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Summit Logan Valley Grazing Authorization Project Draft Environmental Impact Statement

Prairie City Ranger District
Malheur National Forest
Grant County, Oregon

Document Structure

The US Department of Agriculture (USDA) – Forest Service (FS) has prepared this Draft Environmental Impact Statement (DEIS) in compliance with the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR parts 1500-1508), agency regulations and all applicable federal and state laws. This document is organized into the following sections:

- *Abstract*
- *Table of Content*
- *Summary of the DEIS*. An executive summary of the DEIS
- *Chapter 1. Purpose and Need for the Action*: This chapter includes background information on the project proposal, the purpose and need for the project and the proposal for achieving that purpose and need. This section describes how the Forest Service informed the public of the proposal and identified the significant issues that drive the analysis.
- *Chapter 2. Alternatives, including the Proposed Action*: This chapter provides a more detailed description of the Proposed Action as well as alternative methods for achieving the stated purpose and need. These alternatives were developed based on significant issues raised by the public, the interdisciplinary team (IDT) and other agencies.
- *Chapter 3. Existing Condition and Environmental consequences*: This chapter describes the physical, biological and human environments potentially affected by the Proposed Action and alternatives, and describes the potential effects of the Proposed Action and alternatives, including the No Action Alternative.
- *Chapter 4*. Consultation and Coordination: This chapter provides a list of preparers and those who responded during the scoping period.
- *Chapter 5*. This chapter includes a list of references and an index.
- *Appendices*. This section includes supplemental analysis information and colored maps.

Additional documentation may be found in the project planning record files. Permanent project planning record files are located at the Prairie City Ranger Distict Office, 327 Front Street, P.O. Box 337, Prairie City, OR 97869. For information regarding planning record files please contact Randy Gould, Prairie City District Ranger at (541) 820.3800.

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Summit Logan Valley Grazing Authorization Project

Draft Environmental Impact Statement

Grant County, Oregon

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This Draft Environmental Impact Statement (DEIS) has been completed for the Summit Logan Grazing Authorization Project.

The DEIS can be viewed and downloaded from the internet at http://www.fs.fed.us/nepa/fs-usda-pop.php/?project=24301. In addition, an electronic copy on CD-ROM is available upon request, by contacting` Randy Gould using the contact information noted above.

ABSTRACT

The purpose of this analysis document is to disclose the proposed actions and environmental effects of authorizing livestock grazing in the Summit Logan Valley Grazing Authorization Project area. The Summit Logan Valley Grazing Authorization (SLVGA) project area includes all of the Lake Creek, Logan Valley, McCoy Creek and Summit Prairie Allotments. The project area is located south and west of Prairie City, Oregon and includes approximately 40,279 acres of National Forest System lands administered by the Prairie City Ranger District of the Malheur National Forest. Embedded within the project area is approximately 5,000 acres of private land. The Forest Service developed four alternatives: the No Action, the Proposed Action, and two additional action alternatives generated in response to public comment (scoping) and grazing permittee issues.

Check the following website for Draft Enviromental Impact Statement documents:
http://www.fs.fed.us/nepa/fs-usda-pop.php/?project=24301

Table of Contents

Abstract ..... *iii*
Summary *1*
Chapter 1 ..... *23*
Introduction 23
Decision Framework 23
Forest Plan 23
Management Area Standards 24
Listed Species Consultation 25
Current Management 26
Lake Creek Allotment 26
Logan Valley Allotment 26
McCoy Creek Allotment 27
Summit Prairie Allotment 28
Purpose and Need for Action 30
Rescission Act 30
Aquatic Habitiat 31
Proposed Action 31
Allotment Management Plans 34
Scoping 35
Issues 36
Significant Issues 37
Analysis Issues 38
Project Record Availability 38
Chapter 2 ..... *39*
Intorduction 39
Development of Alternatives 39
Alternatives Considered but Elminated from Detailed Study 39
Closure of Forest Roads 39
Beaver Recovery Projects 39
Corridor Fencing of Big Creek 40
Reduction of Permitted Grazing Numbers 40
Current Management 40
Scheduling Rest on All Stream Reaches that are Functioning at Risk 40

Alternatives Considered in Detail 41
Alternative 1 – No Action (No Grazing) 41
Actions Common to Alternatives 2, 3, & 4 41
Alternative 2 – Proposed Action 43
Lake Creek Allotment 44
Logan Valley Allotment 45
McCoy Creek Allotment 47
Summit Prairie Allotment 48
Alternative 3 51
Lake Creek Allotment 52
Logan Valley Allotment 52
McCoy Creek Allotment 54
Summit Prairie Allotment 54
Alternative 4 57
Lake Creek Allotment 58
Logan Valley Allotment 59
McCoy Creek Allotment 61
Summit Prairie Allotment 61
Consistency with Forest Plan Standards and Guidelines, as Amended 63
Summary of Alternatives 66
Design Criteria and Resource Protection Measures 70
Monitoring 77
Summary of Effects in Relation to Issues 82
Comparision of Alternatives 82
Implementation and Management Schedule 85
Chapter 3 .....*91*
Introduction 91
Specialist Reports and Project Record 91
Analyzing Effects 91
Direct, Indirect and Cumulative Effects 91
Irreversible and Irretrievable Commitments 92
Forest Plan Consistancy 92
Plans of Other Agencies 92
Rangeland Vegetation 92

Introduction 92
Regulatory Framework 92
Analysis Methods 93
Affected Environment 95
Environmental Consequences 104
Alternative 1 – No Action (No Grazing) 104
Direct/Indirect Effects 104
Cumulative Effects 105
Effects Common to All Action Alternatives 105
Direct/Indirect Effects 105
Cumulative Effects 111
Alternative 2 – Proposed Action 113
Direct/Indirect Effects 113
Cumulative Effects 115
Alternative 3 116
Direct/Indirect Effects 116
Cumulative Effects 119
Alternative 4 120
Direct/Indirect Effects 120
Cumulative Effects 122
Consistancy with Direction and Regulation 122
Irreversible and Irretrievable Commitments 122
Invasive Species 122
Introduction 122
Regulatory Framework 123
Analysis Methods 123
Affected Environment 123
Environmental Consequences 124
Alternative 1 – No Action (No Grazing) 124
Direct/Indirect Effects 124
Cumulative Effects 124
Alternative 2, 3 and 4 124
Direct/Indirect Effects 124
Cumulative Effects 125

Consistancy with Direction and Regulation 126
Irreversible and Irretrievable Commitments 126
Botany 126
Introduction 126
Regulatory Framework 126
Analysis Methods 127
Affected Environment 128
Environmental Consequences 130
Alternative 1 – No Action (No Grazing) 130
Direct/Indirect Effects 130
Cumulative Effects 130
Alternative 2, 3 and 4 131
Direct/Indirect Effects 131
Cumulative Effects 133
Consistancy with Direction and Regulation 134
Irreversible and Irretrievable Commitments 134
Soils 134
Introduction 134
Regulatory Framework 134
Analysis Methods 135
Affected Environment 135
Environmental Consequences 138
Alternative 1 – No Action (No Grazing) 138
Direct/Indirect Effects 138
Cumulative Effects 139
Alternative 2 – Proposed Action 139
Direct/Indirect Effects 139
Cumulative Effects 140
Alternative 3 140
Direct/Indirect Effects 140
Cumulative Effects 141
Alternative 4 141
Direct/Indirect Effects 141
Cumulative Effects 141

Consistancy with Direction and Regulation 142
Irreversible and Irretrievable Commitments 142
Hydrology and Aquatics.....142
Introduction 142
Regulatory Framework.....142
Analysis Methods 149
Affect Environment.....156
Environmental Consequences 175
Alternative 1 – No Action (No Grazing) 175
Direct/Indirect Effects 175
Cumulative Effects 175
Direct/Indirect Effects Common to Action Alternatives 177
Cumulative Effects Common to Action Alternatives 184
Alternative 2 – Proposed Action.....188
Direct/Indirect Effects 188
Cumulative Effects 199
Alternative 3.....200
Direct/Indirect Effects 200
Cumulative Effects 206
Alternative 4.....207
Direct/Indirect Effects 207
Cumulative Effects 212
Consistancy with Direction and Regulation 213
Irreversible and Irretrievable Commitments 214
Recreation.....215
Introduction 215
Regulatory Framework.....215
Analysis Methods 215
Affected Environment 216
Environmental Consequences 220
Alternative 1 – No Action (No Grazing) 220
Direct/Indirect Effects 220
Cumulative Effects 220
Alternative 2, 3, and 4.....220

Direct/Indirect Effects 220
Cumulative Effects 224
Consistancy with Direction and Regulation 224
Irreversible and Irretrievable Commitments 224
Visual Quality 224
Introduction 224
Regulatory Framework 224
Analysis Methods 225
Affted Environment 225
Environmental Consequences 227
Alternative 1 – No Action (No Grazing) 227
Direct/Indirect Effects 227
Cumulative Effects 227
Alternative 2, 3, and 4 227
Direct/Indirect Effects 227
Cumulative Effects 228
Consistancy with Direction and Regulation 228
Irreversible and Irretrievable Commitments 228
Heritage 228
Introduction 228
Regulatory Framework 229
Analysis Methods 230
Affected Environment 230
Environmental Consequences 232
Alternative 1 – No Action (No Grazing) 232
Direct/Indirect Effects 232
Alternative 2, 3 and 4 3
Direct/Indirect Effects 233
Cumulative Effects 234
Consistancy with Direction and Regulation 234
Irreversible and Irretrievable Commitments 235
Social and Economics 235
Introduction 235
Regulatory Framework 235

Analysis Methods 236
Affect Environment 236
Environmental Consequences 239
Alternative 1 – No Action (No Grazing) 239
Direct/Indirect Effects 239
Cumulative Effects 241
Alternative 2 – Proposed Action 241
Direct/Indirect Effects 241
Alternative 3 242
Direct/Indirect Effects 242
Alternative 4 243
Direct/Indirect Effects 243
Cumulative Effects for All Action Alternatives 244
Consistancy with Direction and Regulation 244
Irreversible and Irretrievable 245
Wildlife 245
Introduction 245
Regulatory Framework 245
Analysis Methods 246
Affected Environment 247
Environmental Consequences 253
Threatened, Endangered and Sensitive Wildlife Species 253
Alternative 1 – No Action (No Grazing) 253
Alternative 2, 3 and 4 254
Management Indicator Species (MIS) 268
Alternative 1 – No Action (No Grazing) 268
Alternative 2, 3 and 4 269
Featured Species 275
Alternative 1 – No Action (No Grazing) 275
Alternative 2, 3 and 4 275
Landbirds including Neotropical Migratory Birds 277
Alternative 1 – No Action (No Grazing) 277
Alternative 2, 3 and 4 278
Consistancy with Direction and Regulation 280

Irreversible and Irretrievable 281
Other Laws, Regulations and Policies.....281
Chapter 4 .....*284*
Consultation and Coordination.....284
List of Preparers 284
Interdisciplinary Team.....284
Contributors.....284
Tribes.....284
Federal, State and Local Agencies 285
Persons who Responded During the Scoping Process 285
Chapter 5 .....*286*
References Cited 286
General 286
Monitoring.....286
Rangeland Vegetation and Invasive Species.....286
Botany.....288
Soils.....290
Hydrology and Aquatics.....291
Recreation 295
Visual Quality 295
Heritage 295
Social and Economics.....296
Wildlife.....297
Index.....304
List of Appendices.....*307*
Appendix A 307
Part 1: Existing and Desired Condition.....307
Part 2: Management Objectives.....321
Part 3: Adaptive Management Strategies 330
Appendix B (Maps).....335
Vicinity Map.....336
Alternative 1 337
Alternative 2 341
Alternative 3 345

Alternative 4 349
Bull Trout Critical Habitat (within Project Area).....349
Monitoring Sites and Stream Reaches (within Project Area).....349
Appendix C (Cumulative Activies Considered).....355
Appendix D (Definition of Terms).....361
Appendix E (Use Levels) 375

SUMMARY OF THIS DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)

Introduction

The Forest Service has prepared this Draft Environmental Impact Statement (DEIS) on the potential effects of authorizing livestock grazing in the Summit Logan Valley Grazing Authorization (SLVGA) Project in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. The SLVGA project area includes all of the Lake Creek, Logan Valley, McCoy Creek and Summit Prairie Allotments.

The project area is predominately within the Upper Malheur River watershed. Numerous streams flow within the watershed including Summit Creek, Big Creek, McCoy Creek and Lake Creek. A minor portion of the Summit Prairie Allotment (371 acres or less than 0.6% of the analysis area) occurs in the Upper North Fork Malheur River watershed (Crane Creek subwatershed). There are no streams within these 371 acres.

The project area is located south and west of Prairie City, Oregon and includes approximately 40,279 acres of National Forest System lands administered by the Prairie City Ranger District of the Malheur National Forest. Embedded within the project area is approximately 5,000 acres of private land. Detailed maps are in DEIS Appendix B.

Purpose and Need for Action

The purposes of the proposed action are two-fold:

- Meet the requirements of the **Rescission Act and provide for an appropriate level of domestic livestock grazing as set forth in the Malheur National Forest Land and Resource Management Plan** (1990) and;
- Improve resource conditions for **aquatic habitat.**

<u>Rescission Act</u>

There is a need to meet the Rescissions Act requirements to complete the NEPA analysis for the Lake Creek, Logan Valley, McCoy Creek and Summit Prairie allotments. There is a need to meet the Malheur Land and Resource Management Plan goals by providing a sustained production of palatable forage for grazing by livestock and dependent wildlife species while meeting the needs of other resources and uses at a level which is responsive to site-specific objectives (Forest Plan, page IV-2) as well as to contribute to the social and economic health of communities which are significantly affected by National Forest management (IV-3, # 42).

<u>Aquatic Habitat</u>

There is a need to improve aquatic habitat in Lake Creek, Big Creek and Summit Creek to support all life stages of bull trout. This includes improvements in riparian vegetation and hardwoods to enhance stream shade, temperature, riparian vegetation composition and vigor and stream bank stability. Water temperature and streambank stability are important aquatic habitat features (riparian management objectives) identified in the Forest Plan as amended by INFISH.

