grazing.

K-60 *The capacity of the LMNG to produce forage and maintain high structure has been an issue from the very beginning of the DPG LRMP. The solution recommended by SRT and adopted in the Livestock Grazing ROD and Demonstration Project was to avoid grazing reductions and to develop sound data. The LRMP assumption of insignificant or less than 9% reductions was based on nonexistent or flawed data. The test drive during the SRT review was equally flawed and showed even less of a reduction.*

The Forest Service agrees that the capacity of the LMNG to produce high structure has been an issue, however, a review of the SRT report did not produce any cites where the SRT recommended avoiding grazing reductions or to develop sound data. The Livestock Grazing ROD (which includes the "Demo Project"; 2006) does not state "avoid" grazing reductions. Contextually, the ROD states, for example: to "maintaining sustainable grazing operations (p. 7)"; to "…maintaining, to the maximum extent possible…current AUM levels (p. 9)"; to "minimize livestock reductions (p. 9)"; "The AMP process…will be the basis for any adjustments to livestock numbers (p. 11)."“maintain, to the maximum extent possible, a grazing program at current levels…(p. 16;" and "There will be no cuts in permitted AUMs without monitoring…p. 17)"

The ROD thus aims to minimize reductions through the use of *other* tools and strategies that may be employed (but does not eliminate the stocking tool) to also meet resource objectives. The DEIS and SDEIS recognizes this, and in Alternatives 3, 3A, and 4 employs monitoring and adaptive management to minimize the potential effects of Grasslands Plan implementation on the potential need for AUM adjustments.

The Grasslands Plan projection of an average 9 percent reduction across the DPG was based on a 20 year average authorized use (2006 ROD page 12).

Note the SRT report does not state the "test drive" was flawed. Commentor misquotes the SRT and the 2006 ROD in their statement.

See response to comment K-112.

K-61 *The AMP DEIS instead shows significant reductions due solely to carrying capacity calculations that are very similar to the estimates grazing reductions made by HAND experts more than 10 years ago.*

The initial estimated carrying capacity was used in Alternative 4 to determine a starting point for Authorized Use along with other proposed initial actions to address identified resource issues. The DEIS on pages 3-52 and 3-54 identifies that under Alternative 4 reductions would range from 0 to 45 percent of preference with

an average of about 20 percent excluding those allotments with no reductions. Note the 20 percent was a typo in the DEIS which should have been stated "about 23 percent".

After the DEIS was published new NRCS production information became available. Initial estimated carrying capacity was recalculated using the updated information. Under Alternative 4, reductions in Authorized Use ranged from 0 to 44 percent with an average reduction of 20 percent (SDEIS Table 3.5). The table below summarizes the information from Table 3.5.

Percent Reduction	Number of Allotments
0-10	11
11-20	15
21-30	8
31-40	7
41-44	1

K-62 *Given the fact that the Forest Service adamantly denied that the DPG LRMP goals, objectives, standards and guidelines would result in significant livestock grazing reductions, the MRD should have immediately re-examined the procedures it used to reach carrying capacity.*

The Grasslands Plan level analysis considered changes or potential reductions at the unit-wide level (hence why the data used was appropriate for the level of analysis.) Site specific analysis may reveal the need for different levels of adjustments. Note in the DEIS that the carrying capacity methodology and results were peer reviewed. (see DEIS 3-13 and SDEIS, Chapter 3 Part 1, Range, Methodology, Carrying Capacity Analysis). There is no need to either amend the plan or modify the site specific analysis to approximate the estimated average reduction across the entire DPG.

See also response to comment C-3.

K-63 *As shown below, there are several sound reasons to conclude that the MRD made significant errors that, if corrected, would show much higher carrying capacities. The AMP DEIS must redo the carrying capacity calculations to conform to NRCS guidelines, because they were not followed.*

For response to the first sentence of this comment, see response to comments K-64 through K-72.

The Forest Service does not need to redo the carrying capacity calculations. The SRT did not recommend using NRCS guidelines, it did recommend using the NRCS Order 2 soil surveys (Final Response to the SRT Reports, 2006, p. 3), which the Forest Service did utilize in the carrying capacity analysis (DEIS pp. 3-12, 3-13).

The DEIS did not claim that the Forest Service used NRCS guidelines and methodologies.

K-64 *Commentors are unclear exactly what carrying capacity assumptions were used in the calculations. Ex. 1, Lacey Letter of October 11, 2009. The brief explanation in the AMP DEIS, 3-12 to 3-13, is insufficient to document this very important step in an AMP. It is, however, clear that the Forest Service did not follow the preferred protocol of clipping and weighing key areas of the land base in order to assign carrying capacity.*

The Forest Service believes that the carrying capacity assumptions are clearly identified on page 3-13 DEIS. The Forest Service agrees that additional descriptive information could be added to the carrying capacity analysis section of the DEIS, the SDEIS has been updated to include this information (SDEIS, Chapter 3 Part 1, Range, Methodology, Carrying Capacity Analysis).

The Forest Service assumes that the commentor is referring to method one from the NRCS National Range & Pasture Handbook to calculate stocking rates as "the preferred protocol"; however, as stated in the Lacey letter of October 11, 2009 it is identified as "often the best method". Many variables go into determining the methdology to use for analyzing carrying capacity. The SDEIS describes the methodoloy and rationale for the carrying capacity analysis used (SDEIS, Chapter 3 Part 1, Range, Methodology, Carrying Capacity Analysis).

The DEIS does not claim that the Forest Service used NRCS guidelines and methodologies. The SRT made a recommendation to use the NRCS Order 2 soil surveys in the development, implementation, monitoring, and refinement of pasture or allotment-level management plans (Final Response to the SRT Reports, 2006 SRT Recommendation I-1), which the carrying capacity analysis did utilize.

K-65 *The production data developed by North Dakota State University (NDSU) should provide some basis for comparison. MGA in cooperation with the Forest Service, has been working with NDSU to evaluate range production, capability and trends. The report will be submitted as soon as the evaluation and compilation is finished in the next few months.*

The Forest Service agrees the production data collected cooperatively with NDSU, MGA, and the Forest Service will be of value in evaluating carrying capacity. It's important to note that this data collection effort will only serve as a baseline. Trends cannot be evaluated until additional data collection efforts occur.

The Forest Service reviewed NDSU's 2008 preliminary data. In the review of the first year of data NDSU pointed out that production values (Biomass) were displayed incorrectly and would need to be corrected. After the correction was made in the 2008 preliminary data the Forest Service reviewed the data again and found errors in biomass calculations on crested wheatgrass, smooth brome grass, and Kentucky bluegrass. It was estimated that the above mentioned errors would be corrected and the information provided sometime in the spring of 2010.

In the summer of 2010 the Forest Service received the 2008 and 2009 data and reviewed it. This data is addressed in the Range, Methodology, Cooperative Monitoring Data section in Chapter 3 Part of the SDEIS.

K-66 *The AMP DEIS does not say but the explanation implies that the AMP DEIS does not use actual site data from the allotments in question. The AMP DEIS should also identify and document the basis for the assumptions used in reaching carrying capacity. Only then can the public evaluate whether the assumptions and methodology conform to NRCS guidelines and whether they are a valid substitute for actual site data. Thus, the AMP DEIS must be able to justify the accuracy and validity of the process used. The two pages in the AMP DEIS are technically inadequate.*

The Forest Service believes it is quite clear on pages 3-12 through 3-13 of the DEIS that the forage production values used in the calculation of the initial estimated carrying capacity were provided by the NRCS. Also, the assumptions used in the calculation are clearly stated on page 3-13 of the DEIS. NRCS methodology was not used to determine carrying capacity (see response to comment K-63). The Forest Service agrees that additional descriptive information could be added to the carrying capacity analysis section of the DEIS, the SDEIS has been updated to include this information (SDEIS, Chapter 3 Part 1, Range, Methodology, Carrying Capacity Analysis).

The Forest Service sought out peer review (SDEIS, Chapter 3 Part 1, Range, Methodology, Carrying Capacity Analysis), "To help assure that the carrying capacity analysis was calculated correctly the Medora Ranger District Range staff had the analysis, methodology, and calculations reviewed by the USDA's Agricultural Research Service". The peer review determined and made the following recommendations. The formulas and process used were accurate. A recommendation to coordinate with the NRCS to rerun the data set with updated production values was made because the initial production data downloaded from the Soil Data Mart in 2005 was inaccurate. They also recommended to ground truth some of the allotments where there were large discrepancies between the Preference AUMs and the Carrying Capacity AUMs &/or on allotments that had several significant issues. Finally, they recommended updating data sets as production values were updated (Project Record, Inter & Intra-agency Memos, Conversations & Agreements, I-7). All of these recommendations have been considered and implemented by the Forest Service.

While the Forest Service agrees that actual site data would further build upon the carrying capacity analysis conducted, the best available information was used at the time. Monitoring described in the third table for each allotment in Chapter 3 Part 2 will confirm or provide a better estimation of carrying capacity for each allotment. Additionally, the Forest Service has reviewed the 2008 and 2009 cooperative monitoring data (see SDEIS, Chapter 3 Part 1, Range, Methodology, Cooperative Monitoring Data).

K-67 *As Dr. Lacey writes:The NRCS National Range and Pasture Handbook (NRPH, September, 1997) describes four methods of calculating stocking rates: 1) "often the best method for establishing the initial stocking rate is to assist the client in making a trend study and utilization check on the key grazing area of the management units. A recording of current stocking rate along with an evaluation of trend or health of the plant community and percent used of the key species can provide an insight to the correct stocking rate for the grazing period." (ironically, this is the approach that the permittees and you advocated for years). 2) Another method of establishing the initial stocking rate is based on production data and growth curves developed locally as a part of the field office technical guide. An estimate of forage supply can be estimated for each month and totaled for the annual production for each management unit. 3) The "usable production method" is based on measuring or estimating the total amount of forage (standing crop) per acre and converting green weight to air dry weights and into AUMs. 4) The forage value rating method is a utilitarian classification indicating the grazing value of important plant species for specific kinds of livestock or wildlife. The classification is based on palatability or preference of the animal for a species in relation to other species. It is important to note that none of the four approaches outlined in the Handbook resembles the FS method that is described in the DEIS.*
The AMP DEIS explanation does not describe one of the four methodologies listed above. Instead, the AMP DEIS states that the Forest Service used NRCS ecological site data. As Lacey notes, there is no mention of clipping data that would be correlated to site data.

See response to comments K-63, K-64, and K-66.

K-68 *The AMP DEIS states that the Forest Service assumed Aweighed average figure was based upon the ecological site reference plant community production (Representative Value) for each ecological site within the soil mapping unit." AMP DEIS 3-13. The AMP DEIS does not say how it reached a weighed average, was it clipping data or was it another estimate. The missing information could significantly affect the actual calculations.*

The answer to the commentor's question in regards to whether the weighted average was based on clipping data or another estimate is contained within the commentor's quote from the DEIS. The weighted average production value is based on the ecological site reference plant community production value that was provided by the NRCS.

The Forest Service reminds the commentor that the carrying capacity analysis was peer reviewed; see response to comment K-66.

K-69 *The AMP DEIS also included other assumptions, "some assumptions to consider about the Representative Value are as follows: 1) season long grazing, 2) normal growing conditions, and 3) reference plant community." AMP DEIS 3-13. Lacey notes that these assumptions would have affected calculations also but the limited explanation fails to disclose how they affected carrying capacities disclosed in the DEIS. Ex. 1, Lacey p.2.*

The AMP DEIS also does not explain how it adjusted for those allotments that do not use season long grazing. Most of the allotments in the AMP DEIS use rest-rotation or deferred grazing systems, rather than season long.

The Forest Service provided the assumptions stated in the DEIS on page 3-13 to give the reader a better understanding of how the production value came about for a particular Representative Value.

The Forest Service used the best available information at the time the initial estimated carrying capacity calculations were made.

Commentor is correct in that each of the Representative Values and the rationale behind them have an effect on the initial estimated carrying capacity. In very general terms, season long grazing would weigh the formula towards a lighter carrying capacity; "normal" growing conditions could both under and over estimate production dependent upon the year; and the reference plant community could both under and over estimate production depending on the site. This general discussion has been included in the SDEIS (Chapter 3 Part 1, Range, Methodology, Carrying Capacity Analysis) to help the reader better understand the rationale, but the bottom line is these are a conservative set of assumptions.

K-70 *In the absence of any documentation of clipping and weighing, Lacey notes that if the MRD relied on similarity indices that are linked to ecological sites which use a historic climax plant community, then the calculations could have omitted significant forage. As Lacey explains:*
If the FS did somehow estimate production by species and compared it directly to the ecological site guides, they would be calculating similarity indices. According to the National Range and Pasture Handbook, similarity indices are calculated by comparing clipping data (i.e., #lbs of production by species) on an ecological site to the historic climax plant community that is defined on the respective ecological site guide. If the FS did this, they would have a "similarity index" for each ecological site. However, the similarity indices are not representative of the stocking rate. For example, 2,000 lbs/acre of smooth bromegrass may be produced on a loamy site, but it would not contribute toward the IS because smooth brome (an introduced species) would not be listed on the Historic Climax Plant Community loamy ecological site guide. Likewise, if the FS did have a list of species growing on an ecological site, and the respective production of each, an inexperienced observer may note that smooth brome did not occur on the historic climax plant community, and thus, smooth brome would not given any credit for forage value on the site.

See response to comment K-71.

K-71 *If the AMP DEIS carrying capacity calculations used plant communities based on the historic climax plant communities list, then the AMP DEIS would have excluded many forage species, including smooth brome grass and crested wheatgrass. Thus the*

carrying capacity calculations may well have excluded forage used by livestock and wildlife alike.

The Forest Service did not calculate similarity indices. The Forest Service assumes that the commentor is referring to reference plant communities when they talk about historic climax plant communities. Reference plant community is one of the assumptions given in the carrying capacity analysis explanation. There is disagreement within the body of literature that introduced/tame/exotic/invasive graminoid species increase stocking rates and increase overall net primary production compared to native graminoid species (Williams and Post's 1945, Smoliak and Slen 1973, Smoliak et al. 1981, Hart et al 1988, Hofmann et al. 1993, Willms et al. 2009).

The SRT recommendation identifies (Final Response to the SRT Reports, 2006, p. 16) that if crested wheatgrass cannot be separated out from native grasslands, grazing should not occur before the 3.5 leaf stage of the management plant species or June 1, thereby managing the pasture as native. The Grasslands Plan also has direction to manage those pastures that have greater than 70 percent crested wheatgrass as a crested wheatgrass pasture and those not meeting this definition as native pastures (Grasslands Plan, p. 1-19).

The monitoring for plant composition will give the Forest Service a better representation of what forage is within the project area. The carrying capacity analysis can then be reviewed, but adjustments to Authorized Use will continue to be resource issue driven as the Forest Service seeks to meet or move towards Grasslands Plan goals and objectives.

K-72 *The AMP DEIS methodology also does not clearly account for soils and related plant variability. Assuming that the MRD does not have "shovel-specific" soil sites and instead relied only on the Web Soil Survey, then it would have omitted important productive sites on the allotments, particularly coulee, outflow areas, and small drainages. Ex. 1, Lacey p.3. These sites may be very productive as well.*
Other included soils and miscellaneous areas, however, have properties and behavior divergent enough to affect use and or require different management. These are called contrasting inclusions. They generally are in small areas and could not be mapped separately because of the scale used. In my experience, most of the soil surveys conducted in western states are done at a scale that precludes the mapping of small drainages and coulees (overflow sites) that often contribute significantly to the carrying capacity of an area that is comprised of a mapping unit. Therefore, the carrying capacity of the soil mapping unit is often under estimated when this approach is used. The magnitude of this discrepancy varies with the topography, mapping scale, and capabilities of the soil scientist that did the mapping.

The Forest Service description of the carrying capacity analysis on page 3-12 of the DEIS is consistent with the recommendation of the SRT in using the Order 2 soil survey and associated ecological site information. Additional information regarding

the carrying capacity analysis has been included in the SDEIS in Chapter 3 Part 1, Range, Methodology, Carrying Capacity Analysis. The Forest Service utilized the weighted average of production of the ecological sites described within a soil map unit, such as 69F. The weighted average accounts for contrasting inclusions of both high production sites (such as overflow areas), as well as, low production sites (such as clay out crops/badlands). The weighted average for any map unit will account for the high and low production of the contrasting inclusions and miscellaneous areas.

K-73 *Regardless of how the AMP DEIS reached its carrying capacity calculations, the explanation leaves key issues unanswered. It is however apparent that the AMP DEIS does not follow the NRCS guidelines. It is impossible to delineate the assumptions made or the procedures followed from the brief description in the AMP DEIS. Nevertheless, if the AMP DEIS used only web-based information, as implied, then the AMP DEIS underestimates the carrying capacity both with respect to usable forage that is not considered "historic climax plant community" and by omitting small but very productive areas in the allotments.*

See response to comments K-63, K-64, and K-66 through K-72.

K-74 *It is likely that there are other significant issues but until commentors have access to the Project File and can compare it with the actual data that has been developed over three years, we cannot make final conclusions.*

Commentors did go through the Freedom of Information Act and have acquired the draft project file. It is not the commentor's job to make a final conclusion as part of the NEPA process. (see 36 CFR 215 section on comment requirements). Also see response to comment K-5.

K-75 *Even without the Project File data, it is likely that the AMP DEIS carrying capacity calculations understate productivity significantly and cannot be a valid basis to institute reductions. The carrying capacity calculations must either be deleted or redone.*

The commentor provides no data or literature in their comment to support the claim that carrying capacity calculations understate productivity significantly and therefore carrying capacity calculations must be redone.

For the reasons stated below (response to comments K-76 through K-79), the Forest Service disagrees with the commentor's statement that the carrying capacity calculations must be deleted or redone. See response to comments K-63 and K-68 through K-72.

The Forest Service did not base reductions on the carrying capacity analysis. Adjustments to Authorized Use were one of the proposed initial actions to address identified resource issues in Alternative 4. The initial estimated carrying capacity was utilized as a starting point for Authorized Use in Alternative 4.

K-76 *Another factor in the carrying capacity calculations could be the exclusion of lands producing less than 300 pounds per acre. The AMP DEIS does not indicate that it follows the SRT recommendations to include in the carrying capacity calculations land that produces less than 300 pounds per acre. The Forest Service Response to the SRT indicated that it still disagreed. Forest Service Response to SRT at 4-5. The SRT recommended that the Forest Service include these lands in carrying capacity estimates. SRT at 10 ("Recommendation I 2: AMP's herbage production estimates should be estimates for all sites. If adjustments in livestock carrying capacities are necessary because of unsuitable terrain (i.e., unsuitable sites), adjustments should be made directly (i.e., no allowable forage) rather than indirectly (i.e., no herbage produced)."). The AMP DEIS did not implement this recommendation, even though the ROD states that the Forest Service will implement the SRT recommendations. Livestock Grazing ROD at 6.*

The recommendations of the SRT were taken into consideration and all lands were used in calculating the initial estimated carrying capacity. (see Project Record, Supporting Documentation – Range, L-1 and L-8 and SDEIS, Appendix C)

K-77 *The Forest Service objection to including the areas producing less than 300 pounds per acre misunderstands the difference between a land use suitability determination and calculation of available forage. These are entirely different concepts and make entirely different conclusions. By excluding these lands, the Forest Service is simply not following the accepted protocols and deliberately skewing the data.*

See response to comment K-76.

K-78 *The LRMP FEIS assumed a 50% increase in livestock size while the SRT found data showing that the increase was more like 20% increase in weight with between 7 and 14% increase in forage demand. SRT at 18. The SRT did not recommend reductions to reflect the large cow size, but did recommend recalculation of AUMs and evaluation of whether management has adjusted to accommodate the larger cattle. SRT at 19. This has not been done in the AMP DEIS.*

The NGP FEIS at page 3-84 actually states, "The increase in stocking levels and the increase in cow size have had a combined effect of up to 50 percent increase in grazing use on some units". The Report of the SRT, 2005 at page 18 actually shows a 20 to 35 percent increase in slaughter weights based on the "preference" numbers being based on a 1,000 pound cow, with or without her calf up to six months of age. The 7 to 14 percent increase in forage demand is incorrectly linked with the commentor's statement regarding the 20 percent increase in weight. The 7 to 14 percent values refer specifically to an example of a 1,100 and a 1,200 pound cow, respectively. The SRT is identifying that there is an increase in nutritional demand as body size incrementally increases.

The commentor is misrepresenting the SRT's recommendation on page 19 (Report of the SRT, 2005) by combining part of the SRT's identified issue into their

recommendation. The recommendation states, "Redefine the animal unit to reflect current cow size along with older, larger calves and recalculate the corresponding authorized livestock numbers on allotments". This recommendation was implemented in Alternative 4 by authorizing use by the AUM which by definition accounts for the size of the cow. Adjustments for cows larger than 1,000 pounds will be necessary in the management of the allotment. The Glossary of the SDEIS identifies the differences between AM, AUM, AU, and Animal Unit Equivalent (AUE).

K-79 *MGA experience shows that livestock may be about 300 pounds larger than they were in the mid to late 1930s when stocking rates were originally set. But when stocking rates were first established on the LMNG and the preference allocated to MGA members, the grasslands had only begun to heal from devastating drought, storms, and years of attempted cultivation. Since that time, the grasslands have been restored to productivity, and wildlife and big game numbers have greatly increased. Thus, just because preference numbers have not changed and livestock are larger does not mean that the allotments are overstocked. Range productivity has also increased. Many MGA members also employ supplemental feeding techniques to maintain livestock health and productivity. Thus, any increase in livestock size does not result in direct pressure on forage resources due to availability of supplemental feed.*

The Forest Service is unable to comment in regards to the statement, "MGA experience shows that livestock may be about 300 pounds larger than they were in the mid to late 1930s when stocking rates were originally set", because the commentor does not provide any data or literature citations to support the claim. The Forest Service's review of literature (see SDEIS, Appendix D) indicates the average cow size has increased 545 pounds.

The Forest Service agrees, anecdotally, that the grassland's productivity has been restored since the mid to late 1930s and that wildlife numbers may have increased. However, the commentor does not provide any productivity data to define to what degree productivity has been restored in relation to the increase in cow size through the years.

The commentor has not provided any data or literature to substantiate their statement, "Thus, just because preference numbers have not changed and livestock are larger does not mean that the allotments are overstocked. Range productivity has also increased." The SRT states, "The bottom line is obvious. There are more "Animal Units" on the DPG than "preference" numbers originally indicated was an appropriate stocking rate. All future management plans must acknowledge the increase in cow and calf size and the subsequent forage demands of larger, higher-producing cows and older, larger calves." (Report of the Scientific Review Team, 2005, p. 19).

The Forest Service acknowledges that many MGA members do utilize supplemental feeding on the grasslands, but not all members do. Supplemental feeding could

offset to some degree the increase in livestock size. However, some supplemental feeds targeted at correcting nutrient deficiencies can stimulate intake, digestion, and/or utilization of forage (Huston J.E. and W.E. Pinchak in: Heitschmidt and Stuth 1991. Grazing Management: an ecological perspective, Chapter 2, p. 57, Supplemental Nutrition Management), thereby increased livestock size with supplemental feeding could equate to increased forage utilization.

K-80 *If the Forest Service were following the Demonstration Project principles, it would have returned to MGA to discuss changes in the LRMP or additional management measures to avoid the apparent reductions. This did not occur, the Forest Service only informed MGA in February 2008 that it was overstocked. At no point, has there been any discussion of how the reductions will be imposed and significantly, the AMP DEIS does not address this crucial fact or how much the additional reductions will be to meet the LRMP objectives, standards and guidelines as proposed in Alternatives 3 and 4.*

As identified for each resource in Chapter 3 Part 1 of the SDEIS, the land is capable of achieving Grasslands Plan goals, objectives, standards, and guidelines therefore no changes to the Grasslands Plan are needed. The design criteria located in Chapter 2 of the SDEIS (Table 2.4) identify how reductions are to be phased in i.e. 10 percent per annum. There are no additional reductions contemplated to meet Grasslands Plan objectives, standards and guidelines. The action alternatives are designed to meet or move impacted resources toward desire conditions. Monitoring will determine if additional adjustments area needed to reach desired conditions.