There is a need to develop an upward trend in riparian areas currently assessed as Functioning at Risk (FAR) with a downward or slowed trend, while continuing to improve or maintain riparian areas with upward recovery trends or properly functioning conditions toward desired conditions identified in Appendix A (part 1).

The Malheur Forest Plan as amended by INFISH directs that grazing practices be modified (e.g., accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent attainment of Riparian Management Objectives or are likely to adversely affect inland native fish. Suspend grazing if adjusting practices is not effective in meeting Riparian Management Objectives (INFISH GM 1).

Proposed Action in Brief

Lake Creek Allotment

Grazing System

Portions of this currently vacant allotment would be added to the Logan Valley and Summit Prairie allotments. The remaining 5,069 acres would remain vacant in the McCoy Creek and Corral Basin units.

Boundary Changes

Approximately 4,778 acres of the Lake Creek allotment would be absorbed into the adjacent Logan Valley and Summit Prairie allotments. Areas containing Lake Creek, Big Creek and Corral Basin Creek would remain vacant (5,069 acres).

The southwest corner of the McCoy Creek unit (349 acres) would be removed from the Lake Creek allotment. This area may be added to the Dollar Basin allotment in the future. A separate environmental analysis would be required to add this area to the Dollar Basin allotment.

Livestock numbers and Grazing Season

No livestock would be authorized on 5,069 acres of the allotment.

Improvements and Structures

The removal of the southwest corner of the McCoy Creek unit from the Lake Creek allotment would require the construction 2.5 miles of new fencing.

Adaptive Management

No adaptive management strategies are proposed.

Logan Valley Allotment

Grazing System

The Logan Valley allotment would be managed with periods of rest or deferment during the season of use. Rest or deferment would be determined based on resource needs and would not be a systematic or scheduled rotation.

Boundary Changes

Approximately 655 acres from the Lake Creek and McCoy Creek allotments would be added to the Logan Valley allotment. The change would allow additional rest for the Logan Valley

allotment, increasing the allotment acres to 4,359 (specific allotment and unit changes are included in Ch. 2).

The Big Creek portion of the East Lake Creek, North Big Creek, and South Big Creek would be combined into a single large unit known as Big Creek Riparian pasture.

The Front Field unit (approximately 52 acres) would be removed from the Logan Valley allotment and absorbed into the Summit Prairie allotment.

Livestock numbers and Grazing Season

The permitted livestock number and grazing season would remain as currently permitted, distributed over the larger landscape by adding areas from the Lake Creek and McCoy Creek allotments.

The Big Creek Portion of the East Lake Creek, North Big Creek and South Big Creek units that would be combined into a single riparian pasture would require livestock removal by August 15th to protect bull trout spawning habitat in Big Creek.

Improvements and Structures

The North Fork unit of the McCoy Creek allotment would be absorbed into the Flat Field unit requiring removal of approximately 0.3 miles of fence.

Absorbing a portion of the McCoy Creek unit along with the Horse Pasture from the Lake Creek allotment into the Logan Valley allotment would require 2.5 miles of additional fence. The new unit would be identified as the Deardorff unit.

Combining the Big Creek Portion of the East Lake Creek, North Big Creek and South Big Creek units would require removal of 1.2 miles of fence.

Adaptive Management

Adaptive management strategies shown in Appendix A (part 3) are summarized in Table 2-6 in Chapter 2.

<u>McCoy Creek Allotment</u>

Grazing System

A deferred rotation grazing system would be applied throughout the allotment. This system provides for a systematic rotation of deferment among units and provides flexibility to change the time of year when units would be used.

Boundary Changes

The present allotment consisting of 980 acres would decrease to 660 acres. The Dry and Ridge units of the allotment would be combined into a single unit as currently managed and would be called the Ridge unit. The Lake Creek and North Fork units (of the McCoy Creek allotment) would be absorbed into the Logan Valley allotment.

The Starvation unit (53 acres) would be removed from the McCoy Creek allotment. This may be added to the Dollar Basin allotment in the future. A separate environmental analysis would be required to add this area to the Dollar Basin allotment.

Livestock numbers and Grazing Season

The permitted livestock number, forage allocation and grazing season would not change in the McCoy Creek allotment. Forage allowable use, move triggers, and endpoint indicators are listed in Appendix E.

Improvements and Structures

The Dry and Ridge units would be combined into a single unit (as currently managed) requiring removal of 1 mile of fence. The combined units would be called the Ridge unit and would provide better livestock distribution.

Adaptive Management

No additional adaptive management strategies are proposed.

Summit Prairie Allotment

Grazing System

The Summit Prairie allotment would be managed with periods of rest or deferment during the season of use. Rest periods and deferment would be determined based on resource needs and would not be a systematic or scheduled rotation.

Boundary Changes

The present allotment consisting of 25,331 acres would increase to 29,832 acres. The Front Field unit (from the Logan Valley allotment) would be absorbed into the Little Logan unit and the Bosenberg unit (from the vacant Lake Creek allotment) would be added as a separate grazing unit.

Livestock numbers and Grazing Season

The permitted livestock number, forage allocations, and the grazing seasons would remain as present conditions, distributed over the larger landscape provided by adding areas from the Lake Creek allotment to the Logan Valley allotment.

Improvements and Structures

Approximately 0.7 miles of fence would be removed if the Front Field unit is absorbed from the Logan Valley allotment.

Adding the Bosenberg unit (from the Lake Creek allotment) would require construction of approximately 7 miles of additional fence. The water gaps would be located where Forest Service road 1648 crosses Bosenberg Creek and an unnamed tributary of Big Creek. Three ponds would be developed in the uplands to provide alternative water away from perennial streams. A spring would be developed off a head water spring for Bosenberg Creek. The spring source would be fenced and water piped to a water trough located 300 feet from the spring. Water would also be piped from Bosenberg Creek to a trough located 100 approximately feet from the stream.

Adaptive Management

Adaptive management strategies shown in Appendix A (part 3) are summarized in Table 2-12 in Chapter 2.

Proposed Forst Plant Amendments

Alternatives 2, 3, and 4 propose amendments to the Malheur Land and Resource Management Plan as amended by Amendment #29. Specifically, the numeric value for shade in hardwood/meadow complexes from Forest Plan Amendment #29 would be modified for site specific stream reaches.

The proposed percent shade values developed for hardwood/meadow complexes within the Summit Logan allotments are based on work by the Carex Working Group (2012) and the Malheur River Basin Total Maximum Daily Load (TMDL) and Water Quality Management Plan completed by State of Oregon Department of Environmental Quality (2010). Work carried out by the Carex Working Group involved estimating the expected (and perhaps maximum) level of streamside shade (height and density) that could be attained from willows, sedges, and other hardwoods under near-natural rates of recovery at two time scales: (a) five years, and (b) twenty years from all stream reaches on Summit Creek. To determine the historic range of variability of the various reaches of Summit Creek the Carex Working Group considered the habitat characteristics of each reach, the habitats occupied by mature willow thickets, alder thickets, and sedge meadows on the reference sites, and similar plant communities we have observed elsewhere in Grant and Harney Counties (Carex Working Group 2010, 2011a, and 2011b).

The stream reaches where modifications are proposed to Amendment #29 Numeric Values are shown in **Table S-1.** Potential values for shade in the TMDL were derived using Ecoregion Based Effective Shade Curves if reference data was not available. These effective shade curves are general heat load allocations that are identified by region and channel width for various riparian plant communities. The given values represent the maximum possible effective shade if the potential height and density are present. The curves account for latitude, critical summertime period and stream aspect. The Carex Working Group only collected reference data for alder and/or willow riparian plant communities. As a result, the Native Floodplain Grasses effective shade curve was used from the TMDL.

Table S-1: Proposed Modifications to the Malheur Land and Resource Management Plan

Stream/Reach	Amendment #29 Numeric Value to be Modified				Proposed Modification and Reference Source
	Forest Plan Source	Amendment #29 Element	Location	Specific Value	
Summit Creek Reach 1	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/Meadow Complex 80% shaded	Shade 65% or greater (TMDL 2010)
Summit Creek Reach 2	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/Meadow Complex 80% shaded	Shade ≥60% in areas with hardwoods (CWG 2012) or ≥25% in areas with native floodplain grasses (TMDL 2010)
Summit Creek Reach 4	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/Meadow Complex 80% shaded	Shade ≥60% in areas with hardwoods (CWG 2012) or ≥25% in areas with native floodplain grasses (TMDL 2010)
Summit Creek Reach 5	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/Meadow Complex 80% shaded	Increase hardwood shade component; shade ≥ 60% (CWG 2012)

Stream/Reach	Amendment #29 Numeric Value to be Modified				Proposed Modification and Reference Source
	Forest Plan Source	Amendment #29 Element	Location	Specific Value	
Summit Creek Reach 6	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded	≥ 25% for native floodplain grasses (TMDL 2010)
Summit Creek Reach 7	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded	Increase hardwood shade component; shade ≥ 80% for alder-dominated areas (Amendment #29), ≥ 60% for mixed shrub areas (Carex Working Group 2012), or ≥ 25% in areas with native floodplain grasses (TMDL 2010).
West Fork Summit Creek Reach 1	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded	≥ 25% for native floodplain grasses (TMDL 2010).
West Fork Summit Creek Reach 2	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded	Increase hardwood shade component; shade ≥ 80% for alder-dominated areas (Amendment #29), ≥ 60% for mixed shrub areas (CWG 2012), or ≥ 25% for native floodplain grasses (TMDL 2010).
Lake Creek Reach 1	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded	Increase hardwood shade component; shade ≥ 60% in hardwood areas (CWG 2012) or ≥ 25% in areas with native floodplain grasses (TMDL 20 10).
Lake Creek Reach 2	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded	Increased hardwood shade component: shade ≥ 60% (Carex Working Group 2012) or ≥ 25% for native floodplain grasses (TMDL 2010).
Lake Creek Reach 3	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded	Shade 60-80% in mixed shrub and conifer (Carex Working Group 2012) or ≥ 25% for native floodplain grasses (TMDL 2010).
Lake Creek (no PFC assessment)	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded	Shade 60-80% in mixed shrub (Carex Working Group 2012) or ≥ 25% for native floodplain grasses (TMDL 2010).
Big Creek (no PFC assessment, south side of FS rd 16	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	b) Mixed Conifer species d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded 50-65% canopy closure	Shade 60-80% in mixed shrub (Carex Working Group 2012) or ≥ 25% for native floodplain grasses

Stream/Reach	Amendment #29 Numeric Value to be Modified				Proposed Modification and Reference Source
	Forest Plan Source	Amendment #29 Element	Location	Specific Value	
for 0.15 miles)					(TMDL 2010).
Big Creek Reach 1	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	b) Mixed Conifer species d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded 50-65% canopy closure	Shade 60-80% in mixed shrub and conifer (Carex Working Group 2012) or ≥ 25% for native floodplain grasses (TMDL 2010).
Big Creek Reach 2	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	b) Mixed Conifer species d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded 50-65% canopy closure	Shade 60-80% in mixed shrub and conifer (Carex Working Group 2012) or ≥ 25% for native floodplain grasses (TMDL 2010).
Big Creek Reach 3	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	b) Mixed Conifer species d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded 50-65% canopy closure	Shade 60-80% in mixed shrub and conifer (Carex Working Group 2012).
Bosenberg Creek	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	b) Mixed Conifer species	Hardwood/meadow complex 80% shaded	Shade 60-80% in mixed shrub (CWG 2012) or ≥ 25% for native floodplain grasses (TMDL 2010).

Public Involement

Public comments were previously requested in October, 2008 for this project. Since that time, the Summit Logan Grazing Authorization Project has transitioned from an Environmental Assessment (EA) to an Environmental Impact Statement (EIS). On February 1, 2012, a scoping letter providing information and seeking public comment was mailed to approximately 230 entities, including agencies, groups, individuals and other parties that had requested information on general forest or specific range projects. Four comments letters were received: Oregon Natural Desert Association in conjunction with Oregon Wild, Grant County Conservationists, Blue Mountain Biodiversity and an anonymous commenter. Original letters, emails and other scoping comments are contained in the project files. Additionally, on February 8, 2012, a Notice of Intent was published in the Federal Register.

Interaction with the Summit Logan allotment grazing permittees has been ongoing since the fall of 2007 and has included several field trips and meetings. Field trips to the project area were facilitated by the National Riparian Service Team and attended by representatives from U.S. Fish and Wildlife Service and the permittees.

Tribal consultation on a government-to-government basis is ongoing with the Burns Paiute Tribe, the Confederated Tribes of the Umatilla Indian Reservation, and the Confederated Tribes of Warm Springs Reservation. This government-to-government consultation is being conducted under the terms of specific agreements with individual tribes and includes regular contact and meetings as appropriate. Scoping letters were mailed to the tribal governments. In the spring and fall of 2008 the District Ranger, Rangeland Management Specialist and various Interdisciplinary Team members met with the Burns Paiute Tribe to discuss their proposals for the Logan Valley area. Several partnership projects are ongoing in the project area involving the Burns Paiute Tribe and the Logan Valley allotment permittees. The Burns Paiute Tribe is

involved in constructing several riparian pasture and exclosure fences on Big Creek and Lake Creek to assist in grazing management and aquatic habitat recovery.

Issues

Scoping identified the following issues. The issues were separated into three groups for the purpose of this analysis:

- Significant issues are defined as those directly or indirectly caused by implementing the proposed action; however, the effects cannot be reduced by normal Best Management Practices (BMPs) or Project Design Criteria (PDCs). Alternatives were developed to address these issues.
- Analysis issues are defined as those directly or indirectly caused by implementing the proposed action; however, the effects could be reduced with normal BMPs and PDCs. An alternative was usually not developed to address these analysis issues. However, these analysis issues will be tracked in the relevant resource area effects analyses in Chapter 3 and in the Comparison of Alternatives in Chapter 2. Several of the issues for this project fall into this category.
- Issues eliminated from detailed study are identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The CEQ NEPA regulations require identification and elimination from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3). These are listed in project file with the rational for eliminating them from detailed study in this analysis.

The significant issues and the analysis issues were carried through the analysis in order to fully develop and allow further comparison of the proposed action and alternatives. The environmental consequences of the proposal are disclosed in Chapter 3 of the DEIS. Issues are discussed in detail in DEIS Chapter 1. The significant issues are noted below:

- Bull Trout Critical Habitat – Grazing may degrade critical habitat for threatened bull trout. There may be direct, indirect, and cumulative effects of livestock use of streams and riparian areas that could negatively affect spawning and reproductive success. Livestock grazing may trample eggs, impact stream banks increasing sediment and widening stream channels, decrease shade-providing plants on the banks and increase water temperatures. Continued grazing on streams that are “functional at risk” may impact recovery of resource values including critical bull trout and beaver habitat. In areas that are functioning at risk, channels may not be interacting with the floodplain, substrate is often highly embedded and pool quality low, banks are incised with little vegetation, willows are under-represented in density and age classes, and water temperatures are high.
- Economic Impacts to Permittees and Community – Changes in how allotments are managed can affect operational and implementation costs. Riparian exclosures and riparian pastures can exclude productive forage areas and impact livestock movement. The addition of fences can increase annual fence maintenance costs. Permittees, managers and employees of allotments reside in the local communities and contribute to the local economy.

Table S-2: Significant Issues

Significant Issue	Significant Issue Indicator(s)
Bull Trout Critical Habitat	Measure or element for evaluation: ▪ Miles of occupied bull trout habitat grazing during spawning season by stream ▪ Miles of critical bull trout habitat[1] • Not grazed • Grazed annually • Grazed with periods of rest • Riparian pastures with rest • Riparian exclosures not grazed ▪ Rate of Recovery • Miles of Critical Habitat expected to achieve PFC in 5 years • Miles of Critical Habitat expected to achieve PFC in 10 years • Miles of Critical Habitat expected to achieve desired vegetation conditions and channel characteristics in 10 years
Economic Impacts to Permittees and the Local Community	Measure or element for evaluation: ▪ Animal Unit Months ▪ Costs of Improvements ▪ Acres Rested or Not Grazed ▪ Acres Available for Grazing ▪ Miles of Added Fence Maintenance

Alternative Considered in Detail

The Forest Service developed four alternatives: the No Action, the Proposed Action, and two other action alternatives generated in response to issues raised during scoping. The four alternatives considered in detail for this analysis are listed in the table below. Project alternatives are discussed in detail in DEIS Chapter 2. Project Design Criteria, Best Management Practices and Monitoring are also listed in detail in DEIS Chapter 2.

Table S-3: Summary of Alternatives

Alternative	Summary
No Action Alternative 1	For this DEIS, the no action alternative is interpreted to be No Grazing. All Term Grazing Permits would be cancelled upon implementation of the decision and resolution of the appeal process. Permittees would be given two years written advance notice of cancellation of their permits as provided for under 36 CFR 222.4 (a)(1). Upon cancellation of the existing permit, there would be no livestock grazing under this alternative.
Proposed Action Alternative 2	This is the agency's proposed action. Alternative 2 (Proposed Action) was developed to establish a grazing system that provides opportunities for rest and deferment (flexibility in season of grazing) in the Logan Valley and Summit Prairie allotments to recover important attributes of aquatic habitat including riparian vegetation and hardwoods, stream shade, and streambank stability. Portions of the vacant Lake Creek allotment would be added to the Logan Valley and Summit Prairie allotments, creating a larger landscape for grazing with no proposed increase in livestock numbers (AUMs). Adding additional acres to these allotments, combined with other grazing unit adjustments within the allotments provides the flexibility to periodically rest entire grazing units or defer the season of grazing to restore riparian area conditions, while maintaining enough acres to be grazed annually to support a viable grazing operation.

[1] Miles of 303d listed streams are included in the critical bull trout habitat miles

Alternative	Summary
	Proposed allotment boundary and pasture adjustments in the McCoy Creek allotment establish a deferred rotation grazing system allowing flexibility to change the time of year when units would be used. Ongoing activities described in DEIS Chapter 1 (Current Management) would construct fences that exclude grazing from most of the Lake Creek riparian area to recover hardwoods and stream shade.
Alternative 3	Alternative 3 was developed in response to the public's concern over bull trout critical habitat. All of the Lake Creek allotment would remain vacant in this alternative. The Lake Creek allotment contains all or portions of Lake Creek, Big Creek, Corral Basin Creek, and Bosenberg Creek which are designated critical habitat for bull trout. Ongoing water developments in the Logan Valley allotment would provide opportunities to defer the season of grazing and a change to a deferred grazing system. Proposed allotment boundary and pasture adjustments in the McCoy Creek allotment establish a deferred rotation grazing system allowing flexibility to change the time of year when units would be used. Ongoing activities described in Chapter 1 (Current Management) would construct fences that exclude grazing from most of the Lake Creek riparian area to recover hardwoods and stream shade. Riparian pastures and exclosures would be constructed on Summit Creek in the Little Logan and Sagehen pastures. Riparian pastures would be rested for several years to expedite recovery of riparian vegetation to enhance stream shade, riparian vegetation composition and vigor, and streambank stability. In the Logan Valley, McCoy Creek, and Summit Prairie allotments, proposed move triggers and allowable use levels for herbaceous forage and shrub use, and bank alteration vary by pasture based on the existing condition of the specific riparian area, its resiliency to grazing effects and other disturbances, and the presence of critical bull trout habitat. See DEIS Appendix E for specific details.
Alternative 4	Alternative 4 was developed using public scoping comments and recommendations from Summit Prairie allotment grazing permittee. Part of the vacant Lake Creek allotment would be added to the Logan Valley allotment. The portions of the Lake Creek allotment containing Lake Creek, Big Creek, Corral Basin Creek, and Bosenberg Creek (critical bull trout streams) would remain vacant. Adding acres from the Lake Creek allotment to the Logan Valley allotment establishes a larger grazing landscape providing the flexibility to rest and defer (flexibility in season of grazing) grazing to recover important attributes of aquatic habitat, while maintaining enough acres to be grazed annually to support a viable grazing operation. Proposed allotment boundary and pasture adjustments in the McCoy Creek allotment establish a deferred rotation grazing system allowing flexibility to change the time of year when units would be used. Ongoing activities would construct fences that exclude grazing from most of Lake Creek within the allotment. Management changes are proposed in the Summit Prairie allotment to encourage recovery of riparian vegetation to enhance stream shade, riparian vegetation composition and vigor, and streambank stability. Daily riding by the permittee would be required when livestock are within the Sagehen and Little Logan units to move and distribute animals into the uplands away from Summit Creek. Small exclosures would be constructed and cages placed in the Sagehen and Little Logan units. A riparian pasture would be constructed from a portion of the Summit Rock and North Summit units containing portions of Summit Creek and West Fork Summit Creek. In the Logan Valley, McCoy Creek, and Summit Prairie allotments, proposed move triggers and allowable use levels for herbaceous forage and shrub use, and bank alteration vary by pasture based on the existing condition of the specific riparian area, its resiliency to grazing effects and other disturbances, and the presence of critical bull trout habitat. See DEIS Appendix E for specific details.

Table S-4: Summary of Alternative Actions: Lake Creek Allotment

Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Allotment Acres	Not Applicable	5,069	10, 196	9,459
Grazing System	No Grazing	Vacant	Vacant	Vacant
Boundary Changes	Not Applicable	Approximately 4,778 acres of the Lake Creek allotment	No boundary changes. Entire allotment would	Approximately 388 acres of the Lake Creek allotment

Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		would be absorbed into the adjacent Logan Valley and Summit Prairie allotments. An additional 349 would be removed from the Lake Creek allotment. This area may be added to the Dollar Basin allotment in the future.	remain vacant.	would be absorbed into the adjacent Logan Valley allotment. An additional 349 would be removed from the Lake Creek allotment. This area may be added to the Dollar Basin allotment in the future.
Livestock Numbers	0	0	0	0
Grazing Season	No Grazing Season	No Grazing Season	No Grazing Season	No Grazing Season
Improvements and Structures	0	0	0	0
Minimum Rest Requirements	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Forage Allowable Use, Move Triggers, and Endpoint Indicators	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Special Requirements	None	None	None	None
Adaptive Management	None	None	None	None

Table S-5: Summary of Alternative Actions: Logan Valley Allotment

Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Allotment Acres	Not Applicable	4,359	3,971	4,359
Grazing System	No Grazing	Periods non-scheduled rest and deferment	Deferred Rotation	Periods non-scheduled rest and deferment

Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Boundary Changes	Not Applicable	Approximately 655 acres from the Lake Creek and McCoy Creek allotments would be added to the Logan Valley allotment. The Big Creek portion of the East Lake Creek, North Big Creek, and South Big Creek would be combined into a single large unit known as Big Creek Riparian pasture. Approximately 52 acres would be removed from the Logan Valley allotment and absorbed into the Summit Prairie allotment.	Approximately 267 acres of the McCoy Creek allotment would be absorbed into the Logan Valley allotment. The Big Creek portion of the East Lake Creek, North Big Creek, and South Big Creek would be combined into a single large unit known as Big Creek Riparian pasture. Approximately 52 acres would be removed from the Logan Valley allotment and absorbed into the Summit Prairie allotment.	Approximately 655 acres from the Lake Creek and McCoy Creek allotments would be added to the Logan Valley allotment. The Big Creek portion of the East Lake Creek, North Big Creek, and South Big Creek would be combined into a single large unit known as Big Creek Riparian pasture. Approximately 52 acres would be removed from the Logan Valley allotment and absorbed into the Summit Prairie allotment.
Livestock Numbers (AUMs)	0	1,983	1,983	1,983
Grazing Season	No Grazing Season	06/10-10/15	06/10-10/15	06/10-10/15
Improvements and Structures	0	Approximately 2.8 miles of additional fences would be constructed and 2.3 miles removed.	Approximately 0.3 miles of additional fences would be constructed and 1.5 miles removed.	Approximately 2.8 miles of additional fences would be constructed and 2.3 miles removed.
Minimum Rest Requirements	Not Applicable	See DEIS Chapter 2, Table 2-4	See DEIS Chapter 2, Table 2-16	See DEIS Chapter 2, Table 2-26
Forage Allowable Use, Move Triggers, and Endpoint Indicators	Not Applicable	See DEIS Appendix E	See DEIS Appendix E	See DEIS Appendix E
Special Requirements	None	Livestock would be removed by August 15th to protect bull trout spawning habitat in the Big Creek Riparian Pasture.	Livestock would be removed by August 15th to protect bull trout spawning habitat in the Big Creek Riparian Pasture.	Livestock would be removed by August 15th to protect bull trout spawning habitat in the Big Creek Riparian Pasture.
Adaptive Management	None	Adaptive management strategies shown in DEIS Appendix A (part3) are summarized in	Adaptive management strategies shown in DEIS Appendix A (part3) are summarized in	Adaptive management strategies shown in DEIS Appendix A (part3) are

Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		Chapter 2, Table 2-6.	Chapter 2, Table 2-18.	summarized in Chapter 2, Table 2-28.

Table S-6: Summary of Alternative Actions: McCoy Creek Allotment

Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Allotment Acres	Not Applicable	660	660	660
Grazing System	No Grazing	Deferred Rotation	Deferred Rotation	Deferred Rotation
Boundary Changes	Not Applicable	The Lake Creek and North Fork units (267 acres) of the McCoy Creek allotment would be removed from the McCoy Creek allotment and absorbed into the Logan Valley allotment. The Starvation unit would be removed from the McCoy Creek allotment and possibly added to the Dollar Basin allotment in the future. A separate environmental analysis would be required.	Same as Alternative 2	Same as Alternative 2
Livestock Numbers (AUMs)	0	416	416	416
Grazing Season	No Grazing Season	06/01-10/30	06/01-10/30	06/01-10/30
Improvements and Structures	0	Approximately 1 mile of fence removed	Same as Alternative 2	Same as Alternative 2
Minimum Rest Requirements	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Forage Allowable Use, Move Triggers, and Endpoint Indicators	Not Applicable	See DEIS Appendix E	See DEIS Appendix E	See DEIS Appendix E
Special Requirements	None	None	None	None

Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Adaptive Management	None	None - Lake Creek fenced in riparian exclosures with no grazing.	None - Lake Creek fenced in riparian exclosures with no grazing.	None - Lake Creek fenced in riparian exclosures with no grazing.

Table S-7: Summary of Alternative Actions: Summit Creek Allotment

Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Allotment Acres	Not Applicable	29,832	25,383	25,383
Grazing System	No Grazing	Periods non-scheduled rest and deferment	Deferred Rotation	Deferred Rotation
Boundary Changes	Not Applicable	Approximately 52 acres would be removed from the Logan Valley allotment and absorbed into the Summit Prairie allotment. The Bosenberg unit (4,449 acres) from the vacant Lake Creek allotment would be added to the Summit Prairie Allotment.	Approximately 52 acres would be removed from the Logan Valley allotment and absorbed into the Summit Prairie allotment. Riparian pastures and grazing exclosure would be constructed in the Sagehen, Little Logan and North Summit units allowing portions of Summit Creek to be rested.	Approximately 52 acres would be removed from the Logan Valley allotment and absorbed into the Summit Prairie allotment. A riparian pasture would be constructed containing portions of Summit Creek and West Fork Summit Creek in portions of the Summit Rock and North Summit units.
Livestock Numbers (AUMs)	0	1,546	1,546	1.546
Grazing Season	No Grazing Season	06/10-10/24	06/10-10/24	06/10-10/24
Improvements and Structures	0	Approximately 7.0 miles of new fence would be constructed and 0.7 miles removed.	Approximately 12.2 miles of additional fences would be constructed and 0.7 miles removed.	Approximately 6.1 miles of additional fences would be constructed and 0.7 miles removed.
Minimum Rest Requirements	Not Applicable	See DEIS Chapter 2, Table 2-10	See DEIS Chapter 2, Table 2-20	See DEIS Chapter 2, Table 2-30
Forage Allowable Use, Move Triggers, and Endpoint Indicators	Not Applicable	See DEIS Appendix E [2]	See DEIS Appendix E	See DEIS Appendix E

[2] Note: Move triggers and allowable use levels on herbaceous hydrophytic riparian species (riparian greenline), riparian woody shrubs, and bank alteration vary by grazing unit and alternative.

Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Special Requirements	None	To ensure adequate protection of all streams in the unit, riding in the Bosenberg unit would be required to maintain livestock concentrations in the uplands. Part of the Bosenberg Unit was burned in early 1990 wildfires. To allow continued recovery of Bosenberg Creek, specific monitoring criteria and stream bank alteration standards would be applied. See Chapter 2 (Monitoring) and Appendix E (Move Triggers and Allowable Use Levels).		Daily riding by the permittee would ensure livestock stay in the uplands, reducing grazing use along Summit Creek in the Sagehen and Little Logan units during the season of use.
Adaptive Management	None	Adaptive management strategies shown in DEIS Appendix A (part3) are summarized in Chapter 2, Table 2-12.	Adaptive management strategies shown in DEIS Appendix A (part3) are summarized in Chapter 2, Table 2-22.	Adaptive management strategies shown in DEIS Appendix A (part3) are summarized in Chapter 2, Table 2-32.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The environmental consequences of implementing this project, by alternative, are described in detail in Chapter 3 of the DEIS. A concise summary of the effects is displayed in the tables below.

Table S-8: Comparison of Alternatives: Significant and Analysis Issues

Significant Issue	Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Bull Trout Critical Habitat	Miles of occupied bull trout habitat grazed during spawning season by stream	0	0	0	0
	Miles of critical bull trout habitat for occupied and unoccupied: ▪ Not grazed	35	9.9	14.3	14.3

Significant Issue	Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	▪ Grazed annually	0.0	7.3	12.1	15.4
	▪ Grazed with periods of rest	0.0	14.5	0.0	0.0
	▪ Riparian pasture with rest	0.0	2.7	7.4	4.8
	▪ Riparian exclosures not grazed	0.0	0.0	0.8	0.0
	Rate of Recovery: ▪ Miles of Critical Habitat expected to achieve PFC in 5 years	31.1	29.6	33.3	31.7
	▪ Miles of Critical Habitat expected to achieve PFC in 10years	35	30.9	34.4	34.5
	▪ Miles of Critical Habitat expected to achieve desired vegetation and channel conditions in 10 years	31	17.2	32.1	25.5
Economic Impacts to Permittees and the Local Community	Animal Unit Months (AUMs)	0	AMUs are the same for every alternative: Lake Creek: 0 Logan Valley: 1,983 McCoy Creek: 416 Summit Prairie: 1,546		
	Costs of Improvements: Lake Creek	$0	67,500	0	67,550
	Logan Valley		74,400	12,600	80,100
	McCoy Creek		3,000	3,000	3,000
	Summit Prairie		224,100	333,800	155,600
	Acres Rested or Not Grazed (average minimum on an annual basis over the next 10 years): Lake Creek	10,196	5,056	10,196	9,459
	Logan Valley	3,756	232	45	232
	McCoy Creek	980	0	0	0
	Summit Prairie	25,331	3,452	74	18
	Acres available for Grazing (average)[3]: Lake Creek	$0	0	0	0
	Logan Valley		4,127	3,926	4,127
	McCoy Creek		660	660	660
	Summit Prairie		26,380	25,310	25,365

[3] Acres do not include existing exclosures that would not be grazed.

Significant Issue	Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Miles of Added Fence Maintenance[4] : Lake Creek	$0	0	0	0
	Logan Valley		4.8	2.3	2.3
	McCoy Creek		1.4	1.4	1.4
	Summit Prairie		7.3	12.5	6.4

Analysis Issues	Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Fences are movement barriers to wildlife	Miles of Fence Removed: Lake Creek	0	0	0	0
	Logan Valley		2.3	1.5	1.5
	McCoy Creek		1.0	1.0	1.0
	Summit Logan		0.7	0.7	0.7
	Miles of Fence Constructed	See Significant Issue "Miles of Added Fence Maintenance" for miles of fence constructed.			
	Design Elements to Reduce Impacts	Not Applicable	To reduce the impact of fences to big game, Design Elements are in place requiring a smooth bottom wire at least 16 inches above the ground to facilitate fawn movement, with a maximum top wire height of 42 inches, and spacing of 10 inches between the top and next lower wire to reduce the potential of back legs being caught when animals jump the fence.		
Proposed Move Triggers, End-Point Indicators not capable of allowing for riparian recovery	Move Triggers and End-Point Indicators	See DEIS Appendix E			
Limited hardwoods have resulted in a loss of beaver habitat and reduction in beaver populations	Short – and Long – Term Effects on Shrub Development	Not Applicable	Adding the Bosenberg unit and requiring yearlong rest (3 out of 10 years) would improve the height and vigor of existing shrubs.	The creation of riparian pastures and exclosures with immediate rest (5 years) along with reduced woody browse would improve height, vigor and potential	Site specific willow exclosures and a range rider along with reduced woody browse would improve height, vigor and potential expiation of willow densities.

[4] Miles are cumulative, including acres from ongoing projects (see current management in Chapter 1 for further detail).

Analysis Issues	Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4
				expiation of willow densities.	
Shifting parts of vacant allotments into active livestock use	Acres of Currently Vacant Allotment Grazed	0	4,478	0	388
	Miles of Critical Bull Trout Habitat Grazed in Currently Vacant Allotment	0	4.4	0	0
Livestock Stocking Levels Should be Reduced	Capability, Suitability and Forage Production	No Grazing	The AUMs proposed are maximum limits and may be adjusted to allow flexibility for annual adjustment of both numbers and/or season. The analysis of available forage and stocking rates shows that adequate forage is available to support AUMs levels currently permitted including any proposed allotment boundary and management changes.		

Table S-9: Comparison of Alternatives: Resource Areas

Resource Areas	Alternative 1 No Action	Alternative 2 Propose Action	Alternative 3	Alternative 4
Rangeland Vegetation				
Range Vegetation and Health Vigor	No direct or indirect effects	Proposed forage use levels are adequate to maintain or improve plant vigor (health) and allow continued improvement in forage condition trends.		
Invasive Species	No direct or indirect effects	The ground disturbance for the new structural improvements could create an opportunity for invasive weed species to be introduced. The presence of livestock on the landscape would increase the risk of invasive weed species being introduced. The risk of spread is low.		
Botany (Sensitive Plants)	See Table S-10	See Table S-10	See Table S-10	See Table S-10
Soils	No direct or indirect effects	Consistent with Forest Plan soil protection standards		
Hydrology and Aquatics				
Bull Trout Habitat Recovery	See Table S-11			
Threatened, Endangered and Sensitive Aquatic Species	See Table S-11			
Forest Plant Consistency	Consistent with Management Area 3A standards, Amendment 29, and INFISH.			
Clean Water Act	Consistent with the Clean Water Act; providing for the recovery of the wetland obligate vegetation attributes and channel morphology, resulting in water temperatures that would provide for Bull Trout beneficial uses.			
Recreation	Meets Recreation Opportunity Spectrum standard			
Visual	Meets Forest Plan Visual Quality Objectives			

Resource Areas	Alternative 1 No Action	Alternative 2 Propose Action	Alternative 3	Alternative 4
Quality				
Malheur Wild and Scenic River Corridor	No direct or indirect effects	No improvements and/or structures within the corridor. Meets Forest Plan Standards. There would be no effect to the outstanding remarkable values or free flowing conditions of the river.		
Heritage	No direct or indirect effects	No additional impacts to heritage sites within the project area are expected from grazing.		
Social Economics				
Animal Month Units	See Table S-8			
Structural Improvement Costs	See Table S-8			
Wildlife	See Table S-11	See Table S-11	See Table S-11	See Table S-11

Table S-10: Effects to Sensitive Plant Species

Concern / Impacts	Sensitive Species	Alternative(s)		Rationale
		1	2, 3, 4	
Species where impacts from herbivory / grazing is a concern.	*Carex cordillerana* *Muhlenbergia minutissima* *Trifolium douglasii*	BI	MDI	These three species are palatable and have the potential to be negatively impacted by intensive grazing (Bakker et al. 2010, NatureServe 2012, Wilson et al. 2008).
Species where impacts from trampling and defecation is a concern.	*Botrychium ascendens* *Botrychium hesperium* *Botrychium lunaria* ***Botrychium montanum*** *Botrychium paradoxum* *Botrychium pedunculosum* *Bryum calobryoides* *Eleocharis bolanderi* *Listera borealis* *Mimulus evanescens* *Phacelia minutissima* *Schistidium cinclidodonteum* *Tortula mucronifolia*	BI	MDI	These species are very small, delicate, and exists in areas with high soil moisture. Livestock are often concentrated in these areas. For these species, a single hoof print or cow pie can destroy an individual plant, and even a relatively small amount of hoof action and/or defecation can eliminate a small population.
Species where impacts from trampling, trailing, herbivory, and defecation in peatlands is a concern.	*Anthelia julacea* ***Botrychium crenulatum*** *Harpanthus flotovianus* ***Helodium blandowii*** ***Meesia uliginosa*** *Ophioglossum pusillum* *Pseudocalliergon trifarium* *Splachnum ampullaceum* ***Tomentypnum nitens*** *Utricularia minor*	BI	MDI/BI	Adaptive management strategies that benefit these species would be implemented if detrimental effects are occurring and management objectives are not met within a 5 year period (SLVGA DEIS, Appendix A, parts 2 and 3).

BI=Beneficial Impact, NI=No Impact, MID=May Detrimentally Impact but would not lead to a tread toward federal listing [40 CFR §1508.8, FSM 2672.42(5)]. Species identified in bold font are documented within the project area.

Table S-11: Effects to Threatened, Endangered and Sensitive Aquatic Species

Aquatic Species	Status	Effects Determination			
		Alt 1	Alt 2	Alt 3	Alt 4
Columbia River Bull Trout	T (MIS)	NLAA/BE	LAA	NLAA/BE	NLAA/BE
Columbia River Bull Trout Designated Critical Habitat	D	NLAA/BE	LAA	NLAA/BE	NLAA/BE
Interior Redband Trout	S (MIS)	MIIH/BI	MIIH	MIIH/BI	MIIH/BI
Columbia spotted frog	S	NI	MIIH	MIIH/BI	MIIH/BI
Western Ridged Mussel	S	MIIH	MIIH	MIIH/BI	MIIH/BI
Shortface Lanx	S	MIIH	MIIH	MIIH/BI	MIIH/BI

Table S-12: Threatened, Endangered and Sensitive Wildlife Species Summary

Terrestrial Species	Status	Effects Determination			
		Alt 1	Alt 2	Alt 3	Alt 4
Canada Lynx	Threatened	NE	NE	NE	NE
Gray Wolf	Sensitive	NI	NI	NI	NI
Bald Eagle	Sensitive	NI	NI	NI	NI
American Peregrine Falcon	Sensitive	NI	NI	NI	NI
California Wolverine	Sensitive	NI	NI	NI	NI
Pygmy Rabbit	Sensitive	NI	NI	NI	NI
Greater Sage-Grouse	Sensitive	NI	MIIH	MIIH	MIIH
Silver-bordered Fritillary	Sensitive	NI	MIIH	MIIH	MIIH
Wallowa Rosy Finch	Sensitive	NI	NI	NI	NI
Bobolink	Sensitive	No Impact	MIIH	MIIH	MIIH
Grasshopper Sparrow	Sensitive	No Impact	MIIH	MIIH	MIIH
Upland Sandpiper	Sensitive	No Impact	No Impact	No Impact	No Impact
Tricolored Blackbird	Sensitive	No Impact	No Impact	No Impact	No Impact
Bufflehead	Sensitive	No Impact	No Impact	No Impact	No Impact
Lewis's Woodpecker	Sensitive	No Impact	MIIH	MIIH	MIIH
White-headed Woodpecker	Sensitive	No Impact	MIIH	MIIH	MIIH
Townsend's Big-Eared Bat	Sensitive	No Impact	MIIH	MIIH	MIIH
Pallid Bat	Sensitive	No Impact	MIIH	MIIH	MIIH
Fringed Myotis	Sensitive	No Impact	MIIH	MIIH	MIIH
Johnson's	Sensitive	No Impact	No Impact	No Impact	No Impact

Terrestrial Species	Status	Effects Determination			
		Alt 1	Alt 2	Alt 3	Alt 4
Hairstreak					
Columbia Clubtail	Sensitive	No Impact	MIIH	MIIH	MIIH
Columbia Spotted Frog	Sensitive	See Aquatic Section	MIIH	MIIH	MIIH
Big Game Habitat (Elk)	MIS	No Impact	Not expected to affect elk population numbers or viability.		
Old Growth Habitat	MIS	No direct or indirect effects to old growth habitat and the MIS species associated with this habitat.	Cattle grazing would have little to no impact to Old Growth Habitat and associated MIS pileated woodpecker, American marten, and three-toed woodpecker.		
Primary Cavity Excavators	MIS	No direct, indirect or cumulative effects to the primary cavity excavators or their habitat.	No impact to snag and down wood habitat in ponderosa pine, lodgepole pine, or mixed conifer stands. Little or no impact to woodpeckers utilizing these habitats. Unprotected aspen stands may continue decline impacting nesting and foraging habitat.		
Goshawk, Osprey, Blue Grouse, Antelope	Features Species	No direct, indirect or cumulative effects to featured species or their habitat.	There would be no impacts to goshawk nesting habitat, osprey nesting habitat (snags), or blue grouse winter roosts. Improvements in riparian shrub density and age classes, as well as herbaceous cover, would improve habitat for small mammals, birds (northern goshawk prey), fisheries (osprey prey), or blue grouse foraging areas. Cattle grazing may displace female pronghorns. Because turn-out dates would be in mid- June or later, this would not impact newly born fawns. Most antelope have had their young by June.		
Beaver	Species of Concern During Scoping	No direct or indirect, or cumulative effects.	Recovery of herbaceous vegetation and riparian hardwoods could increase the expansion of beaver within the project area.		
Landbirds Including Neotropical Migratory Birds	Migratory Birds	No direct or indirect, or cumulative effects.	Overall disturbance from activities would be limited in time and place, and therefore, would not be expected to impact populations of species at the landscape level.		