K-81 *If the carrying capacity or forage production is significantly less than the grazing preference, the AMP DEIS also needs to determine whether the DPG LRMP high structure assignments are correct as well.*

See response to comment K-1.

K-82 *The AMP DEIS carrying capacity was a desk top process, as opposed to a physical site review. The review process would require confirmation of soil types, vegetation, density and weight, a process requiring several years.*

See response to comment E-7.

K-83 *The same review would also determine site capability for high structure. The high structure assignments found in the LRMP direction were based on data now determined to have been invalid for site specific management decisions. The AMP DEIS does not acknowledge this data gap and inconsistency with the LRMP direction.*

Commentor misunderstands the use of data for Grasslands Plan level planning versus site-specific project planning. The goals, objectives, standards and guidelines for the Grasslands Plan have been decided and upheld through appeals (2003 and 2007 WO appeal decisions and 2003 and 2007 Discretionary reviews). Therefore, without solid valid data as to why the project area could not meet the goals, objectives, standards and guidelines, these are determined to be valid.

The commentor repeatedly requests the Forest Service follow the SRT recommendations. The Forest Service has done so for this project (see SDEIS, Appendix C). In the 2006 Forest Service Final Response to the SRT, it is stated high structure will only be required of biologically capable areas (2006 Final Response to the SRT Reports p. 5). It goes on to define the habitat types that are considered biologically capable for the Little Missouri National Grassland (2006 final response to the SRT p. 5). The DEIS is not inconsistent with the SRT or Grasslands Plan direction. Again it should be noted the validity of the data used at the level it was used at was appropriate (see response to comment K-7).

K-84 *The SRT also criticized the VOR data based on highly variable protocols and results. SRT at 10. The AMP DEIS ignores the peer critique of the Forest Service data and concludes that most allotments fail to meet the high structure objectives on the data. See e.g. App. A-49-53, 47, 59-71, 73-90.*
The AMP DEIS does not reassess the capability of the sites, and instead assumes that the allotments would meet the objectives but for livestock grazing. AMP DEIS at 3-57, 3-72.

The SRT discussion at 10 is addressing a recommendation to use NRCS Order 2 soil survey information in the development of AMPs which the analysis did and the definition and use of "biologically capable".

Contrary to the allegation, the LMNG VOR protocol is not highly variable but is well documented. Essentially, the same protocol has been in use since the LMNG began using the VOR methodology in 1996 (DEIS p. 3-129 to 3-130; Project Record, Specialist Reports and Notes, Wildlife Report, Appendix B; Schenbeck 1996; and NGP FEIS, Appendix B). The only item of any significance is the stratification process but since the transect staring points are geo-referenced, cross-walking with any stratification is possible. The protocol is also reasonably consistent with Kohn's (1976) study of grouse habitat on the LMNG

It is possible that the SRT is confused with the use of the method when considering all of the studies concerning use of the VOR method such as found in Benkobi and Uresk (2000) versus what the objective was in Kirby and Grosz (1995) or Reece et al (2001). Standardizing across all studies is not an objective of the SDEIS.

The SRT did not review VOR data for this project, see response to comment K-42. The commentor is correct in stating that allotments not meeting high structure objectives are identified in Appendix A of the DEIS.

There is no need to reassess site capability see response to comment K-41. The DEIS at 3-57, 3-72 is addressing riparian condition and effects. The only reference to structure is the statement "However, of concern is the low amount of high structure in the project area which has the potential to effect the integrity of ephemeral drainages…."

K-86 *The working groups' or Forest Service and the grazing associations and their members' proposals would be carried forward in the National Environmental Policy Act (NEPA)*

process as the Forest Service's proposed action for the AMP and any related LRMP amendments, provided they are consistent with existing law. Id at 17.

This is a correct quote from the Demonstration Project (2006 ROD, p. 17).

K-87 *The DEIS does not include many, if not most of, the Association recommendations because the IDT rejected them. This contradicts the criteria for the Demonstration Project which were adopted in the 2006 Livestock Grazing ROD.*

The Forest Service believes this part of the Demonstration Project has been met, see response to comment M. The Association recommendations have been added to an additional alternative, 3A, so the decision maker and the public can view the differences in the alternatives.

K-88 *The Livestock ROD requires that the A proposed action be the approach agreed to by the grazing associations and the Forest Service.@ ROD at 17. MGA and affected livestock grazing permittees never in fact agreed to Alternative 3 as stated in the AMP DEIS. AMP DEIS at xvi. While MGA and its members were willing to support adaptive management as a concept, the Forest Service excluded them from the detailed development of Alternative 3 in the AMP DEIS, and there was no agreement as to project specifics, as discussed supra at 15.*

See response to comments K-26, 27, 28, 35, Schneider 4 and 5, comment M, and SDEIS, Appendix A.

On January 10, 2007 the Forest Service met with the MGA board of directors at their regular meeting. At the meeting the MGA declined the CRM and identified that they wanted to continue to use the process we had been following in creating the proposed action. The Forest Service documented this decision in a letter to the MGA dated January 29, 2007. The letter states "At the January 2007 meeting the board decided to follow through with the adaptive management alternative as a proposed action and to continue on as we have been doing business/process with the North Billings Range EIS". The Forest Service also provided the MGA with the opportunity to correct the notes, the MGA did not respond with any corrections.

K-89 *Certainly MGA members did not agree to a 20% cut in numbers or the more accurate 45% reductions anticipated once other restrictions are applied. Ex. 3, Schneider Decl. at &&15-16.*

The Forest Service agrees with this statement. Authorized Use reductions would occur under Alternative 4 and would range from 0 to 45 percent with a 20 percent average reduction from preference (DEIS at p. 3-52). Note the 20 percent reduction is a typo the average reduction would be about 23 percent.

After the DEIS was published new NRCS production information became available. Initial estimated carrying capacity was recalculated using the updated information.

Under Alternative 4, reductions in Authorized Use ranged from 0 to 44 percent with an average reduction of 20 percent when excluding the 2 allotments with no reductions (SDEIS Table 3.5). See also response to comment K-61.

Alternative 4 is a Forest Service created alternative, and as such didn't require the concurrence of the MGA.

K-90 *Because MGA members did not agree to Alternative 3, as represented in the AMP DEIS, claims that MGA members were in full agreement are misleading.*

See response to comments K-29 and K-35.

K-91 *There will be no cuts in permitted AUMs without monitoring showing that livestock are principally responsible for not meeting the desired condition, and that the cuts are the only ecologically practicable and economically feasible means available for meeting the desired condition. In these circumstances, the Forest Service will work with the grazing associations to minimize livestock grazing reductions. Livestock Grazing ROD, App. A, at 17.*
The SRT criticized the Forest Service for its lack of monitoring data. SRT at 32-34. The recent review of range conditions embodied in the Range Assessment does not constitute monitoring data, because the AMP DEIS does not use repeatable data that measured change in vegetation over time. A one-time assessment which includes two years of drought fails to meet the decision criteria of monitoring data that would support a reduction in livestock grazing levels.

The Range Assessment i.e. Dragon information was not used as monitoring data, see also response to comment G-1.

The DEIS (Chapter 3) and the SDEIS, Chapter 3 Part 2 identify where livestock are principally responsible for not meeting the desired condition,

The DEIS, under the methodology sections in Chapter 3, identified the different types of resource information collected and how and when it was collected. These methodologies are repeatable and are carried into the Monitoring section of Chapter 2 of the DEIS as well as the Allotment Summary Sheets in Appendix A. Assessments need to include data taken in drought as drought is a normal process on grassland prairie ecosystems. Holechek notes (DEIS, p. 2-3), that drought has occurred on the Northern Great Plains 21 percent of the time since 1940 (Holechek et al, 1991). The data used included one year of drought not two. Within the last ten year period drought has occurred on the Little Missouri National Grasslands four times (SDEIS, Chapter 1, Key Issues, Key Issue #1. Drought). To exclude data collected during drought would present skewed results. Allotments need to be properly stocked to withstand periods of drought, as well as normal and above normal periods of precipitation.

In addition, the Forest Service used NRCS order 2 soil mapping and the ecological site information/production information included to help determine the initial estimated carrying capacity. This information, which the SRT suggested considering, reports production data that is based on the combination of expertise of many professionals from various agencies and field data through the years where available.

K-92 *The AMP DEIS does not document the development of the "monitoring data" used. In the mid 1990's the Forest Service prepared reports on the National Grasslands that described as monitoring data. See Custer National Forest Monitoring Reports. These reports were later quietly discarded by the DPG perhaps because they concluded that the LMNG was in good to excellent ecological condition. Unlike the data used from 1995 to 2005, the Custer National Forest Monitoring Reports used seral stages and ecological condition ratings of the LMNG.*

Commentor confuses Grasslands Plan level monitoring data with project level monitoring data. Some portions of the 2002 Grasslands Plan have only just started being monitored in part because the Livestock Grazing portion of the plan was "phased in" and so underwent review by the SRT, was confirmed in the 2006 ROD, but has actually only been implemented on the ground through the Allotment Management Planning processes in a few areas. The starting point that should be used is the analysis in the Northern Great Plains FEIS and field work done specifically for this project. Project monitoring protocol is described in the DEIS starting on page 2-18 and in Appendix A and in the SDEIS in the Monitoring section in Chapter 2 and in the third table for each allotment in Chapter 3 Part 2. Seral stage conditions are described starting on page 3-144. Ecological condition rating information from the Little Missouri Rangeland Assessment report identified concerns with herbaceous structure and green ash woody draws.

K-93 *The SRT Report noted that the Forest Service did not present monitoring data after 1995, SRT at 32, so we assume there is no monitoring data from 1995 to 2005. The AMP DEIS purports to use data that it characterizes as monitoring data even though the data sets were not started until three years ago. Because two of the years were drought, it is reasonable to assume this is not the monitoring data that the SRT or the range industry would expect as a basis to make rangeland management decisions.*

The DEIS, under the methodology sections in Chapter 3, (SDEIS, Chapter 3 Part 1) identifies the different types of resource information collected and how and when it was collected. The collected information was used to establish existing condition which was compared to desired condition to establish a need for action. It will also serve as a baseline for future monitoring to determine if initial actions are meeting or moving towards Grasslands Plan goals and objectives. Monitoring becomes significant after a decision is made, and management actions are implemented. DEIS, Chapter 2 identifies the monitoring plan and DEIS, Appendix A identifies the specific monitoring and frequency of accomplishment by allotment (SDEIS Chapter 2, Monitoring and third table for each allotment in Chapter 3 Part 2). The Forest

Service is unaware of any reference in the DEIS to the collected data being referred to as monitoring data and the commentor doesn't present a specific reference to support their statement. See also response to comment K-91.

K-94 *The lack of consistent monitoring data is even more problematic in the evaluation of the riparian areas. The SRT found a number of technical flaws in previous PFC assessments. It appears that the AMP DEIS uses many of the same flawed data sets to classified riparian area conditions.*

The Forest Service is unaware of any technical flaws, other than the completion of some surveys, more than 10 years ago, by an individual, rather than by an interdisciplinary team. And those data from the late 1990s were not used in this project to define existing conditions. Instead some of those data from the 1990s were used to establish trends in riparian conditions. The existing condition reported in the DEIS is based on data collected by interdisciplinary teams in 2004, 2006, and 2007. The SRT did not identify any other technical flaws, contrary to the assertion by the commentor. See also response to comments K-16, 43, 51, and 52.