Status

T	Federally Threatened
S	Sensitive species for Regional Forester's list
D	Designated Critical Habitat
MIS	Management Indicator Species

Effects Determination

NLAA	May Effect, Not Likely to Adversely Affect
LAA	May Effect, Like to Adversely Affect
BE	Beneficial Effect

Sensitive Species

NI	No Impact
MIIH	May Impact Individuals or Habitat but Will Not Likely Contribute to a Trent Toward Federally Listing

	or Cause a Loss of Viability to the Population or Species
BI	Beneficial Impact

IDENTIFICATION OF THE PREFERRED ALTERNATIVE

Alternative #4 with the associated design criteria and monitoring items is the Agency Preferred Alternative.

Chapter 1

Introduction

The Forest Service has prepared this Draft Environmental Impact Statement (DEIS) on the potential effects of authorizing livestock grazing in the Summit Logan Valley Grazing Authorization (SLVGA) project in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. The Summit Logan Valley Grazing Authorization project area includes all of the Lake Creek, Logan Valley, McCoy Creek and Summit Prairie Allotments.

The project area is predominately within the Upper Malheur River watershed. Numerous streams flow within the watershed including Summit Creek, Big Creek, McCoy Creek and Lake Creek. A minor portion of the Summit Prairie Allotment (371 acres or less than 0.6% of the analysis area) occurs in the Upper North Fork Malheur River watershed (Crane Creek subwatershed). There are no streams within these 371 acres.

The project area is located south and west of Prairie City, Oregon and includes approximately 40,279 acres of National Forest System lands administered by the Prairie City Ranger District of the Malheur National Forest. Embedded within the project area is approximately 5,000 acres of private land.

Decision Framework

The Forest Supervisor of the Malheur National Forest is the responsible official who will decide whether domestic livestock grazing should be authorized on all, part, or none of the project area. If the decision is to authorize some level of livestock grazing, then management prescriptions would be applied to ensure that the Forest Plan goals and the purpose and need for the project are met.

Forest Plan

This DEIS tiers to the Malheur National Forest Land and Resource Management Plan (Forest Plan) Final Environmental Impact Statement and Record of Decision (1990) and incorporates by reference the accompanying Land and Resource Management Plan (Forest Plan (1990)), as amended. Additional management direction is provided by Forest Plan amendments approved since 1990, some of which include:

- "*Columbia River Anadromous Fish Management Policy and Implementation Guide*" (USDA 1994; herein referred to as Amendment #29). The amendment included changes to both Management Areas 3A (inland fish habitat) and 3B (anadromous fish habitat).
- "*Interim Strategies for Managing Fish-Producing Watersheds in Eastern Oregon and Washington, Idaho, Western Montana and Portions of Nevada*" (USDA Forest Service 1995; also known as INFISH). This amendment provides riparian goals, management objectives, and standards and guidelines that reduce the risk of loss of populations of inland fish and potential negative impacts to aquatic habitat.
- The Pacific Northwest Region Final Environmental Impact Statement for the Invasive Plant Program, 2005, herby referred to as the R6 2005 Invasive Plant FEIS. The R6 2005

Invasive Plant FEIS culminated in a Record of Decision (R6 2005 ROD) that amended the Malheur Forest Plan by adding management direction relative to invasive plants and released all National Forests from direction established by the 1988 ROD and Mediated Agreement for invasive plant management. Parts of the 1988 ROD and 1989 Mediated Agreement for unwanted *native* plants were not affected by the R6 2005 ROD.

- "*Interim Management Direction Establishing Riparian, Ecosystem and Wildlife Standards for Timber Sales*" (USDA Forest Service 1995; also known as Regional Forester's Eastside Forest Plan Amendment 2 or Eastside Screens). Amendment 2 is not applicable to this analysis.

Forest Plan amendments are those analyses documented in the R6 2005 Invasive Plant FEIS and Record of Decision; and Decision Notices for INFISH and Amendment #29.

Management Area Standards

The Forest Plan divided the analysis area into eight management areas (MA), each with different management goals and standards. In addition, INFISH created Riparian Habitat Conservation Areas (RHCAs) that overlap management areas and supersede Forest Plan direction with specific standards, except if the existing direction provided more protection for inland native fish habitat. The following MAs are located within the project area (see Table 1-1).

Table 1-1: Management Areas

Management Areas	Acres	% of Area
1-2: General Forest and Rangeland	9,117	23
3A: Non-Anadromous Riparian Areas (including RHCAs)	4,719	12
12: Developed Recreation	8	<1
13: Old Growth	2,115	5
14: Visual Corridors	24,278	60
19: Administrative Sites	27	<1
22B: Wild and Scenic River	15	<1
TOTAL	**40,279**	**100%**

Management Area 1 - General Forest

This management area primarily consists of forested lands and is designed to emphasize timber production on a sustained yield basis while providing for other resource values.
Generally, acres for MA 1 and MA 2 (see below) are combined.

Management Area 2 – General Rangeland

This management area primarily consists of non-forested grasslands and low-site ponderosa pine lands that are unsuitable for timber production. Forage production is emphasized on non-forested areas on a sustained yield basis while providing for other resource values. This management area is usually included as non-forested lands within other MAs, primarily MA 1 – General Forest (see MA-1 for acres).

Management Area 3A – Non-Anadromous Riparian Areas

Management Area 3A consists of lakes, perennial streams and seasonally flowing streams. These areas are to be managed to protest and enhance their value for wildlife, resident fish habitat and water quality. Fore Plan Amendment 29 incorporated the Columbia River

Anadromous Fish Habitat Management Policy Plan (USDA Forest Service 1994) establishing specific desired condition numeric values. INFISH (USDA 1995) provided riparian goals, riparian management objectives (RMO's) and standards and guidelines that amended the Forest Plan. INFISH also directed that Riparian Habitat Conservation Areas (RHCAs) be delineated to include portions of watersheds where riparian dependent resources of would receive primary emphasis. RHCAs are subject to specific standards. See Aquatic section in Chapter 3 for further detail.

Management Area 12 – Developed Recreation Sites

Manage for developed recreation opportunities, providing interpretation and enhancement of cultural and natural resources. This management area includes Murray and Big Creek Campgrounds.

Management Area 13 – Dedicated Old Growth and Replacement Old Growth

The primary goal is for wildlife and plant habitat, ecosystem diversity and aesthetic quality.

Management Area 14 – Visual Corridors

This management area consists of visible and potentially visible landscape along major travel routes and the wild and scenic rivers where traveling public has a high-to-medium sensitivity to the scenery.

Management Area 19 – Administrative Sites

This management area includes the Lake Creek Organization camp. The goal is to provide and maintain sites for facilities necessary for the administration of Malheur National Forest lands.

Management Area 22b – Wild and Scenic River

The Malheur River has both wild and scenic segments designated. A portion of the scenic segment is located in the project area. The goal is within the corridor is to protect and enhance the scenic, geologic, wildlife habitat, and historic values of the river corridor. Preserve the free-flowing conditions of the river for the use and enjoyment of present and future generations. A Decision Notice was signed on August 7, 1992 authorizing a management strategy for the Malheur Wild and Scenic River. This decision amended the Forest Plan and established a new Forest Plan Management Area (MA 22b) replacing Management Area 22. The management strategy from the decision was incorporated into the Malheur Wild and Scenic River Plan.

<u>Listed Species Consultation</u>

On June 18, 2012, the Malheur National Forest submitted a Biological Assessment (BA) and subsequent information to the U.S. Fish and Wildlife service (FWS) La Grande Field Office for concurrence on the effects of grazing from 14 allotments on Columbia Basin bull trout designated critical habitat. The Logan Valley, McCoy Creek and Summit Prairie allotments were included in the BA. Lake Creek was not included because no action was proposed. On September 6, 2012, the Malheur National Forest received a Biological Opinion/Concurrence Letter from the FWS. The FWS concurred that the proposed livestock management for the Logan Valley allotment is *not likely to adversely affect* bull trout and bull trout critical habitat. The FWS also concurred and wrote a letter of opinion that the proposed livestock management in the Summit Prairie and McCoy Creek allotments is *likely to adversely affect* bull trout critical habitat.

Current Management

The following outlines the current management system and conditions for each allotment:

Lake Creek Allotment

Totals 10,196 acres and is currently vacant. It contains three units (Bosenberg, Horse Pasture and McCoy Creek) with separation fences. However some portions of the fence were burned during the 1990 Snowshoe fire. There are two developed springs on the allotment in the Bosenberg unit.

Prior to the Snowshoe Fire in 1990, this allotment was unmanageable due to the dense overstory canopy and reduced forage base; the permittee waived the allotment back to the Forest Service. Since then it has been vacant and not been grazed for over 20 years.

Logan Valley Allotment

Totals 3,756 acres with 11 grazing units in which fences separate the West Lake Creek, East Lake Creek, North Big Creek, South Big Creek, West Bosenberg, East Bosenberg, Corral Holding, Front Field, Lower Field, Big Field and Flat Field units will be analyzed. There is one developed water source that aids in the distribution of livestock throughout the Flat Field unit. Other stock water is provided by Lake Creek, Big Creek and Deardorff Ditch. Up to 357 head of cattle (cow calf pairs) are authorized for a season generally between June 10th and October 15th.

Since completion of Proper Functioning Condition (PFC) assessments in 2007 changes in management have occurred on the West Lake Creek unit which was determined to be in a Functioning-at-Risk (FAR) with a downward trend condition. Adaptations to grazing management in the West Lake Creek unit were made during the 2008-2012 grazing seasons to improve steam bank stability and the composition of stream bank stabilizing species. Adaptations include moving to early season grazing and reductions in authorized duration of grazing (Head Months), as well as the development of a portable solar panel pump with troughs placed in the uplands away from Lake Creek.

In 2011,three Decision Memo's were signed by the Prairie City District Ranger authorizing projects within the Logan Valley allotment to enhance livestock management and improve shade and hardwood communities associated with bull trout habitat on Big Creek and Lake Creek. Projects include:

Project Name	Project Description	Objective	Allotment/Unit	Estimated Implementation
Big Creek & Lake Creek Range Aquatics Project (signed: 08-02-2011)				
Big Creek Fence and Water-Gap	Construction of a riparian pasture fence on approximately 0.2 miles along Big Creek. A hardened water-gap (not exceeding 20 ft.) would be constructed within the fence line to	Restoration of critical bull trout habitat on Big Creek while maintaining livestock access to water	Logan Valley allotment/West Bosenberg unit Creates West Bosenberg Riparian pasture	2012-2013

Project Name	Project Description	Objective	Allotment/Unit	Estimated Implementation
	provide water to the remainder of the West Bosenberg unit.			
Big Creek & Lake Creek Off-Site Water Sources and West Lake Creek Riparian Fence Range Aquatic Projects (signed: 10-05-2011)				
Big Creek & Lake Creek Off-Site Water Source	Development of solar system to pump water from Big and Lake Creeks to troughs located in the uplands of the units.	Reduce impacts of livestock along Big and Lake Creeks by providing water sources in the uplands of the allotment.	Logan Valley allotment/Big Field, Flat Field, East Lake Creek and West Lake Creek units.	2012-2013
West Lake Creek Riparian Fence	Construction of a riparian pasture fence along approximately 1 mile along Lake Creek.	Reduce impacts of livestock along Lake Creek, allowing the herbaceous plant community to recover and stabilize the streambank.	Logan Valley allotment/West Lake Creek unit Creates West Lake Creek Riparian pasture	2012-2013
Big Creek & Lake Creek Riparian Hardwood Planting Restoration Project (signed: 12-09-2011)				
Big Creek and Lake Creek Riparian Hardwood Planting	Planting hardwoods within the newly created West Bosenberg and West Lake Creek Riparian pastures	Restore shade and cover (undercut banks) along Big and Lake Creeks	Logan Valley allotment/West Bosenberg and West Lake Creek Riparian pastures	2012-2013

McCoy Creek Allotment

Totals 980 acres in 7 grazing units, where fences separate Cow Camp, Dry, Gov't Flat, Lake Creek, North Fork, Ridge and Starvation units. There is one water development located with the Lake Creek unit. Other stock water is provided by Lake Creek and Deardorff Ditch. Up to 63 head of cattle (cow calf pairs) are authorized for a season generally between June 1st and October 30th.

Three units (Lake Creek, Starvation and North Fork) are detached from the main body of the McCoy Creek allotment and are not consistently grazed because of the logistics of moving livestock. Each of these units has a single source of water provided by ponds or streams. The pond in the Lake Creek unit only provides early season water. Irregular use has allowed the palatability and vigor of upland vegetation to decline.

In the 4 units that are grazed on a yearly basis, Lake Creek is the only consistent source of water. The stream is accessed by all units through the Cow Camp unit. In the remaining 3 units, water is limited to ditches that do not provide a consistent source of livestock water, requiring the 4 units to be managed as a single unit. Limited water and decreased forage palatability and vigor in uplands have decreased livestock distribution and use in uplands.

In 2011, three Decision Memo's were signed by the Prairie City District Ranger authorizing projects within the McCoy Creek allotment to enhance livestock management and improve shade

and hardwood communities associated with bull trout habitat on Big Creek and Lake Creek. Projects include:

Project Name	Project Description	Objective	Allotment/Unit	Estimated Implementation
Big Creek & Lake Creek Range Aquatics Project (08-02-2011)				
Lake Creek Unit Division Fence Reconstruction	Reconstruction of approximately 1.0 mile of fence	Restore fence to an acceptable condition to control livestock movement and protect critical bull trout habitat on Lake Creek.	McCoy Creek allotment/Lake Creek unit	2012-2013
Lake Creek Fence and Water-Gap	Approximately 0.2 miles of fence construction along Lake Creek. Construction of a hardened water gap within the fence line to provide water for livestock.	Vegetation and stream channel to recovery while maintaining a functional water source for livestock	McCoy Creek/ Cow Camp unit Creates temporary exclosure identified in this analysis as the Lake Creek Exclosure	2012-2013
Lake Creek Willow Gallery Fence	Approximately 0.5 mile of fence construction along Lake Creek	Provide protection of willow gallery along Lake Creek that is utilized by beaver and is critical habitat for bull trout.	McCoy Creek/Cow Camp unit Creates temporary exclosure identified in this analysis as the Lake Creek Willow Exclosure	2012-2013
Big Creek & Lake Creek Off-Site Water Sources and West Lake Creek Riparian Fence Range Aquatic Projects (10-05-2011)				
Big Creek & Lake Creek Off-Site Water Source	Development of solar system to pump water from Big and Lake Creeks to troughs located in the uplands of the units.	Reduce impacts of livestock along Big and Lake Creeks by providing water sources in the uplands of the allotment.	McCoy Creek allotment/Cow Camp unit	2012-2013
Big Creek & Lake Creek Riparian Hardwood Planting Restoration Project (12-09-2011)				
Lake Creek Riparian Hardwood Planting	Planting hardwoods within the Lake Creek and Lake Creek Willow Gallery Fences.	Restore shade and cover (undercut banks) along Lake Creek	McCoy Creek allotment/Cow Camp Grazing unit	2012-2013

Summit Prairie Allotment

Totals 25,331 acres with seven units, fences separate the Sagehen, Crane Rock, Little Logan, Summit Rock, North Summit, South Summit, and West Summit units. Within the allotment, 31

ponds have been constructed for livestock water and springs developed help distribute livestock. Up to 260 head of cattle (cow calf pairs) are authorized for a season generally between June 10th and October 24th.