K-95 *This is also true for Robel Pole readings, which the SRT concluded could not be used reliably due to the lack of documented protocols. SRT at 34 (A3. The protocol for using the Robel pole to assess structure is flawed. Suggestions for improving the methodology are located in Section II, Issues II 1 to 4.@). The SRT generally found the data used for the LRMP inadequate in virtually every aspect for AMP and specific grazing management decisions. SRT at14, 32-34. This was due to the lack of actual use data on the part of the Forest Service, lack of monitoring data, and lack of information with respect to woody species historical distribution and trends in particular. SRT at 17 (A The lack of information on how vegetation responds to changes in grazing practices has hampered the SRT in its evaluation, and no doubt hampers the FS in carrying out its mission. The SRT recognizes that resources for monitoring are limited, but proposes that carefully designed protocols can be implemented without major additional costs.@); at 13 (A Standardized protocols should be adopted and training provided for consistency among years and observers using the Robel pole method.@); 32-34.*

The commentor is confusing the SRT and Grasslands Plan revision effects with this project. The Grasslands Plan was upheld through appeals and discretionary reviews.Applicable SRT recommendations, in accordance with the DPG Final Response to the SRT Reports have been incorporated into the analysis of this project, (see Appendix C).

The Forest Service agrees that monitoring is important, and this is brought forth through the Monitoring section of the DEIS and in Chapter 2 of the SDEIS and in the specific monitoring associated with each allotment identified in the SDEIS, Chapter 3, Part 2.

The same VOR protocol has been in use since the LMNG began using the VOR methodology in 1996 (SDEIS, Chapter 3 Part 1, Herbaceous Structure, Methodology; Project Record, Specialist Reports and Notes, Wildlife Report,

Appendix B; Schenbeck 1996; NGP FEIS, Appendix B). The only item of any potential significance is the stratification process but since the transect starting points are geo-referenced using GPS and GIS technologies, cross-walking with any stratification is possible. Lastly, the VOR protocol is reasonably consistent with Kohn (1976) and Mattise (1978) studies of grouse habitat on the LMNG. The SRT may have confused the entirety of VOR literature with what has essentially been the standard protocol on the LMNG since 1996.

K-96 *The Forest Service continues to ignore actual use data that it declined to provide to the SRT, erroneously telling the SRT that no such data existed. The DEIS perpetuates the incorrect information where it suggests that the Association reporting data are untrue or "unreliable" DEIS 3-14.*

See response to comment K-12.

K-97 *MGA data show that use levels vary from year to year but that the data exist and are reported to the Forest Service. Ex. 3, Schneider Decln. &20. Apparently the MRD claims that even an early removal of a few head must be reported to the Forest Service as nonuse. This is not consistent with Forest Service policy which permits delegation of authority to approve nonuse to the association. FSH 2209.13, ch. 20 '23.1, &2. The policy for direct grazing permits, which does not apply to grazing agreements, defines nonuse as more than 10% of permitted use. FSM 2231.62a, 2231.7. Moreover, MGA monitors use to ensure that if a member is not grazing in any given year, the authorized AUMs can be awarded to a member who can use the AUMs.*

The Forest Service agrees that use levels may vary from year to year. But the Forest Service disagrees that the actual use levels are reported to the Forest Service. See response to comment K-12.

The Forest Service has reviewed the above FSH and FSM citations, and believes that the comments do not pertain to the proposed project. However, the Forest Service would like to point out that the Allotment Worksheet/AOI does include the following statements, "If the permittee desires to change the grazing schedule as set forth below, the permittee will notify the Pasture Director within 5 days, who in turn, will notify the Medora Grazing Association office as soon as possible. The MGA will notify the US Forest Service within 10 days of the requested change and the basis for it. The Forest Service will be notified by the Association via telephone call with written confirmation to follow." Early removal of livestock would be a change in the grazing schedule, which would require notification to the Forest Service. Typically, this would be the kind of information the Forest Service would expect to receive as actual use information.

If the MGA monitors its members use or lack thereof, the Forest Service has not received any reports of this nature.

K-98 *The AMP DEIS states that MGA did not take drought reductions in the last two years. AMP DEIS 3-10. This is inaccurate. In 2008, MGA members resisted the MRD demand*

that everyone take a 35% reduction and instead members took reductions based upon the conditions in each pasture. Ex. 3, Schneider Decln. &23.

The SDEIS has included the drought reductions taken in 2008. See response to comment N-18 regarding reductions taken during the 2008 drought.

K-99 *Notwithstanding conclusions that the Forest Service lacked necessary data or reliable data, the AMP DEIS proposes significant reductions without monitoring data. The AMP DEIS provides scant documentation supporting the conclusion that livestock grazing is "principally responsible" for the failure to meet the LRMP goals, objectives, standards or guidelines. The summary sheets found in Appendices A and C do not describe the monitoring data nor document conclusions regarding causation for failure to meet the assigned vegetation structure or PFC standards.*
These sheets primarily refer to evidence of livestock use but rarely if ever distinguish between energy development and livestock and omit the impacts of big game use entirely.

The commentor's statement that the Forest Service lacked necessary data or reliable data, is assumed to be in reference to the SRT process whose function it was to determine if the Grasslands Plan could be implemented (see response to comment K-10), however, it doesn't pertain to this project.

See response to comment K-89 in regards to the commentor's statement concerning the DEIS proposing significant reductions. However, the effects of cattle on the different resources are identified in Chapter 3 of the DEIS, in Chapter 3 Part 2 of the SDEIS, and in the respective specialist reports (Project Record, Specialist Reports and Notes).

In regards to the commentor's statement that the summary sheets do not describe monitoring data. Appendix A in the DEIS does in fact provide a summary of what was found from the field data under the heading of Existing Condition. The field data itself is located in the Project Record. More detailed information is included under the various resource sections in Chapter 3 of the SDEIS and in the respective specialist reports (Project Record, Specialist Reports and Notes). See also response to comment K-93.

The DEIS and SDEIS in Chapter 1 identifies Grasslands Plan direction, existing condition, and a need for action when the existing condition varies from desired condition. Chapter 3 and Appendix A of the DEIS and Chapter 3 Part 2 of the SDEIS provide a summary of existing conditions by allotment, based on field data, and a need for action to meet or move resources towards the desired resource conditions identified in Chapter 3 of the DEIS and Chapter 3 Part 1 of the SDEIS.

The effects of oil and gas development use are identified on pages 3-7, 3-59, 3-84,3-96, 3-97 3-141, 3-150, and 3-158 of the DEIS and Chapter 3 Parts 1 and 2 of the SDEIS. The impacts of wildlife and oil and gas development have been previously addressed in response to comment K-57.

K-100 *The AMP DEIS fails to make any finding that reductions are the only "ecologically practicable and economically feasible" solution. The AMP DEIS also assumes that, in many cases, range structures cannot be added to the allotments, and thus livestock grazing reductions are the primary and only tools (DEIS Appendix D) rather than other methods that would involve structures to improve distribution and reduce use of sensitive areas. The limit on range structures is not required by law and the ROD requires the Forest Service to reconsider this criteria.*

The Forest Service believes both Alternative 3 and Alternative 4 meet this test. Balancing the ecologically practicable and economically feasible can be done on a sliding scale. A combination of both potential reductions and other practices to meet the ecological and economic goal to maintain a grazing program to the extent possible and provide sufficient habitat for grassland species is inherent in both alternatives. Alternative 3 has no initial livestock reductions, other techniques i.e. range infrastructure, water development, grazing rotation adjustments etc. were used as initial actions to address resource concerns. Alternative 4, uses the initial estimated carrying capacity to establish initial Authorized Use in AUMs, and in concert with other tools (i.e. Range infrastructure, etc.), results in no change in Authorized Use for some allotments (see SDEIS, Table 3.5). For the other allotments the resource needs (ecologically practicable) drive including reductions as an initial tool to meet or move towards Grasslands Plan goals and objectives.

The Forest Service disagrees with the statement that "The AMP DEIS also assumes that, in many cases, range structures cannot be added to the allotments, and thus livestock grazing reductions are the primary and only tools.." The DEIS doesn't assume or state such an accusation nor does the commentor present a specific reference to support this statement. The proposed action is built on use of tools and range methodologies other than livestock reductions as initial actions to address resource issues. DEIS Table 2.11 summarizes structures proposed by alternative. The misconception concerning range structures is further addressed in response to comments K-4 and K-33.

K-101 *The DEIS states that the Forest Service has not identified a preferred alternative because the agency "would like to hear what the public has to say about the project and its alternatives before selecting a course of action".@ DEIS at I. CEQ regulations require the section of the EIS on alternatives to "identify the agency's preferred alternative if one or more exists, in the draft statement, and identify such alternative in the final statement.@ 40 C.F.R. '1502.14(e). CEQ has further clarified that this means that if the agency has a preferred alternative at the Draft EIS stage, that alternative must be labeled or identified as such in the Draft EIS.@ Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, 46 Fed. Reg. 18026, 18027 (March 23, 1981).*

Commentor correctly quotes this section of the DEIS. The responsible official in this case had no preferred alternative at the time the DEIS was released. A preferred alternative is identified in the SDEIS.

The requirement is "[i]dentify the agencies preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference". *40 C.F.R. '1502.14(e)*

Commentor also cites the Forty Most Asked Questions… This quote is:

4b. Does the "preferred alternative" have to be identified in the Draft EIS and the Final EIS or just in the Final EIS?

A. Section 1502.14(e) requires the section of the EIS on alternatives to "identify the agency's preferred alternative if one or more exists, in the draft statement, and identify such alternative in the final statement . . ." This means that if the agency has a preferred alternative at the Draft EIS stage, that alternative must be labeled or identified as such in the Draft EIS. If the responsible federal official in fact has no preferred alternative at the Draft EIS stage, a preferred alternative need not be identified there. By the time the Final EIS is filed, Section 1502.14(e) presumes the existence of a preferred alternative and requires its identification in the Final EIS "unless another law prohibits the expression of such a preference."

The DEIS was consistent with both the regulation and the guidance.

K-102 *The Forest Service rationale for not disclosing its preferred alternative is also disingenuous. Only Alternatives 3 or 4 are likely to be considered. Given the MRD modification of Alternative 3 to "conform to the LRMP" or objections by the IDT, it is clear that the Forest Service prefers Alternative 4. Thus, the Forest Service cannot hide its preference and is required to disclose it.*

The Responsible Official has a range of alternatives to consider; he may select any one of the five alternatives or take parts of any of the alternatives and create a modified alternative. There is a range of implications associated with the selection of any of the alternatives, which will be fully disclosed in the Record of Decision. The Forest Service is unclear on the commentor's rationale about why the changes to Alternative 3 would imply that Alternative 4 would be the preferred alternative, when in fact there were very few changes made to MGA recommendations, see response to comment M. The Responsible Official discloses his lack of a preferred alternative on page i of the DEIS Abstract. The Forest Service is in compliance with the CEQ guidance on this issue.

K-103 *The Forest Service's rationale for not identifying a preferred alternative contravenes the NEPA policy, which requires a preferred alternative in an EIS. FSM 1950.41, &6. The agency should first subjectively identify its preferred alternative and then respond accordingly to public comment. Thus, if the Forest Service currently favors one of the*

identified alternatives, it must identify it as the preferred alternative, regardless of what the public has to say, and reopen the DEIS for meaningful public comment.

Commentor misinterprets the FSM. The FSM 1950.41 (6) reads, "[f]or each Forest Service proposal the responsible official shall coordinate and integrate NEPA review and relevant environmental documents with agency decision making as follows: (6) Identify the preferred alternative in an environmental impact statement (EIS) (40 CFR 1502.14)." See response to comment to K-101 for the 40 CFR 1502.14 language.

It is unclear where the commentor draws the "subjectively identify its preferred alternative" conclusion. The Forest Service finds no NEPA process flaws after considering this comment against the DEIS.

K-104 *The alternatives are the heart of the EIS, 40 C.F.R. '1502.14(a). Because the requirements for a proposed action or preferred alternative are essential to the integrity of the NEPA process, the DEIS must be rewritten and put out for public comment a second time.*

If the alternatives fully considered are substantially changed, a supplemental or a new draft EIS may be warranted. Refer to response to comments K-102 and 103 above on the discussions on a preferred alternative. Commentor does correctly state the need for a proposed action in the NEPA process, and as documented in the project record and the DEIS, a proposed action was scoped and analyzed, giving the public and the commentor two opportunities to comment on the proposal. Because of these opportunities (including an extended comment period), and the extensive prework that was done with the permittee to develop the proposed action, it is felt that the DEIS does not need to be rewritten.

As point of clarification, the commentor does correctly quote the alternatives is the heart of the EIS, but incorrectly cites the reference. This is actually found in the paragraph between the main heading of 40 CFR 1502.14 and 40 CFR 1502.14 (a).

K-105 *The AMP DEIS calls Alternative 3 the proposed action even though it is not the proposed action of MGA. The Livestock Grazing ROD provides that the Forest Service and the grazing association will agree on the "proposed action alternative". Livestock Grazing ROD, App. A at 17, supra at 26. But Alternative 3 is not fairly described as the "proposed action," given the changes that the Forest Service made, notwithstanding the objections of MGA members. Ex. 3, Schneider Decl. at &14.*

The commentor misquotes the Livestock Grazing ROD, App. A at 17, which states: "The range of alternatives might include, but are not limited to: 1) The proposed action, which would be the approach agreed to by the grazing associations and the Forest Service…".

Forest Service worked extensively with the MGA board and individual permittees in the development of Alternative 3 (SDEIS, Appendix A). The proposed action reflects nearly all of the recommendations provided by the MGA, see response to comment M. Based on MGAs comments, Alternative 3A was created for the SDEIS to reflect those specific actions the MGA felt the Forest Service should or should not have included (SDEIS, Appendix A).

This comment is addressed in response to comments K-29 and M.

K-106 *In accordance with Livestock Grazing ROD and Demonstration Project , the AMP DEIS may, but is not required to, consider a "no grazing" alternative. Livestock Grazing ROD at 17; FSH 2209.13, Ch.92.31. In these circumstances, NEPA does not contemplate the detailed analysis of a "no grazing" alternative in the DEIS, because the LRMP already made the decision to have livestock grazing on these lands. Livestock Grazing ROD at 13 incorporating by reference decisions made in the 2002 DPG LRMP ROD.*

The EIS is required to consider the No action alternative as directed by The Council on Environmental Quality (CEQ) regulations at 40 Code of Federal Regulations (CFR) 1502.14 (d). "Include the alternative of no action". 1502.15 continues with this direction related to alternative evaluation: (a) Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated. (b) Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits.

Forest Service Handbook 2209.13_90 WO Amendment 2005-10, page 11 states that "In addition to the proposed action, the "no action" alternative shall always be fully developed and analyzed in detail. "No action" is synonymous with "no grazing" and means that livestock grazing would not be authorized within the project area." The *Livestock Grazing ROD at 17 (7)* **provides examples of a range of alternatives that might be included in an alternative array. This specifically includes both a "no grazing" and a current management alternative, which is included in this analysis. The** *Livestock Grazing ROD at 9* **states "This decision authorizes grazing on the Dakota Prairie Grasslands through the issuance of grazing agreements and/or grazing permits, which will comply with the provisions of the Dakota Prairie Grasslands Plan as finalized by this ROD". In other words the ROD identifies that grazing is a valid use of the DPG and where allowed shall be accomplished through issuance of a grazing agreement and/or grazing permits in accordance with the provisions of the Grasslands Plan. This does not negate the need to consider a no action alternative.**

K-107 *The "no grazing alternative" should not be confused with the no action alternative required in NEPA. These lands have been grazed since the 1890s, and livestock grazing is a matter of vital economic and social interest to the local communities. NEPA requires that the Forest Service consider reasonable alternatives, and in this case, a no grazing*

alternative is not only unreasonable, but contrary to the purpose and need of the DEIS, statutory objectives for the LMNG and the issues driving the LRMP, including avoiding reductions in livestock grazing.
In a factually similar context, the court in Natural Resources Defense Council v. Hodel, 624 F. Supp. 1045 (D. Nev. 1985), aff'd 819 F.2d 927 (9th Cir. 1987) held as much: First, it is an indisputable fact that livestock grazing has been going on in the Reno planning area, on public lands, for more than a century. . . For better or worse, production of forage for livestock use is at least an important priority in the overall resource picture of this area. . . Second, the mandate of Congress in PRIA was that livestock use was to continue as an important use of public lands; they should be managed to maximize productivity for livestock and other specified uses. 43 U.S.C. ' 1903. Third, NEPA does not require examination of alternatives that are so speculative, contrary to law, or economically catastrophic as to be beyond the realm of feasibility. Kilroy v. Ruckelshaus, 738 F.2d 1448, 1454 (9th Cir.1985); California v. Block, 690 F.2d 753, 767 (9th Cir.1982). The complete abandonment of grazing in the Reno planning area is practically unthinkable as a policy choice; it would involve monetary losses to the ranching community alone of nearly 4 million dollars and 290 jobs. . . not to mention unquantifiable social impacts. . . Eliminating all grazing would have extreme impacts on this small community. A Ano grazing@ policy is simply not a Areasonable alternative@ for this particular area. Citizens For A Better Henderson v. Hodel, 768 F.2d 1051, 1057 (9th Cir.1985). Id. at 1054.

See response to comment K-106.

K-108 *As was true in NRDC v. Hodel, the Northern Great Plains have been grazed for at least several centuries, first by buffalo and other game, and later by domestic livestock. The AMP DEIS admits as much when it states that the ACongressional intent to allow grazing on suitable lands@ and that there is a Aneed for continued livestock grazing to support local families and communities.@ DEIS at x. In fact: A no grazing alternative was considered but eliminated at the [DPG LRMP] FEIS level because the Great Plains (including the DPG) evolved with several natural ecological disturbance processes, including herbivory (grazing). Grazing is an important process in achieving desired vegetation and habitat conditions to address rangeland and forest health and other issues.@ Livestock Grazing ROD at 9.*
A "no grazing alternative" would also contradict the legal objectives which govern management of the National Grasslands. These lands were acquired and reserved from the public domain to support the rural economy and provide demonstration projects for grassland agriculture, or livestock grazing. Ex. Orders 7374, 7375. The National Grasslands were established during the Great Depression, when the small farms allowed under the Homestead Acts reeled from triple calamities of drought, dust storms, and falling commodity prices. Congress adopted a solution in the Emergency Appropriation Acts and Executive Orders to purchase the farms, relocate the farmers to more arable land, and to return these former farms to grassland agriculture to be managed by the remaining ranchers. Howard E. The National Grasslands, 78 N.D.L.Rev. 409, 420-421 (). Thus, the no action alternative or the status quo is Alternative 2, continued livestock grazing that preserves rural agriculture economy. No grazing is a significant departure

from the status quo, does not conform to the LRMP decisions nor does it meet the Purpose and Need of the proposed action.

The commentor is incorrect in stating that "…no grazing alternative was considered but eliminated at the [DPG LRMP] FEIS level…" The no action alternative is identified in the DPG FEIS and carried through the analysis in Chapter 3 of the FEIS.

See response to comment K-106 in relation to the definition of no action.

K-109 *Even if the Forest Service were to analyze a no grazing alternative, it needs to acknowledge that such an alternative is not consistent with Presidential and statutory direction, the history of the National Grasslands, is inconsistent with the current land use plan, and does not meet the purpose and need of the action. Thus, any consideration of 'no grazing' as an alternative should only respond to public comments showing a substantive reason that 'no grazing' is a viable alternative. There is no indication in the record that this is the case here.*

The ROD for this project will provide the deciding officials reasoning for his decision including why other alternatives were not selected.

K-110 *Under NEPA, agencies must ensure professional and scientific integrity and accuracy of analyses. 40 C.F.R. "1500.1, 1502.24. The Forest Service, therefore, must identify areas of scientific controversy and respond to adverse opinions held by respected scientists. Public Lands Council v. U.S. Department of the Interior, 929 F. Supp. 1436 (D. Wyo. 1996), aff'd in part, rev'd in part, 167 F.3d 1287 (10th Cir. 1999), aff'd 529 U.S. 728 (2000).*
By the Forest Services' own admission, there are several unresolved scientific controversies. Livestock Grazing ROD at 13. Rather than addressing the Forest Service's own scientific assumptions, which are admittedly controversial, the AMP DEIS appears to use the original 2002 LRMP assumptions. See Seattle Audubon Society v. Mosely, 798 F. Supp 1473, 1482 (W.D. Wash. 1992) (setting aside EIS which did not give reasoned analysis and response to scientific report which disputed agency findings); Sierra Club v. Eubanks, 335 F. Supp.2d 1070, 1079 (E.D. Calif. 2004) (NEPA specifically requires BLM "to objectively evaluate and disclose credible scientific evidence that contradicts its proposed course of action").

In reviewing page 13 of the 2006 ROD, it is difficult to find any language that would suggest "several unresolved scientific controversies" (see 2006 ROD, p. 13). Discussion about modifying and strengthening Grasslands Plan monitoring does occur, which is only reasonable and prudent as additional studies are done and valid data collected. Again, the SRT report discusses continuing controversy, but not over the scientific points, but rather over the values held by a diverse group of the American public, and the need to balance uses to meet multiple public land management goals and objectives driven by a multitude of factors (see 2006 ROD p. 4-5).

The information provided by the commentors is considered and evaluated in the Range section of Chapter 3 Part 1 of the SDEIS and in this response to comments. Also, refer to the Range, Methodology, Carrying Capacity Analysis section in Chapter 3 Part 1 of the SDEIS and the project record where the Forest Service specialists have done peer review with other Federal agencies on the methodology and best available background information used as far as current ecological sites and soil mapping.

The opinion the commentor relies upon to support their claim of scientific controversy also commented on the Grasslands Plan (Dr. Lacey). Please note throughout the Addendum for the Final Environmental Impact Statement and Land and Resource Management Plans in Comments and Responses (for example p. 160-161) where the same scientist (Dr. Lacey) made basic errors in assumptions of land management planning creating misleading conclusions. The scientist used also fails to explain there are several different acceptable methodologies that can be used to reach an estimated initial stocking rate, and also fails to use all of the criteria suggested by the SRT committee to reach his conclusions (for example, the use of adjusting for cow size and older, larger calves, see SRT report, p. 19). In fact, his report does not discuss why, or why not, this important criteria was ignored, in contrast to the Forest Service specialists who discuss that this would be a step evaluated as part of adaptive management (see DEIS 1-13 through 1-15, and Appendix D). Regardless, this scientist's work was duly evaluated, considered and discussed in the SDEIS, which meets the requirement the commentor purports to claim from Public Lands Council v. USDI.

K-111 *The DEIS fails to address scientific controversies which the Forest Service admitted remain unresolved after more than 10 years of NEPA process and debate in the DPG LRMP. Livestock Grazing ROD at 1. These include (1) recommendations regarding woody draw management and encroachment, (2) whether the soil, precipitation and weather will support high structure vegetation and VORs assigned in the DPG LRMP, (3) whether VORs provide a valid measurement to manage vegetation for biological diversity, resource health, and livestock grazing, (4) whether it is appropriate in calculating carrying capacity to exclude lands producing less than 300 pounds per acre; (5) whether the PFC criteria developed by the Forest Service should apply to riparian areas or be adjusted to reflect the northern Great Plain; and (6) the validity of the Forest Service data to date, especially the consistency of protocols for VOR readings, PFC assessments, and assumptions regarding range condition and carrying capacities.*

Review of page 1 of either the 2002 or 2006 Grasslands Plan ROD did not reveal any unresolved scientific controversies. Page 1 of the 2006 ROD does state that "Due to uncertainty and considerable controversy regarding assumptions, standards, and guidelines and projected effects of the LRMP, the 2002 established a "phase in" or "interim" approach to implementing the Plan's livestock grazing direction and guidance". It further states that "It has been four years since the initial Record of Decision was signed and 11 years since the beginning of the Northern Great Plains

planning process." The additional points identified in the comment are not on page 1 as implied by the commentor.

However, the points were addressed by the SRT and recommendations provided to the Forest Service who responded in the DPG Final Response to the Scientific Review Team Reports. The DEIS addressed the applicable recommendations consistent with the DPG's Final Response to the SRT reports, see Appendix C of the SDEIS.

This statement has been responded to through the Forest Service's 2006 Final Response to the Scientific Review Team Reports. See also response to comment K-11.