Adaptations to grazing management were made in the Sagehen, West Summit and Summit Rock units during the 2008-2011 grazing seasons to improve stream bank stability and bank cover of stabilizing plants. Adaptations include reductions in authorized Head Months in the Sagehen unit in 2008-2011; installation of electric fencing along West Fork Summit Creek in 2009-2011; and the removal of all livestock that congregate along the West Fork of Summit Creek in the Summit Rock unit when approaching allowable use standards.

In 2011, a Decision Memo was signed by the Prairie City District Ranger authorizing projects within the Summit Prairie allotment to provide aquatic restoration and improve livestock distribution throughout grazing units.

Project Name	Project Description	Objective	Allotment/Unit	Estimated Implementation
Summit Creek Range Aquatics Project (09-09-2011)				
West Fork Summit Creek Fence and Water Gap	Approximately 0.3 miles of fence construction along the West Fork of Summit Creek. Construction of a hardened water gap within the fence line to provide water for livestock.	Reduce impacts of livestock on West Fork of Summit Creek while maintaining a water source for livestock	Summit Prairie allotment/ West Summit unit Creates West Summit Creek Riparian pasture	2012-2013
West Fork Summit Creek Parallel Tree Felling	Felling of green lodgepole pine parallel to West Fork of Summit Creek, restricting/ deflecting livestock and/or wild ungulates from the streambanks	Reduce streambank impacts of livestock and wild ungulates, protecting establishing hardwoods and other riparian plant communities	Summit Prairie allotment/Summit Rock unit	2012-2013
Little Logan Willow Restoration	Enlarge or replace existing cages around willows. Remove cages that have significantly grown above browse height. Construct a buck-n-pole exclosure approximately ¼ mile in length along Summit Creek	Continue monitoring willow recovery and browsing that occurs along Summit Creek	Summit Prairie allotment/Little Logan unit	2012-2013
Sagehen Stock Ponds	Construction of three uplands stock ponds	Provide functional water source in the uplands, reducing livestock impacts along Summit Creek	Summit Prairie allotment/Sagehen unit	2012-2013

Purpose and Need for Action

The Prairie City Ranger District, Malheur National Forest, has developed the project proposals, analyzed in this DEIS, to support the purposes of this project and meet Forest Plan goals and objectives.

The purpose of the proposed action is prompted by Section 2001(b) of Public Law 104-19, commonly known as the 1995 Rescission Act. The Act requires that each National Forest establish and adhere to a schedule for completion of National Forest Environmental Policy Act of 1969 (NEPA) analysis on all active grazing allotments. The Lake Creek, Logan Valley, McCoy Creek and Summit Prairie allotments were combined into this analysis because they have similar geographic, vegetative and ecological attributes. They are all located in the Upper Malheur River Watershed and are tributaries to the Malheur River. All four allotments contain critical habitat for threatened bull trout and have similar aquatic habitat needs.

The purpose and need for an action is driven by the difference between the existing and desired conditions. The difference between these conditions helps define the resource need. Lake Creek, Big Creek and Summit Creek are the three main fish bearing streams in the project area. Appendix A (part 1) compares the existing condition to the desired condition for each of these streams by stream reach.

The existing condition shows many stream reaches lack diverse age classes of willows and other hardwoods, and stabilizing herbaceous vegetation. Impaired shrub height and density and herbaceous vegetation is limiting stream shade, bank stability, hiding cover (undercut banks), and pool habitat. These essential stream components provide protection, food, and habitat (rearing, migratory, and reproductive) for bull trout and other aquatic species. Quantity and diversity of riparian vegetation is also limiting habitat for various wildlife species including beaver.

Segments of Lake Creek, Summit Creek and West Fork of Summit Creek are Functioning-at-Risk (FAR) with either an upward (5.1 miles) or downward (4.6 miles) trend. FAR riparian areas have an existing soil, water, or vegetation attribute that makes them more susceptible to degradation during moderately high flow events. Most frequently, vegetation is the primary determining factor for trend on low-gradient streams common to those in the Summit Logan project area (Appendix A, part 1 shows PFC).

Lake Creek, Big Creek and Summit Creek are 303(d) listed streams for water temperature. The existing condition is not currently meeting the biological use criteria for bull trout spawning, rearing and migration.

The purposes of the proposed action are two-fold:

- Meet the requirements of the **Rescission Act and provide for an appropriate level of domestic livestock grazing as set forth in the Malheur National Forest Land and Resource Management Plan** (1990) and;
- Improve resource conditions for **aquatic habitat.**

Rescission Act

There is a need to meet the Rescissions Act requirements to complete the NEPA analysis for the Lake Creek, Logan Valley, McCoy Creek and Summit Prairie allotments. There is a need to

meet the Malheur Land and Resource Management Plan goals by providing a sustained production of palatable forage for grazing by livestock and dependent wildlife species while meeting the needs of other resources and uses at a level which is responsive to site-specific objectives (Forest Plan, page IV-2) as well as to contribute to the social and economic health of communities which are significantly affected by National Forest management (IV-3, # 42).

Aquatic Habitat

There is a need to improve aquatic habitat in Lake Creek, Big Creek and Summit Creek to support all life stages of bull trout. This includes improvements in riparian vegetation and hardwoods to enhance stream shade, temperature, riparian vegetation composition and vigor and streambank stability. Water temperature and streambank stability are important aquatic habitat features (riparian management objectives) identified in the Forest Plan as amended by INFISH.

There is a need to develop an upward trend in riparian areas currently assessed as FAR with a downward or slowed trend, while continuing to improve or maintain riparian areas with upward recovery trends or properly functioning conditions toward desired conditions identified in Appendix A (part 1).

INFISH directs that grazing practices be modified (e.g., accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent attainment of Riparian Management Objectives or are likely to adversely affect inland native fish. Suspend grazing if adjusting practices is not effective in meeting Riparian Management Objectives (INFISH GM 1).

Proposed Action

Overview

A “proposed action” is defined early in the project-level planning process. It serves as a starting point for the Interdisciplinary Team and gives the public and other agencies specific information on which to focus comments. Using those comments (see discussion of Significant Issues later in Chapter 1) and information from preliminary analysis, the Interdisciplinary Team developed alternatives to the proposed action.

The Malheur National Forest, Prairie City Ranger District, proposes to authorize livestock grazing on the Lake Creek, Logan Valley, McCoy Creek and Summit Prairie allotments and update grazing management direction by revising four AMP’s to address the purpose and need and meet Forest Plan goals, objectives, standards and guidelines and the desired conditions for the analysis area. The specific elements of the proposed action are discussed in brief below. A more detailed description of the proposed action can be found in Chapter 2.

Lake Creek Allotment

<u>Grazing System</u>

Portions of this currently vacant allotment would be added to the Logan Valley and Summit Prairie allotments. The remaining 5,069 acres would remain vacant in the McCoy Creek and Corral Basin units.

Boundary Changes

Approximately 4,778 acres of the Lake Creek allotment would be absorbed into the adjacent Logan Valley and Summit Prairie allotments. Areas containing Lake Creek, Big Creek and Corral Basin Creek would remain vacant (5,069 acres).

The southwest corner of the McCoy Creek unit (349 acres) would be removed from the Lake Creek allotment. This area may be added to the Dollar Basin allotment in the future. A separate environmental analysis would be required to add this area to the Dollar Basin allotment.

Livestock numbers and Grazing Season

No livestock would be authorized on 5,069 acres of the allotment.

Improvements and Structures

The removal of the southwest corner of the McCoy Creek unit from the Lake Creek allotment would require the construction 2.5 miles of new fencing.

Adaptive Management

No adaptive management strategies are proposed.

Logan Valley Allotment

Grazing System

The Logan Valley allotment would be managed with periods of rest or deferment during the season of use. Rest or deferment would be determined based on resource needs and would not be a systematic or scheduled rotation.

Boundary Changes

Approximately 655 acres from the Lake Creek and McCoy Creek allotments would be added to the Logan Valley allotment. The change would allow additional rest for the Logan Valley allotment, increasing the allotment acres to 4,359 (specific allotment and unit changes are included in Ch. 2).

The Big Creek portion of the East Lake Creek, North Big Creek, and South Big Creek would be combined into a single large unit known as Big Creek Riparian pasture.

The Front Field unit (approximately 52 acres) would be removed from the Logan Valley allotment and absorbed into the Summit Prairie allotment.

Livestock numbers and Grazing Season

The permitted livestock number and grazing season would remain as currently permitted, distributed over the larger landscape by adding areas from the Lake Creek and McCoy Creek allotments.

The Big Creek Portion of the East Lake Creek, North Big Creek and South Big Creek units that would be combined into a single riparian pasture would require livestock removal by August 15th to protect bull trout spawning habitat in Big Creek.

Improvements and Structures

The North Fork unit of the McCoy Creek allotment would be absorbed into the Flat Field unit requiring removal of approximately 0.3 miles of fence.

Absorbing a portion of the McCoy Creek unit along with the Horse Pasture from the Lake Creek allotment into the Logan Valley allotment would require 2.5 miles of additional fence. The new unit would be identified as the Deardorff unit.

Combining the Big Creek Portion of the East Lake Creek, North Big Creek and South Big Creek units would require removal of 1.2 miles of fence.

Adaptive Management

Adaptive management strategies shown in Appendix A (part 3) are summarized in Table 2-6 in Chapter 2.

McCoy Creek Allotment

Grazing System

A deferred rotation grazing system would be applied throughout the allotment. This system provides for a systematic rotation of deferment among units and provides flexibility to change the time of year when units would be used.

Boundary Changes

The present allotment consisting of 980 acres would decrease to 660 acres. The Dry and Ridge units of the allotment would be combined into a single unit as currently managed and would be called the Ridge unit. The Lake Creek and North Fork units (of the McCoy Creek allotment) would be absorbed into the Logan Valley allotment.

The Starvation unit (53 acres) would be removed from the McCoy Creek allotment. This may be added to the Dollar Basin allotment in the future. A separate environmental analysis would be required to add this area to the Dollar Basin allotment.

Livestock numbers and Grazing Season

The permitted livestock number, forage allocation and grazing season would not change in the McCoy Creek allotment. Forage allowable use, move triggers, and endpoint indicators are listed in Appendix E.

Improvements and Structures

The Dry and Ridge units would be combined into a single unit (as currently managed) requiring removal of 1 mile of fence. The combined units would be called the Ridge unit and would provide better livestock distribution.

Adaptive Management

No additional adaptive management strategies are proposed.

Summit Prairie Allotment

Grazing System

The Summit Prairie allotment would be managed with periods of rest or deferment during the season of use. Rest periods and deferment would be determined based on resource needs and would not be a systematic or scheduled rotation.

Boundary Changes

The present allotment consisting of 25,331 acres would increase to 29,832 acres. The Front Field unit (from the Logan Valley allotment) would be absorbed into the Little Logan unit and the Bosenberg unit (from the vacant Lake Creek allotment) would be added as a separate grazing unit.

Livestock numbers and Grazing Season

The permitted livestock number, forage allocations, and the grazing seasons would remain as present conditions, distributed over the larger landscape provided by adding areas from the Lake Creek allotment to the Logan Valley allotment.

Improvements and Structures

Approximately 0.7 miles of fence would be removed if the Front Field unit is absorbed from the Logan Valley allotment.

Adding the Bosenberg unit (from the Lake Creek allotment) would require construction of approximately 7 miles of additional fence. The water gaps would be located where Forest Service road 1648 crosses Bosenberg Creek and an unnamed tributary of Big Creek. Three ponds would be developed in the uplands to provide alternative water away from perennial streams. A spring would be developed off a head water spring for Bosenberg Creek. The spring source would be fenced and water piped to a water trough located 300 feet from the spring. Water would be piped from Bosenberg Creek to a trough located 100 approximately feet from the stream.

Adaptive Management

Adaptive management strategies shown in Appendix A (part 3) are summarized in Table 2-12 in Chapter 2.

Allotment Management Plans (AMP)

Authorization of grazing would be implemented with grazing permits and AMPs. An AMP as defined in the Federal Land and Policy Management Act (FLPMA) is a document prepared in consultation with lessees or permittees that applies to livestock operations on the public lands and prescribes:

1. The manner and extent to which livestock operations will be conducted in order to meet multiple use, sustained yield, economic and other needs and objectives.

2. Range improvements to be installed and maintained.

3. Range fences constructed to a standard that is compatible with wildlife and human uses, i.e. gates would be placed at a minimum of every one mile and bottom fence wire would be 16 inches off the ground.

4. Such other provisions relating to livestock grazing and other objectives found by the Secretary to be consistent with provisions of FLPMA.

The AMPs also include upland and riparian vegetation community objectives (long-term goals), upland and riparian forage use standards and guidelines (short-term goals), required management

practices (e.g. salting and riding/herding for proper distribution), maintenance standards for structural improvements and monitoring plans.

Scoping

The CEQ defines scoping as "…an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action" (40 CFR 1501.7). Among other things, the scoping process is used to invite public participation, to help identify public issues and to obtain public comment at various stages of the NEPA process. Although scoping is to begin early, it is really an iterative process that continues until a decision is made. To date, the public has been invited to participate in the project in the following ways:

Schedule of Proposed Actions

The Summit Logan Valley Grazing Authorization Project has been listed on the Malheur National Forest Schedule of Proposed Actions since April 2008.