K-112 *The Demonstration Project was designed to address the above issues at the project level. Id. at 15 ("Based on the SRT's findings and recommendations, the continuing controversy over the livestock grazing portion of the DPG Plan, and the national grassland mandate to demonstrate sound and practical principles of multiple use management that includes grassland agriculture, a pilot demonstration project is being proposed."). The AMP DEIS design does not address these issues nor does it adopt procedures to do so. Most importantly, the AMP DEIS assumes that the 2002 LRMP objectives, standards and guidelines are set in concrete and does not consider amendments to the DPG LRMP, even though the DPP was intended to explore necessary changes to avoid livestock grazing reductions. Not only does the DEIS not try to avoid reductions but Alternative 4 embraces reductions as the principal management tool in its tool box. Appendix A-91-135.*

Commentor correctly quotes part of the purpose of the Demonstration Project. While that statement does capture some of the rationale behind the creation of the Demonstration Project, the very next sentence of that paragraph goes on to say "[t]he purpose of the demonstration project would be to develop and implement integrated allotment management plans pursuant to a collaborative process with the respective grazing associations that share in the management of grazing on the National Grasslands, to determine if Plan Goals and Objectives are achieveable or need modification, and monitor progress towards meeting the resource objectives." What the Forest Service agreed to do with the SRT report (see the list provided by the commentor in K-111), are addressed in the Final Response to the SRT report. So the Demonstration Project was not designed to address the SRT issues listed in K-111 at the project level. The Applicable SRT recommendations were addressed in the analysis (SDEIS, Appendix C). Also see response to comment K-116.

The SDEIS analysis didn't reveal the need for amendments to the Grasslands Plan so none are proposed. As cited elsewhere in this response, the Forest Service best available science and knowledge of the area shows the land is capable of achieving the Grasslands Plan goals and objectives (see Capability section for each resource in Chapter 3 Part 1 of the SDEIS). Monitoring, described in the Monitoring Section in Chapter 2 and in the third table for each allotment in Chapter 3 Part 2 of the

SDEIS, will determine if adjustments are needed in either the Grasslands Plan or the management of the allotments.

Nowhere in the Demonstration Project does it suggest that the Grasslands Plan should be amended so as to keep resource conditions as they currently are across the Dakota Prairie Grasslands, nor that no changes in management should occur until a perfect monitoring and data gathering system universally agreed to by all users for all possible grassland resources should be developed. Rather, the purpose would seem to be to move forward with the permittees in balancing needed changes in management in a cooperative manner to meet Grasslands Plan goals and objectives and to minimize permitted AUM reductions in the proposals (refer to the Demonstration Project Proposal Strategy section on p. 16 and 17 of the 2006 ROD).

Commentor incorrectly makes the assumption that alternatives must avoid reductions. It would be a violation of 40 CFR 1502.14, when taken in total to not explore reasonable alternatives, such as Alternative 4.

Not only does the DEIS not try to avoid reductions but Alternative 4 embraces reductions as the principal management tool in its tool box. Appendix A-91-135.

This is an incorrect statement. Alternative 2 has no Authorized Use (DEIS p. 2-14, 3-52) reductions. There are no initial reductions in Authorized Use in Alternatives 3 or 3A, which were designed using a variety of tools (SDEIS, Appendix A) excluding initial adjustments to Authorized Use (DEIS 2-15). Alternatives 3 and 3A under the SDEIS don't consider Authorized Use adjustments unless monitoring reveals the need for a management adjustment, and then it is one of many tools that can be selected to address a resource concern.

K-113 *Similarly, despite the disclosure that initial reductions will be an average of 26%, the MRD makes no effort to avoid such reductions or to address the SRT recommendations.*

The commentor is referring to Alternative 4 when referring to an average 26 percent reduction. The DEIS on page 3-52 identifies that under Alternative 4 for those allotments receiving an adjustment in Authorized Use range from 0 to 45 percent with an average reduction of about 20 percent from preference. Note the 20 percent was a typo in the DEIS should have been about 23 percent.

See comments K-4, K-48, K-100, and K-112 in regards to the MRD lack of effort concerning reductions and Appendix C in the SDEIS regarding SRT recommendations.

K-114 *Also the AMP DEIS does not disclose how the Forest Service resolved the data issues raised by the SRT.*

How the issues brought forward by the SRT will be dealt with across the DPG are discussed in the Final Response to the Scientific Review Team Reports (Oct. 10,

2006). How they are dealt with in this project can be found in Appendix C of the SDEIS. Note not all of the SRT recommendations can be dealt with in a project by project basis, as some are more administrative in nature, such as "[m]aintain and share detailed, pasture-specific grazing records by Grazing Association and Forest Service personnel."

K-115 *In many cases, the PFC readings appear to have been done prior to the final SRT report, thus raising questions about the validity of the determinations that the areas fail to meet PFC. For example, 244 allotment was originally classified as meeting PFC and now is shown at risk, although livestock numbers did not change. App. A-74.*

The PFC data used to establish existing conditions in the North Billings County project area were collected from 2004 (see Brooks, 2005) through 2007. It is unclear to the Forest Service how collecting PFC field data prior to the final SRT report would affect the validity of the PFC determinations made from that field data. Additionally the SRT report dealt with the Grasslands Plan not this site specific project. The SRT did not review the PFC data for this project and made no judgment of the data.

The evaluation of a riparian area provides a snapshot of conditions. The rating is not permanent. Surveys are routinely repeated to establish trends and to detect problems with current management or to document successful restoration of degraded areas. The two surveys in question are 6 to 7 years apart. The results of the survey indicate that in a matter of a few years, riparian conditions can degrade. In contrast, there are cases where rest or small changes in management can restore riparian conditions in one or two years.

K-116 *It is also clear that the AMP DEIS does not adopt most of the SRT recommendations, with the exception of dropping the floristic quality index and not using the DRAGON team data. Otherwise the criticisms levied by the SRT and its recommendations are ignored.*

This is an incorrect statement, applicable SRT recommendations were addressed in each resource area of the DEIS. However, every SRT recommendation and how it was addressed has been compiled into one section in the SDEIS (see Appendix C of the SDEIS).

K-117 *Ordinarily, DEIS, therefore, would be revised to respond to the credible but contradictory scientific evidence provided. While the Forest Service ultimately has the discretion to decide what science to choose, the best available science "is not just whatever the Forest Service finds on the shelf. . . it still must be good science-that is reliable, peer-reviewed, or otherwise complying with valid scientific methods." Ecology Center, Inc. v. U.S. Forest Service, 451 F.3d 1183, 1193, 1194 n.4 (10th Cir. 2006). In this case, the Livestock Grazing ROD acknowledges the scientific issues are still in controversy and requires each AMP to develop procedures to address them. Livestock Grazing ROD at 11 ("Based on the continuing controversy over the livestock grazing*

portion of the DPG Plan, and the national grassland mandate to demonstrate sound and practical principles of multiple use management that includes grassland agriculture, a Demonstration.”). When it appears there will be reductions, the Forest Service must also consider amending the LRMP to avoid reductions or to test the underlying assumptions in the plan. Id. Because the SRT concluded that several of the DPG LRMP and other Forest Service assumptions lacked credible scientific support, the data to be used in the AMP DEIS must conform to the SRT recommendations. The AMP DEIS does not incorporate the recommendations and thus is fundamentally flawed.

The Forest Service used the applicable SRT recommendations (see SDEIS, Appendix C), and used peer review to check methodology. See response to comment K-112 for response to the contentions on scientific controversy, the purposes of the Demonstration Project, and whether there is a need to amend the Grasslands Plan to avoid reductions.

The Demonstration Project states “Goals, objectives, standards and guidelines related to livestock grazing in the Grasslands Plan will be assessed. If adjustments are needed, Grasslands Plan amendments will be proposed.” The analysis completed for the North Billings project determined that the Grasslands Plan goals and objectives are achievable; therefore, modification to the Grasslands Plan is not needed and has not been incorporated. However, monitoring progress towards meeting the resource objectives is an integral component of the proposed action.

The analysis in the DEIS and SDEIS meet the requirements of the Demonstration Project and appropriately followed the Final Response to the SRT report.

K-118 *The AMP DEIS also omits the impacts of other grazing animals. The populations of deer, elk and big horn sheep have grown significantly since the establishment of the LMNG. Hunting is a major sport in North Dakota and population objectives of NDGF reflect its popularity. Nevertheless, these game animals affect rangeland resources and the AMP DEIS fails to address the interaction and the impacts. This is especially important with respect to woody species, since deer and elk will graze woody species in the spring before livestock are turned out.*
Elk and deer herds have increased significantly, but the DEIS fails to address the differences between cattle and big game use or even if the data make the distinction. This omission is significant, and suggests that the data do not support the premise in the DEIS that all reported resource concerns or unsatisfactory conditions are due to livestock grazing needs to be reexamined. See e.g. Appendix C summary of conditions by allotment; DEIS App. C-41.

See response to comment K-57.

K-119 *The SRT also criticized the Forest Service data for failing to document causation, especially as to PFC assessments. The same flaws are found throughout the AMP DEIS, where the PFC notes fail to identify any cause. See e.g. Appendix A-77, A-118.*

The DEIS on pages 3-60 thru 3-70 identified livestock and other impacts to stream reaches. The PFC field notes (Project Record, Supporting Documentation - Riparian, L-36) contain notations regarding the presence of livestock, tracks in the creeks, grazed vegetation, cattle manure in the streams. See also response to comments K-44 and K-53.

K-120 *Noxious Weed Infestations Due to Many Factors Omitted in AMP DEIS*
The AMP DEIS assumes that noxious weed infestations are largely due to livestock use, livestock trailing, and grazing. AMP DEIS at 3-54 (equating less livestock with fewer noxious weeds). This is only partly correct. Noxious weeds are carried by all grazing animals, including big game, birds, wildlife, as well as the wind. Wildlife, birds, and wind play a significant role in the dispersal of noxious weeds. Sakai, et al., The Population Biology of Invasive Species, ANNU. REV. ECOL. SYST. 2001. 32:305B32 at 312. The need to conduct noxious weed control in wilderness areas where there is no livestock use is further evidence that livestock are by no means the sole or even the primary vector for noxious weeds. 74 Fed. Reg. 40809 (2009); 71 Fed. Reg. 64509 (2006). It is also well-established that surface disturbance from energy development will facilitate new noxious weed sites. The AMP DEIS ignores these significant impacts entirely.

The DEIS does not assume that noxious weed infestations are largely due to livestock. The DEIS at 3-54 identifies that under Alternative 4 fewer livestock might have a positive effect because there would be fewer cows, therefore, fewer vectors to spread noxious weed seed. The same would be true if there were less car and truck traffic, fewer hikers, less ground disturbance, etc.

The Forest Service agrees that big game, wind, birds etc. also have a role in dispersal of noxious weed seed. The DEIS doesn't single out livestock as the only or primary vector effecting livestock. The DEIS (pp. 3-6, 3-7, 3-16, 3-85, 3-127, 3-150, 3-151) and Botany Report (Project Record, Specialist Reports and Notes) identify many other vectors that can spread noxious weeds.

K-121 *Energy development has been occurring on the National Grasslands for almost 60 years and that development also has significant impacts on vegetation, soils, and sediment. It would appear that in most cases the data relied upon in the AMP DEIS do not make a distinction between livestock uses and other land uses, such as energy development, especially in riparian areas. See e.g. AMP DEIS C-4, C-29, C-32, C-41 (roads cause noxious weeds and crested wheatgrass). There are a few notes about roads but nothing about well sites, pipelines and transmission line construction or other development. These are actions occurring at the same time and place and need to be addressed in the AMP DEIS as similar and cumulative actions. 40 C.F.R. '1508.25(a).*

The effects of oil and gas development use are identified on pages 3-7, 3-59, 3-84,3-96, 3-97 3-141, 3-150, and 3-158 of the DEIS and Chapter 3 Parts 1 and 2 of the SDEIS.

The individual PFC field checklists (see Project Record, Supporting Documentation – Riparian, L-26 and L-36) note impacts to riparian areas from various activities, livestock grazing and other activities. The PFC protocol is specifically designed to examine riparian areas. Well sites are never located in riparian areas on National Forest System lands of the Dakota Prairie Grasslands. Pipelines and transmission lines are buried. Road crossings, by Grasslands Plan direction, are perpendicular to streams (see Grasslands Plan, p. 1-9, 1-10, 1-11). The fact that there are few notes about roads, pipelines, and transmission lines reflects that this infrastructure has been generally installed well and located properly so as to have little to no long-term impacts to riparian areas. Pipelines are generally bored under riparian areas as are transmission lines to minimize disturbance.

Additional information regarding oil and gas development has been added to the Past, Present, and Reasonably Foreseeable and Cumulative Effects sections in Chapter 3 Part 1 of the SDEIS.

K-122 *Recommendations*

A. Revise Purpose & Need to Reflect Livestock Grazing ROD, Rey Direction and DP Objectives

1. Include Avoiding Livestock Grazing Reductions

As found in both the Livestock Grazing ROD, Demonstration Project, and the Under Secretary direction, the AMP DEIS must show significant efforts to maintain livestock grazing levels. The AMP DEIS does just the opposite and needs to be revised to adopt the full range of techniques to avoid reductions. Reductions should occur only after monitoring data demonstrate a need and other techniques have not succeeded.

The 2006 Grazing ROD (page 16) states that " One goal will be to maintain or improve current on-the-ground conditions and/or condition to maintain, to the maximum extent possible, a grazing program at current levels and provide sufficient habitat for grasslands species". There is no requirement to show significant efforts to maintain livestock grazing levels.

The DEIS and SDEIS provide an array of alternatives to address resource concerns. Alternative 2 has no Authorized Use reductions (DEIS p. 2-14). Alternatives 3 and 3A (SDEIS) have no initial reductions in Authorized Use, and cannot entertain reductions unless monitoring shows resource objectives aren't being met. Alternatives 3 and 3A both utilize a full range of different techniques (see DEIS Appendix A, SDEIS Chapter 3 Part 2) to address resource concerns. The toolbox (DEIS p. 2-15) is comprised of all the different tools used to address resource concerns. The commentor doesn't provide other techniques to consider. Alternative 4 uses a combination of grazing reductions and other range management techniques

K-123 *The AMP DEIS needs to include LRMP amendments that will include deletion of the 'no net' increase in range structures, revision of high structure and VOR standards to reflect site capability and maintaining grazing levels, revision of PFC criteria designed for western North Dakota, and revision of woody draw standards to reflect historical*

distribution and trend data, recalculate AUMs and evaluate whether larger livestock affect forage health and vigor adversely, and include all lands in calculation of carrying capacity.

The IDT considered these comments in a new alternative. However, that alternative was dismissed from detailed study. See the Alternatives Considered But Dropped from Detailed Analysis section in Chapter 2 of the SDEIS for a detailed discussion of why the alternative was dropped.

K-124. *Recalculate Carrying Capacity with Actual Data*
Incorporate MGA program with NDSU which will have three years of ecological site condition and production data. More than three years ago, MGA contracted with NDSU to develop range condition data, which will be compiled and evaluated within two months.

The cooperative monitoring effort between NDSU, MGA, and the Forest Service began on the ground data collection in 2008. The Forest Service has reviewed the 2008 and 2009 cooperative monitoring data (see SDEIS, Chapter 3 Part 1, Range, Cooperative Monitoring Data). See response to comment K-65.

K-125 *Revise Data or Acknowledge Missing Data to Conform to SRT Recommendations*
The AMP DEIS puts in place significant grazing reductions in many cases without correcting the data deficiencies identified by the SRT. The AMP should be the point where management is not changed without sound data. If the data were flawed or questionable due to varying protocols, lack of training, or the need to revise criteria, then it cannot be fairly used to justify grazing reductions. The cost is too high to the members and to the community to impose cuts that are not needed just because the readings were inaccurate.

See response to comment K-114.

K-126 *Put in Place Process to Develop Data Through Joint Monitoring*
If adaptive management is going to work, there needs to be a process to develop good information. The AMP is that opportunity and the information development needs to mirror the recommendations of the SRT regarding VORs, vegetation structure, PFC and woody draws in particular.

The Monitoring Plan starting at page 2-18 of the DEIS and the Allotment Summary Sheets (Appendix A) identify the process and what will be monitored and frequency of monitoring by allotment. The monitoring regime for each allotment has been updated in the SDEIS (see Chapter 3 Part 2). Information that will be collected does mirror SRT recommendations in accordance with the DPG's Final Response to the Scientific Review Team Reports. The MGA as the Forest Service's agent has a role in the collection of monitoring information in conjunction with Forest Service data collection efforts.

See also response to comment K-112.

K-127 *Revise Alternative 3 to Reflect All of the MGA Recommendations*
The MGA stands ready to engage in good faith negotiations to develop a joint alternative. The AMP DEIS cannot conform to the Livestock Grazing ROD and Demonstration Project until this occurs.

A review of Exhibit 2, revealed that most of the highlighted MGA recommendations were either included in the proposed action or dropped for one of several different reasons, see response to comment M for further details. Based on MGA's comments Alternative 3A was created for the SDEIS to reflect those specific recommendations the MGA felt the Forest Service should or should not have included in Alternative 3 (SDEIS, Appendix A).

K-128 *Revise Alternative 3 to Include Monitoring Program Designed to Test Issues in Controversy*
In light of the fact that there may not be sufficient data and the questions about the carrying capacity calculations, it is apparent that adaptive management or stock and monitor system avoids reductions and yet allows credible data to be developed. This system will only work if the AMP also acknowledges the need to put in place a process to evaluate the merit and ability to meet LRMP goals, objectives, standards and guidelines.

No additional processes are needed to evaluate the merit of the Grasslands Plan goals, objectives, standards, and guidelines (refer to the 2003 and 2007 Grasslands Plan Washington Office appeal decisions and the associated Discretionary Reviews, the SRT report, and the Final Response to the SRT report). The SDEIS identifies that the ground is capable of meeting The Grasslands Plan goals, objectives, standards and guidelines. Project implementation, monitoring and review will determine if any adjustments are needed to the Grasslands Plan in accordance with point 3 (2006 ROD, page 16) of the Demonstration Project.

Also see response to comment K-22.

K-129 *Avoid Livestock Grazing Reductions*
The AMP DEIS fails to include the requirement that grazing levels be maintained. This needs to be central to the decision and AMP.

The Demonstration project states "One goal will be to maintain or improve current on-the-ground conditions to maintain, to the maximum extent possible, a grazing program at current levels and provide sufficient habitat for grassland species. (2006 ROD, p. 16). This is not a requirement to maintain current grazing levels, and as such is not incorporated into the DEIS or SDEIS.

Throughout the 2006 ROD, including the Demonstration Project, implementing the Grasslands Plan and providing for the suite of multiple uses is discussed. The Forest Service has formally agreed to the practice it has often employed on the

Dakota Prairie Grasslands, which is to try to minimize livestock reductions while providing for sufficient habitat for grassland species, multiple uses, and complying with all applicable federal laws, regulations, and executive orders.

EXHIBIT 1. LETTER OF JOHN LACEY, PHD. OCTOBER 11, 2009

L-1 *Based on my review of the selected material, I believe that the FS methodologies did not correctly follow the NRCS guidelines. Based on the FS description of their methodologies, I do not know how they generated their estimated carrying capacities.*

The commentor is correct in that the Forest Service did not follow NRCS guidelines for estimating carrying capacity (see response to comments K-63 and K-64). The Forest Service acknowledges that additional descriptive information could be added to the carrying capacity analysis section of the DEIS, the SDEIS has been updated to include this information (SDEIS, Chapter 3 Part 1, Range, Methodology, Carrying Capacity Analysis).

L-2 *It is important to realize that the FS decision to use a quasi-NRCS approach to carrying capacities should be criticized.*

See response to comments K-63 and K-64.

L-3 *It is important to note that none of the four approaches outlined in the Handbook resembles the FS method that is described in the DEIS.*

The commentor is correct in that none of the four approaches outlined in the NRCS National Range and Pasture Handbook were used to estimate carrying capacity. See response to comments K-63 and K-64.

L-4 *I think that your clients deserve to know--- How did the FS obtain their production data (did they clip plots and weigh each species)?*

See response to comments K-66 and K-68.

L-5 *The FS claim that the "weighed average figure was based upon the ecological site reference plant community production (Representative Value) for each ecological site within the soil mapping unit." This seems to suggest that the carrying capacity was somehow estimated by comparing "something" to ecological site guides?*

The commentor is incorrect in suggesting that the carrying capacity was estimated by comparing "something" to ecological site guides. In the Range, Methodology, Carrying Capacity Analysis section in Chapter 3 Part 1 of the SDEIS, the Forest Service identifies that forage production values for each mapping unit within the soil survey were calculated by using a weighted average of the listed ecological sites within that mapping unit. Each listed ecological site within a mapping unit has a

reported Representative Value that is the expected production for the reference plant community under normal growing conditions for that ecological site.

L-6 *The FS further writes "some assumptions to consider about the Representive Value are as follows: 1) seasonlong grazing, 2) normal growing conditions, and 3) reference plant community." To me, this suggest that these considerations somehow influenced the estimated carrying capacities. If so, how did they influence the calculations?*

See response to comment K-69.

L-7 *If the FS did somehow estimate production by species and compared it directly to the ecological site guides, they would be calculating similarity indices. According to the National Range and Pasture Handbook, similarity indices are calculated by comparing clipping data (i.e., #lbs of production by species) on an ecological site to the historic climax plant community that is defined on the respective ecological site guide. If the FS did this, they would have a "similarity index" for each ecological site. However, the similarity indices are not representative of the stocking rate. For example, 2,000 lbs/acre of smooth bromegrass may be produced on a loamy site, but it would not contribute toward the DI because smooth brome (an introduced species) would not be listed on the historic Climax Plant Community loamy ecological site guide. Likewise, if the FS did have a list of species growing on an ecological site, and the respective production of each, an inexperienced observer may note that smooth brome did not occur on the historic climax plant community, and thus, smooth brome would not be given any credit for forage value on the site.*

See response to comments K-70 and K-71.

L-8 *The FS needs to clarify their description of the methodology, and be required to specifically describe how the production of crested wheatgrass, smooth bromegrass, Kentucky bluegrass, etc, entered into their carrying capacity calculations. Or were they omitted because they were not listed as a species on the Historic Climax. Plant Community (and thus significantly lower forage production)?*

See response to comment K-71.

L-9 *In my experience, most of the soil surveys conducted in western states are done at a scale that precludes the mapping of small drainages and coulees (overflow sites) that often contribute significantly to the carrying capacity of an area that is comprised of a mapping unit. Therefore, the carrying capacity of the soil mapping unit is often under-estimated when this approach is used. The magnitude of this discrepancy varies with the topography, mapping scale, and capabilities of the soil scientist that did the mapping.*

See response to comment K-72.

L-10 *The FS may have been logical (if they had clipping data) when they calculated forage production values for each mapping unit within the soil survey by using a "weighed*

average" of the ecological sites within that mapping unit. This suggests to me that if a mapping unit was comprised by 70% shallow and 30% clayey ecological sites, then the weighted forage production for the unit would consider the number of acres of each, and the respective forage production that characterizes them. However, this "weighted average" could not be compared to the ecological site guides. Furthermore, the "weighted average" would not have included the "contrasting inclusions".

See response to comments K-66, K-68, K-71, and K-72.

L-11 *The FS used a harvest efficiency of 25%. This value may not be appropriate for all allotments. According to the NRCS Handbook, harvest efficiency is the percentage of forage actually ingested by the animals from the total amount of forage produced. Harvest efficiency increases as the number of animals increases in an area and they consume plant material before it senesces, transfers to litter, or otherwise leaves the area. Because of differences in stock density, vegetative types, livestock distribution, grazing system, etc, it is logical to expect that harvest efficiency would not be identical for all allotments. In many areas, a harvest efficiency of 35% is probably attained.*

The SDEIS in Chapter 3 Part 1, Range, Methodology, Carrying Capacity Analysis describes the formula used to calculate the carrying capacity analysis and gives an explanation of why 25 percent was used as the harvest efficiency value. The Forest Service agrees that every individual operator is different, but generalities need to be made when doing an analysis across many acres of land.