Public Mailing and Field Trips

Public comments were previously requested in October 2008 for this project. Since that time, the Summit Logan Grazing Authorization Project has transitioned from an Environmental Assessment (EA) to an Environmental Impact Statement (EIS). On February 1, 2012, a letter providing information and seeking public comment was mailed to approximately 230 entities, such as, agencies, groups, individuals and other parties that had requested information on general forest or specific range projects. Four comments letters were received: Oregon Natural Desert Association in conjunction with Oregon Wild, Grant County Conservationists, Blue Mountain Biodiversity and an anonymous commenter. Additionally, on February 8, 2012, a Notice of Intent was published in the Federal Register.

Interaction with the Summit Logan allotment grazing permittees has been ongoing since the fall of 2007 and has included several field trips and meetings. Field trips to the project area were facilitated by the National Riparian Service Team and attended by representatives from U.S. Fish and Wildlife Service and the permittees.

Tribal Government Consultation

Tribal consultation on a government-to-government basis is ongoing with the Burns Paiute Tribe, the Confederated Tribes of the Umatilla Indian Reservation, and the Confederated Tribes of Warm Springs Reservation. This government-to-government consultation is being conducted under the terms of specific agreements with individual tribes and includes regular contact and meetings as appropriate. Scoping letters were mailed to the tribal governments. In the spring and fall of 2008 the District Ranger, Rangeland Management Specialist and various Interdisciplinary Team members met with the Burns Paiute Tribe to discuss their proposals for the Logan Valley area. Several partnership projects are ongoing in the project area involving the Burns Paiute Tribe and the Logan Valley allotment permittees. The Burns Paiute Tribe is constructing several riparian pasture and exclosure fences on Big Creek and Lake Creek to assist in grazing management and aquatic habitat recovery.

Issues

Scoping is used to identify issues that relate to the effects of the proposed action. An issue is an unresolved conflict or public concern over a potential effect on a physical, biological, social or economic resource as a result of implementing the proposed action and alternatives to it. An issue is not an activity; instead, the projected effects of the proposed activity create the issue. Issues are generated by the public, other agencies, organizations and Forest Service resource specialists and are in response to the proposed action. Issues provide focus for the analysis of environmental effects and may influence alternative development, including development of project design criteria. In this document issues are tracked and are used to display differing effects of the proposed action and the alternatives.

The issues were separated into three groups for the purpose of this analysis:

Significant issues, analysis issues and issues eliminated from detailed study. The CEQ NEPA regulations give guidance (40 CFR Sec. 1501.7) to "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)."

- Significant issues are defined as those directly or indirectly caused by implementing the proposed action; however, the effects cannot be reduced by normal Best Management Practices (BMPs) or Project Design Criteria (PDCs). Alternatives were developed to address these issues.
- Analysis issues are defined as those directly or indirectly caused by implementing the proposed action; however, the effects could be reduced with normal BMPs and PDCs. An alternative was usually not developed to address these analysis issues. However, these analysis issues will be tracked in the relevant resource area effects analyses in Chapter 3 and in the Comparison of Alternatives in Chapter 2. Several of the issues for this project fall into this category.
- Issues eliminated from detailed study are identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The CEQ NEPA regulations require identification and elimination from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3). These are listed in project file with the rational for eliminating them from detailed study in this analysis.

The Interdisciplinary Team identified and carried through the analysis the significant issues and the analysis issues in order to fully develop and allow further comparison of the proposed action and alternatives. The environmental consequences of the proposal are disclosed in Chapter 3 for each resource affected by these issues. Each issue has indicators to allow members of the public and the Responsible Official (Forest Supervisor) to determine how well issues are addressed by the alternatives (see Comparison of Alternatives Table in Chapter 2 for effects of the alternatives on issues). A complete issue identification summary is in the project record files. A discussion of all issue groups and indicators are presented below:

Significant Issues

After reviewing the public comments received during scoping, two significant issues were identified by the Responsible Official:

- Bull Trout Critical Habitat – Grazing may degrade critical habitat for threatened bull trout. There may be direct, indirect, and cumulative effects of livestock use of streams and riparian areas that could negatively affect spawning and reproductive success. Livestock grazing may trample eggs, impact stream banks increasing sediment and widening stream channels, decrease shade-providing plants on the banks and increase water temperatures. Continued grazing on streams that are "functional at risk" may impact recovery of resource values including critical bull trout and beaver habitat. In areas that are functioning at risk, channels may not be interacting with the floodplain, substrate is often highly embedded and pool quality low, banks are incised with little vegetation, willows are under-represented in density and age classes, and water temperatures are high.
- Economic Impacts to Permittees and Community – Changes in how allotments are managed can affect operational and implementation costs. Riparian exclosures and riparian pastures can exclude productive forage areas and impact livestock movement. The addition of fences can increase annual fence maintenance costs. Permittees, managers and employees of allotments reside in the local communities and contribute to the local economy.

Table 1-1: Significant Issues Indicators

Significant Issue	Significant Issue Indicator(s)
Bull Trout Critical Habitat	Measure or element for evaluation: ▪ Miles of occupied bull trout habitat grazing during spawning season by stream ▪ Miles of critical bull trout habitat[5] • Not grazed • Grazed annually • Grazed with periods of rest • Riparian pastures with rest • Riparian exclosures not grazed ▪ Rate of Recovery • Miles of Critical Habitat expected to achieve PFC in 5 years • Miles of Critical Habitat expected to achieve PFC in 10 years • Miles of Critical Habitat expected to achieve desired vegetation conditions and channel characteristics in 10 years
Economic Impacts to Permittees and the Local Community	Measure or element for evaluation: ▪ Animal Unit Months ▪ Costs of Improvements ▪ Acres Rested or Not Grazed ▪ Acres Available for Grazing ▪ Miles of Added Fence Maintenance

[5] Miles of 303d listed streams are included in the critical bull trout habitat miles

Analysis Issues

Table 1-2 below lists the analysis issues considered for this analysis generated from public comments and/or the project Interdisciplinary Team.

Table 1-2: Analysis Issues

Analysis Issue	Analysis Issue Indicator(s)
Fences are Movement Barriers to Wildlife	Measure or element for evaluation: ▪ Miles of Fence Removed ▪ Miles of Fence Constructed ▪ Design Elements to Reduce Impacts
Proposed Move Triggers, End-Point Indicators not capable of allowing for riparian recovery	Measure or element for evaluation: ▪ Move Triggers and End-Point Indictors
Limited hardwoods have resulted in a loss of beaver habitat and reduction in beaver populations	Measure or element for evaluation: ▪ Short- and Long-Term Effects on Shrub Development
Shifting parts of vacant allotments into active livestock use	Measure or element for evaluation: ▪ Acres of Currently Vacant Allotment Grazed ▪ Miles of Critical Bull Trout Habitat Grazed in Currently Vacant Allotment
Livestock Stocking Levels Should be Reduced	Measure or element for evaluation: ▪ Capability, Suitability and Forage Production

Project Record Availability

This DEIS hereby incorporates, by reference, the project record. The project record contains all project-specific information including resource reports, the watershed analysis and other results of field investigations. The record also contains information resulting from public involvement efforts. The project record is available for review during regular business hours at Prairie City Ranger District in Prairie City, Grant County, Oregon.

Chapter 2

Introduction

Chapter 2 describes and compares the no action (no grazing), the proposed action and alternatives considered by the Forest Service for the Summit Logan Valley Grazing Authorization Project. This chapter is intended to present the alternatives in comparative form, sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public (40 CFR 1502.14).

Development of Alternatives

The Interdisciplinary Team used information from public scoping comments, the significant issues identified for the project (see Chapter 1) and direction given by the Responsible Official including Forest Plan direction and amendments, existing State and Federal laws, and field-related resource information to formulate a reasonable range of alternatives. A reasonable range of alternatives to the proposed action was developed to 1: Meet the purpose and need for the project, and 2: Consider a reasonable range of solutions for the significant issues.

This chapter includes a detailed description of each alternative, a list of design criteria, and other features of the alternatives. A summary of the alternatives is provided in Table 2-34.

Each alternative is analyzed in detail to disclose environmental effects associated with its implementation in Chapter 3. A summary comparing the effects to the significant and analysis issues is provided at the end of this chapter in Table 2-36.

Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by National Environmental Policy Act (NEPA) to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). The following alternatives or components of alternatives were considered, but eliminated from detailed consideration for reasons summarized below.

Closure of Forest Roads

Public comments during the scoping period requested road closures to be considered as part of the proposed action. A recent access travel management plan was implemented in Logan Valley area with the Merit Project. Over the last several years several miles of road closures and decommissioning were implemented in areas overlapping portions of the Logan Valley, Lake Creek, and McCoy Creek allotments benefiting aquatic and wildlife habitat. The Line Officer made a decision to not propose additional road closures in this analysis.

Beaver Recovery Projects

Public comments requested that a credible and substantive beaver restoration alternative be considered. Although alternatives considered in detail do not specifically propose to restore beaver habitat, grazing management changes considered are expected to move riparian areas toward desired conditions resulting in improved habitat for beaver across the project area. The

quality of beaver habitat will depend on the stream-type and vegetation potential. Closing roads was a beaver restoration strategy recommended in public comments. As stated above, the responsible official decided not to include road closures within the scope of the analysis.

Corridor Fencing of Big Creek

A proposal was brought forward from the Burns Paiute Tribe to consider constructing corridor fences on Big Creek to eliminate livestock access and rest. Proper Functioning Condition (PFC) Assessments on Big Creek stream reaches were conducted in 2007. All reaches of Big Creek assessed were determined to be in a Proper Functioning condition with an upward recovery trend, therefore corridor fencing of all stream reaches was eliminated from detailed study. The Forest Service is working cooperatively with the Burns Paiute Tribe and the Logan Valley allotment permittee to restore aquatic habitat on Big Creek and Lake Creek. In 2011, the Prairie City District Ranger authorized creating a riparian pasture on approximately 0.2 miles of Big Creek that was not reviewed during the 2007 PFC assessments. The pasture fence is scheduled to be completed in 2012. In all alternatives the riparian pasture (West Bosenberg Riparian Pasture) is proposed to be rested and planted with willows to expedite recovery.

Reduction of Permitted Grazing Numbers

An alternative was considered that would have decreased the annual permitted livestock numbers and Animal Unit Months (AUMs) to improve stream conditions and habitat for bull trout. A capability and suitability and forage production analysis was completed for all allotments in the project area. The study showed that forage availability with the currently permitted livestock animal unit months (AUMs) is not a limiting factor in the allotments within the project area.

Reducing numbers as a stand-alone strategy would have economic impacts to the permittee and fails to fully consider the stressors on the riparian systems that are slowing or preventing their recovery. Recovery of stream conditions can successfully be accomplished using a combination of timing, duration and frequency of grazing. Within the alternatives considered in detail, changes in management were designed specifically for the stream reaches based on the existing condition. Strategies considered related to the timing, duration, and frequency of grazing include: periodic rest of entire grazing units, fencing to create riparian pastures and exclosures to better control the duration and frequency of grazing, changes in allowable stream bank impacts and forage use levels in riparian areas, and development of upland water source development and management requiring daily riding by the permittee to move livestock away from riparian areas. In addition, the AUMs proposed in all alternatives considered in detail were established as a maximum limit, maintaining flexibility for periodic adjustments in livestock numbers if needed to achieve desired conditions for streams.

Current Management

Although current grazing strategies are facilitating recovery of most stream reaches, it was eliminated as an alternative studied in detail because there is still a need for changes in management to improve shrub, herbaceous vegetation, bank stability and stream shade conditions on specific reaches of Summit Creek. Summit Creek is critical habitat for bull trout.

Scheduling Rest on all Stream Reaches that are Functioning at Risk

Several sources of data were used by the Interdisciplinary team to determine the existing condition and desired condition (see Appendix A, part1). This includes a Proper Functioning Condition (PFC) assessment completed in 2007. The assessment identified several stream

reaches in the project area as "functioning at risk". Some stream reaches that are functioning at risk, have an upward recovery trend and scheduling rest to achieve the desired condition is not always necessary. Combinations of management that change the timing, duration and frequency of grazing are being considered based on the specific recovery needs of each stream reach. Scheduling rest as a stand-alone strategy for recovery all streams that are functioning at risk was eliminated from detailed study.

Alternatives Considered in Detail

This DEIS assesses the potential effects of four alternatives: a no action alternative and three action alternatives.

Alternative 1 – No Action (No Grazing)

For this DEIS, the no action alternative is interpreted to be No Grazing.

Under Alternative 1, all Term Grazing Permits would be cancelled upon implementation of the decision and resolution of the appeal process. No permits would be issued for any of the affected allotments until or unless there was a subsequent NEPA analysis and a decision made to re-stock any or all of the allotments. Permittees would be given two years written advance notice of cancellation of their permits as provided for under 36 CFR 222.4 (a)(1).

Upon cancellation of the existing permit, there would be no livestock grazing under this alternative. During the two years prior to cancellation of the permits, livestock would continue to be managed under current management regimes for the existing permits.

Permittees would be reimbursed for their amortized share of cooperative range improvements where they participated in the development (FSH 2209.13 Chapter 70).

Allotment exterior boundary fences would be assigned to adjacent permittees for continued maintenance. Private land boundary fences would remain intact with ownership assumed to belong to the private landowners. Subsequent decisions would need to be made regarding retention of any improvements for other resource needs.

The purpose of the no grazing alternative is to describe the effects of cancellation of grazing permits, with no livestock grazing taking place. Other management activities taking place in the area would continue if this Alternative was selected. Activities such as motorized access travel management, road maintenance, dispersed recreation, noxious weed management and fire protection would be allowed to continue as they currently take place in the Project Area.

Actions Common to Alternatives 2, 3 and 4

Adaptive Management

All action alternatives are based on "adaptive management," a process/model that uses monitoring and assessment information to determine if management changes are needed and, if so, what changes and to what degree. It is a process to cope with uncertainty and changing conditions over time. It gives the authorized officer the flexibility to adapt to changes on a yearly basis or after a period of longer term monitoring.

Adaptive management strategies that may be used with each alternative are identified in Appendix A (part 3). Monitoring would be used to determine if management objectives

identified in Appendix A (part 2) are being achieved in a timely manner. If it is determined through monitoring that objectives are not being achieved through the actions prescribed, then the pre-determined adaptive management strategy would be applied.