L-12 *The NRCS Handbook defines an animal unit (AU) as one mature cow of approximately 1,000 pounds and a calf as old as 6 months or their equivalent. An AUM is the amount of forage required by an animal unit for one month. According to the Handbook, the NRCS has "elected to use 26 pounds of oven-dry weight or 30 lbs air-dry weight (as-fed) of forage per day as the standard forage demand for a 1,000 pound cow (one animal unit). Therefore, their "913" pounds of forage (air dried) required to maintain a cow for one month appears to be consistent with NRCS methodology. Although I did not find the FS description, they probably multiplied the 913 lbs of forage by 1.2 to estimate the forage required to maintain a 1,200lb cow? (If they did, it should be pointed out that the relationship between the consumption of a 1000 and 1200 lb cow, is not linear. But as argued by the SRT, a big cow eats more than a little one).*

If the Forest Service adjusts for the average size of a cow being greater than the definition of an animal unit, the process for this is described in the SDEIS in Chapter 3 Part 1, Range, Methodology, Livestock Weight Adjustment and in Appendix D. This would be done outside of the carrying capacity analysis.

L-13 *As you know, adjusting stocking rates simply on the basis of cow size is not logical without additional supporting data. Unfortunately, some land administrators now use cow size as a tool to reduce livestock use on rangelands.*

The commentor is incorrect that the Forest Service is using cow size as a tool to reduce livestock use on rangelands. Alternatives 3, 3A, and 4 were created to address various resource issues in light of Grasslands Plan goals and objectives. These alternatives propose initial actions which include several grazing management tools.

EXHIBIT 2. TABLE COMPARING MEDORA GRAZING ASSOCIATION RECOMMENDATIONS WITH ALTERNATIVE 3 OF THE DEIS

M-1 **See SDEIS, Appendix A which documents how Exhibit 2 of the Medora Grazing Association's and Billings County's comments was considered. Alternative 3A was developed based on the review of this exhibit.**

EXHIBIT 3. DECLARATION OF CLINT SCHNEIDER, MEDORA GRAZING ASSOCIATION

N-1 *3. The Forest Service held individual meetings with each permittee or permittees for the in-common pastures to discuss management of the allotments. The first set of meetings involved about half an hour with each member when the member could recommend changes in management, as well as structural and non-structural range improvements. The Forest Service took detailed notes. Throughout the meetings, the Forest Service personnel talked about achieving the objectives in the Dakota Prairie Grasslands Land & Resource Management Plan (Plan). The Forest Service employees were particularly focused on meeting the structure objectives or the VOR readings specified in the plan.*

In review of the MGA letters sent out to the individual permittees and base property owners an hour was scheduled for each individual allotment for the first set of meetings (Project Record, Supporting Documentation – Range, L-22 – October 11, 2005 and November 9, 2005; Project Record, Process Documentation, Permittee Meeting Notes, B-51). Enclosed within the letters was information from the Forest Service concerning these meetings and the Allotment Management Plan revisions. MGA also instructed the permittees to review the information before their individual meeting. The actual length of the meeting varied among allotments. There were allotments that only took a half hour, and others took an hour or more. A review of the notes taken, the information enclosed in the MGA letters (Project Record, Correspondence Permittee, J-4), and the SDEIS, Appendix A shows that Forest Service personnel did discuss the Grasslands Plan goals and objectives and also pointed out in the meetings what potential issues may occur on the allotment. However, Forest Service personnel made it clear that site specific issues were not identified at this time. Structure objectives were one of several goals and objectives discussed at the first set of permittee meetings.

N-2 *4. At the end of the first set of meetings the Forest Service said they would take these recommendations back to the planning team. They were specific that the association members may get what they wanted or may not.*

The Forest Service agrees that permittee requests, comments, and concerns were brought back to the Forest Service IDT after the first set of permittee meetings. A review of the notes taken at the first set of permittee meetings indicates that the Forest Service did specify that they would take the information back to the IDT, and permittees would be kept in the loop (Project Record, Process Documentation, Permittee Meeting Notes, B-51). Forest Service personnel indicated that requests could be considered especially if they addressed identified resource issues and didn't cause any additional resource issues.

N-3 *5. In 2006, the Forest Service scheduled a second set of meetings. This consisted of an explanation of why the Forest Service did not take what the member wanted. If the member did not get what he recommended it was put into the "toolbox." The Forest Service instead proposed trying different techniques to achieve or make progress toward achieving the LRMP objectives. Nothing was concrete but the Forest Service told the members what would be done, and did not give the members the chance to suggest something else. In many cases the Forest Service just said the biologist or archeologist on the IDT could not accept the member's recommendations.*

See response to comments K-27 and K-28.

N-4 *6. There was no timetable given between trying different techniques and figuring out what would and would not work.*

The monitoring section of each Allotment Summary Sheet in Appendix A of the DEIS describes timetables for implementation monitoring. The SDEIS has included a Trigger Points section under Monitoring in Chapter 2, and monitoring frequencies for each allotment have been updated in the third table for each allotment in Chapter 3 Part 2.

N-5 *8. In response to questions regarding the length of time the Forest Service has taken, we were told that the AMP DEIS has been delayed to work on the grazing agreement renewal.*

While the Forest Service has repeatedly provided information on timetables and deadlines for the North Billings project that has been backed up, at no time has the Forest Service said that the work was delayed to work on the grazing agreement renewal. Work on each project has been concurrent with different representatives heading up the individual projects.

N-6 *9. The DEIS states that the Board agreed to adaptive management. DEIS 1-5. This is misrepresented. There was one short meeting where the Forest Service gave MGA members an up or down choice between coordinated resource management planning (CRMP) or adaptive management. MGA was not told what it would involve but members were aware of a continuing CRMP process that has not gone smoothly. Based solely on*

that up or down choice, we expressed a preference for adaptive management based on what the Forest Service explained and no additional information.

See response to comment K-35.

N-7 *10. Adaptive management was not presented as precluding or excluding the Demonstration Project that the association supported. Nor was it presented as waiving the resolution opportunities raised by the Scientific Review Team (SRT).*

See response to comment K-35.

N-8 *11. Even now we are not opposed to adaptive management if it were properly structured with agreed upon objectives. The dilemma we face is that the Plan objectives particularly the structure and woody draw are the subject of a major scientific controversy. So adaptive management as set out in the DEIS is not able to test the validity of the objectives in the first place.*

See response to comment K-36.

N-9 *13. There was no discussion of how to test whether the sites are capable of producing the structure objectives and VOR measurements set out in the LRMP. On many occasions the members told the Forest Service that the allotment could not to meet the objectives due to limits on the site capability. These comments were ignored.*

See response to comments K-15 and K-41.

Comments on site capability were not ignored. The Forest Service took the opportunity at permittee meetings to describe what they considered "biologically capable" visually on a map. In fact, at the second set of meetings the Forest Service offered the opportunity for individual permittees to challenge identified issues on their individual allotment. The IDT field reviewed all identified challenges (Project Record, Process Documentation, Permittee Meeting Notes, B-52).

N-10 *14. At no time during this process were we told that the Forest Service calculations of the carrying capacity showed that we were overstocked. The first I heard of it was when the Forest Service presented the stocking rates in relation to Appendix A, Alternative 3. More importantly, the Forest Service has never disclosed to MGA that there would be any reductions. In fact the Forest Service repeatedly represented that there would not be reductions until the tools in the toolbox were explored. Now however it is clear that both Alternatives 3 and 4 call for immediate cuts without regard to the separate task of meeting or maintaining the LRMP objectives.*

See response to comment K-58.

N-11 *15. These cuts are much higher than the 10 years of Forest Service representations to the Governor, the public and to the SRT that reductions would be only an average of 9% if that. Instead, the cuts are as much as 40% and average 29%.*

See response to comments K-46 and K-89.

N-12 *17. The Forest Service did tell MGA that all lands deemed to produce less than 300 pounds per acre are classified as unsuitable and are not counted in the carrying capacity.*

The Forest Service disagrees with this statement. See response to comment K-76.

N-13 *18. I have read the Scientific Review Team Report on several occasions. The SRT team expressly recommended that the Forest Service include the lands that produce less than 300 pounds per acre. While the Forest Service has told us that they are implementing the SRT recommendations, it is clear to me that they are not.*

See response to comment K-76.

N-14 *19. We did provide the Forest Service with permitted use data for the years 2005 through 2007, even though 2005 was a severe drought. The Forest Service claims that it would 'take that into consideration' but we have not seen any explanation as to how the Forest Service weighted those numbers. Previously, the Association provides the Forest Service with actual use data when asked for the reports.*

MGAs permitted use data for the years 2005 through 2007 was used to describe an average permitted use for current management. No "weight" was given to any one year, be it a drought or above-average precipitation year. This information was used in the analysis to evaluate the effects of past grazing systems and whether or not trends would likely increase, decrease, or stay the same based on the alternatives and comparison to the three-year average MGA permitted use, as well as Preference. This information is provided strictly for comparison purposes to more sharply define differences between the alternatives (SDEIS, Chapter 3 Part 1, Affected Environment – Range, Actual Use and Tables 3.4 and 3.5).
See also response to comment K-12.

N-15 *20. I have read page 3-15 of the DEIS where the Forest Service implies that MGA is misrepresenting the actual use numbers. The Forest Service is flatly incorrect and should know that. First, MGA has always provided actual use numbers when requested by the Forest Service and this conforms to our grazing agreement. Our reports do not differ significantly from that of direct permittees, who also reach agreement on numbers at the beginning of the season, pay the grazing bill and report when they have left federal land. The suggestion that the information is flawed or false reflects hostility on the part of this Ranger District office.*

See response to comments K-12 and K-14.

N-16 *21. It is true that many operators, if conditions change, might sell livestock early. This is not a violation of the permit nor is it a violation of Forest Service policy.*

The Forest Service agrees that operators may sell their livestock early and that this does not violate the permit. However, this again represents why the data the MGA provides from the Allotment Worksheets/AOIs does not reflect actual use.

N-17 *22. It is not true as implied in the DEIS, 3-14 that MGA members are grazing more than what is reported by MGA. Both the association structure and the resource would quickly reveal if someone were grazing above his preference.*

See response to comment K-14.

N-18 *23. The DEIS is also incorrect when it states that MGA members did not take reductions due to drought in recent years. There are two types of reductions, one is mandatory and ordered by the Forest Service and a second is voluntary and undertaken by members when lack of rain supports a decision to leave federal lands early. In 2004, there was a mandatory reduction. In 2005, the MGA members agreed to voluntary reductions and understocked in response to the drought. While we had good precipitation in 2007, in 2008 the Forest Service ordered a mandatory 35% reduction. MGA objected to the across-the-board reduction due to the variability of conditions. As a result the reductions were voluntarily done by allotment, ranging from 15% to 40%.*

The SDEIS has included the drought reductions taken in 2008. However, some clarification is required to address the commentor's statements on what kind of reductions were taken in recent years. The commentor is correct that in 2004 a mandatory reduction was put in place. However, a mandatory, not voluntary, reduction was implemented in 2005 (Project Record, Supporting Documentation, Range, L-21 - November 10, 2004). The reduction in 2008 was also a mandatory reduction that considered individual allotments on a site-by-site basis. Field reviews were conducted by Forest Service personnel and applicable pasture directors with determinations made on the ground of what the 2008 reduction would be.

Index

Index

A

adaptive management, 1, 2
AMs, 3
Animal Months
    AMs, 3
animal unit equivalent, 2
animal unit equivalents, 2
    AUEs, 2
AUE, 2
AUEs, 3
AUM, 3
AUMs, 2, 3, 82, 83

C

carrying capacity, 2
cow size, 2

E

erosion, 53

G

grazing association, 2, 3

H

herbaceous structure, 1

I

issues, 1

P

preference, 3

S

scoping, 2
SRT, 2