The factors that would be considered in determining if or when adaptive management strategies would be applied include:

- Were management objectives identified in Appendix A (part) achieved within the desired timeframes?
- If management objectives were not achieved:
    - Did unplanned circumstances cause non-attainment of the objectives (i.e., unauthorized or natural disturbance [ice scour, wildfire, flood event])?
    - If some of the objectives were achieved but not others, were the objectives met for the indicators driving the upward trend for steam recovery and bull trout habitat reached? Suggesting other management objectives need more time to develop but the rate of recovery is similar to reference DMAs.
    - Were the objectives achievable or appropriate? Provide flexibility of changing the numerical values or indicators for management objectives as time processes, more monitoring data becomes available and as future research improves the understanding of structure and function of riparian area.

Chapter 3 discloses the effects of implementing the specific adaptive management strategies proposed, so they can be implemented without additional analysis in the future.

Other Requirements

<u>Grazing Would be Based on AUMs; Permits Would be Based on Average Animal Use and Cow/Calf Pairs or Yearlings</u>

The action alternatives establish a maximum limit for animal unit months (AUMs) for each allotment. Alternatives propose livestock numbers (an average number of livestock) and the average season of use. Flexibility is maintained for annual adjustment of both numbers and/or season as long as the permitted use level (AUMs) is not exceeded. On an annual basis the actual livestock numbers and period of use may be adjusted in response to discussions with resource specialists and in response to resource needs, range readiness and monitoring. The grazing season beginning and ending dates could be varied by as much as two weeks (from the average season of use) allowing flexibility for differences in annual range readiness. Flexibility that allows for annual adjustments provides a management tool to assure that riparian and rangeland objectives are met.

Changes to numbers and season of use would be displayed in the Annual Operating Instructions (AOI). The permit would display the “average” number of livestock for the “average” season of use (Grazing Permit Administration Handbook 2209.13, Section 15.13; these dates and numbers may vary year by year in AOIs but when combined, would be equal to or less than the maximum permitted AUMs).

<u>Allotment Facilities are Maintained</u>

Permittees would be required to perform all annual maintenance of range improvements (i.e. fences and water developments) assigned in their permits. All fences would be functional before

animals are turned out into the unit to be used. Range improvements would be reconstructed as the need arises (i.e., end of life span).

Appropriate Administrative Actions Would Occur

Appropriate administrative actions would be taken when the permittee's management is not in compliance with the annual operating instructions (AOI). Consequences would occur (as described in FSH 2209.13, Section 16.21). Under the Terms and Conditions of the Forest Service Term Grazing Permit (Part2, number 8(b) and Part3) the Forest Officer in charge may modify the permitted number to protect resources. This is consistent with Forest Service Manual (FSM 2200).

Recent Changes in Current Management

Since completion of Proper Functioning Condition (PFC) assessments in 2007, several projects were authorized within the Logan Valley, McCoy Creek, and Summit Prairie Allotments to enhance livestock management and improve shade and hardwood communities associated with bull trout habitat on Big Creek and Lake Creek; and to provide aquatic restoration and improve livestock distribution along Summit and West Fork Summit Creeks. Projects include:

- Construction of riparian pasture fences on approximately 0.2 miles of Big Creek and 1.0 mile of Lake Creek. Riparian pasture fences are called West Bosenberg Riparian pasture and West Lake Creek Riparian pasture.
- Construction of riparian exclosure fences on approximately 0.7 miles of Lake Creek.
- Hardwood planting in riparian pastures and exclosures on Lake Creek and Big Creek.
- Development of solar water systems from Big Creek and Lake Creek to troughs located in the uplands.
- Reconstruction of 1.0 mile of division fence in the McCoy Creek allotment to control livestock movement.
- Fence construction to create a temporary livestock pasture called West Summit Recovery unit. Streambank protection with trees on West Fork Summit Creek.
- Construction of a buck and pole fence on 0.25 miles of Summit Creek. Existing willow cage replacement, enlargement, and removal on Summit Creek.
- Construction of upland stock ponds to provide functional upland water sources.

Decisions were signed in 2011 for all projects and are expected to be completed by 2013. These projects are considered as part of current management for all action alternatives (see Chapter 1, Current Management for more detail).

Alternatives 2 (Proposed Action)

Alternative 2 (Proposed Action) was developed to establish a grazing system that provides opportunities for rest and deferment (flexibility in season of grazing) in the Logan Valley and Summit Prairie allotments to recover important attributes of aquatic habitat including riparian vegetation and hardwoods, stream shade, and streambank stability. Portions of the vacant Lake Creek allotment would be added to the Logan Valley and Summit Prairie allotments, creating a larger landscape for grazing with no proposed increase in livestock numbers (AUMs). Adding additional acres to these allotments, combined with other grazing unit adjustments within the

allotments provides the flexibility to periodically rest entire grazing units or defer the season of grazing to restore riparian area conditions, while maintaining enough acres to be grazed annually to support a viable grazing operation.

Proposed allotment boundary and pasture adjustments in the McCoy Creek allotment establish a deferred rotation grazing system allowing flexibility to change the time of year when units would be used. Alternative 2 in combination with ongoing activities described in Chapter 1 (Current Management) was developed to address the purpose and need to improve resource conditions for aquatic habitat.

Management plans for each allotment are discussed in detail below and summarized in Table 2-34. See Appendix B (maps) showing allotment and unit configurations and proposed activities.

Lake Creek Allotment

Grazing System

Portions of this allotment would be added to the Logan Valley and Summit Prairie allotments. The remaining 5,069 acres would remain vacant in the McCoy Creek and Corral Basin units (see Table 2-1 below).

Table 2-1: Alternative 2, Proposed Lake Creek Allotment Units to Remain Vacant

Unit	Acres
McCoy Creek unit	2,639
*Corral Basin unit	2,430
Total	**5,069**

***Part of the existing Bosenberg Unit

Boundary Changes

Approximately 4,778 acres of the Lake Creek allotment would be absorbed into the adjacent Logan Valley and Summit Prairie allotments. Areas containing Lake Creek, Big Creek and Corral Basin Creek would remain vacant. Lake Creek and Big Creek contain occupied bull trout habitat.

The southwest corner of the McCoy Creek unit (349 acres) would be removed from the Lake Creek allotment. This area may be added to the Dollar Basin allotment in the future. A separate environmental analysis would be required to add this area to the Dollar Basin allotment.

Livestock numbers and Grazing Season

No livestock would be authorized on 5,069 acres of the allotment.

Table 2-2: Alternative 2, Lake Creek Allotment Summary

Allotment Name	Acres	Number of Livestock	AMU's	Season of Use	Grazing System
Lake Creek	5,069	0	0	Vacant	None

Improvements and Structures

The removal of the southwest corner of the McCoy Creek unit from the Lake Creek allotment would require the construction 2.5 miles of new fencing.

Adaptive Management

No adaptive management strategies are proposed.

Logan Valley Allotment

Grazing System

The Logan Valley Allotment would be managed with periods of rest or deferment during the season of use. Deferment and rest periods would be determined based on resource needs and would not be a systematic or scheduled rotation. The rest periods would vary from a period critical to plant development, full growing season or one forage crop (one year). Emphasis would be placed on resting units with aquatic habitat recovery needs. See Table 2-4 for minimum rest requirements.

Table 2-3: Alternative 2, Proposed Logan Valley Allotment Grazing Units

Unit	Acres
Big Creek Riparian pasture	623
Big Field unit	1,024
Corral holding unit	22
Deardorff unit	388
East Bosenberg unit	118
East Lake Creek unit	399
Flat Field unit	595
Lake Creek unit	218
Lower Field unit	283
West Bosenberg unit	269
West Bosenberg Riparian pasture	14
West Lake Creek unit	271
West Lake Creek Riparian pasture	135
Total	**4,359**

The following table shows the rest requirements for the grazing units in the Logan Valley allotment.

Table 2-4: Alternative 2, Logan Valley Allotment Minimum Rest Requirements

Unit	Required Rest
West Bosenberg Riparian pasture	Rest would occur for 3-5 years after the fence is constructed (estimated 2012) and willows are planted. Grazing would resume after management objectives have been achieved[6], with rest (season long rest) required 3 years out of a 10 year period after grazing is resumed. When grazing is resumed the move trigger and use levels in Appendix E would be applied.

[6] Management objective is defined as conditions that have resilient vegetation and stream channel characteristics capable of withstanding disturbance and moving towards the desired condition when grazing is resumed. Site specific management objectives by target time periods are shown in Appendix A (part 2). If it is determined through monitoring that management objectives are not being achieved through the actions prescribed, then the respective adaptive management strategy would be applied to accelerate recovery. Adaptive management strategies are shown in Appendix A (part 3).

Unit	Required Rest
West Lake Creek Riparian pasture	Rest would occur for 3-5 years after the fence is constructed (estimated 2012 or 2013) and willows are planted. Grazing would resume after willows have established, with rest (season long rest) required 3 years out of a 10 year period. When grazing is resumed the move trigger and use levels in Appendix E would be applied.
Big Creek Riparian pasture	Rest 3 years out of 10 year period (season long rest).

Boundary Changes

The Logan Valley allotment would increase from 3,756 acres to 4,359 acres. Approximately 655 acres from the Lake Creek and McCoy Creek allotments would be added to the Logan Valley allotment. Specific allotment and unit changes include:

- The Horse Pasture and a portion of the McCoy Creek unit of the Lake Creek allotment would be absorbed into the Logan Valley allotment (approximately 388 acres). This new unit is identified as the Deardorff unit.
- The Lake Creek and North Fork units of the McCoy Creek allotment would be absorbed into the Logan Valley allotment (approximately 267 acres). The Lake Creek unit would remain as an individual unit and North Fork unit would be absorbed into the Flat Field unit for better livestock distribution.

The Big Creek portion of the East Lake Creek, North Big Creek, and South Big Creek would be combined into a single large unit known as Big Creek Riparian pasture.

The Front Field unit (approximately 52 acres) would be removed from the Logan Valley allotment and absorbed into the Summit Prairie allotment.

Livestock numbers and Grazing Season

The permitted livestock number and grazing seasons would remain as currently permitted, distributed over the larger landscape provided by adding areas from the Lake Creek and McCoy allotments to the Logan Valley allotment.

Up to 357 head of cattle would be authorized for a season generally between June 10th and October 15th. Authorized use would not exceed 1,983 AUMs. Forage allowable use, move triggers and endpoint indicators are listed in Appendix E.

The Big Creek portion of the East Lake Creek, North Big Creek and South Big Creek units that would be combined into a single riparian pasture would require livestock removal by August 15th to protect bull trout spawning habitat in Big Creek.

Table 2-5: Alternative 2, Logan Valley Allotment Summary

Allotment Name	Acres	Number of Livestock	AMU's	Season of Use	Grazing System
Logan Valley	4,359	*357	1,983	06/10-10/15	Periods non-scheduled rest and deferment

* Cow/calf pairs or individual steers or heifers not to exceed AUMs.

Improvements and Structures

The North Fork unit of the McCoy Creek allotment would be absorbed into the Flat Field unit requiring removal of approximately 0.3 miles of fence.

Approximately 0.3 miles of electric fence in the North Fork unit would be converted to a permanent let-down fence to exclude livestock from a small section of Big Creek.

Absorbing a portion of the McCoy Creek unit along with the Horse Pasture from the Lake Creek allotment into the Logan Valley allotment would require 2.5 miles of additional fence and 0.8 miles of fence removal. The new unit would be identified as the Deardorff unit.

Combining the Big Creek Portion of the East Lake Creek, North Big Creek and South Big Creek units would require removal of 1.2 miles of fence.

Adaptive Management

Adaptive management strategies shown in Appendix A (part3) are summarized in Table 2-6 below.

Table 2-6: Alternative 2, Logan Valley Allotment Adaptive Management Strategies

Stream/Unit	Adaptive Management Strategy
Lake Creek/West Lake Creek Riparian pasture	Additional rest within riparian pasture
Big Creek/West Bosenberg Riparian pasture	Additional rest within riparian pasture
Big Creek/Big Creek Riparian pasture	Scheduled rest or additional rest
Big Field (Fen area)	Install fence around Fen area

McCoy Creek Allotment

Grazing System

A deferred rotation grazing system would be applied throughout the allotment. This system provides for a systematic rotation of deferment among units and provides flexibility to change the time of year when units would be used.

Table 2-7 below shows the grazing units and associated acres.

Table 2-7: Alternative 2, Proposed McCoy Creek Allotment Grazing Units

Unit	Acres
Cow Camp unit	157 (23 ac. excluded in riparian protection exclosures[7])
Ridge unit (Combed Ridge/Dry)	292
Gov't Flat unit	211
Total	**660**

[7] Includes Lake Creek and Lake Creek Willow Exclosures

Boundary Changes

The present allotment consisting of 980 acres would decrease to 660 acres. The Dry and Ridge units of the allotment would be combined into a single unit as currently managed and would be identified as the Ridge unit. The Lake Creek and North Fork units (267 acres) of the McCoy Creek allotment would be removed from the McCoy Creek allotment and absorbed into the Logan Valley allotment. Both units are isolated from the main body of the McCoy Creek allotment and would be more efficiently managed as part of the Logan Valley allotment.

The Starvation unit is a small (53 acres), isolated area not easily managed with McCoy Creek allotment. This unit would be removed from the McCoy Creek allotment and possibly added to the Dollar Basin allotment in the future. A separate environmental analysis would be required to add this area to the Dollar Basin allotment.

Livestock numbers and Grazing Season

The permitted livestock number and grazing seasons would remain as currently permitted.

Up to 63 head of cattle would be authorized for a season generally between June 1th and October 30th. Authorized use would not exceed 416 AUMs. Forage allowable use, move triggers, and endpoint indicators are listed in Appendix E.

Table 2-8: Alternative 2, McCoy Creek Allotment Summary

Allotment Name	Acres	Number of Livestock	AMU's	Season of Use	Grazing System
McCoy Creek	*660	**63	416	06/01-10/30	Deferred Rotation

* Cow/calf pairs or individual steers or heifers not to exceed AUMs.
** Although the allotment acres would decrease from approximately 980 acres to 660 acres the authorized head of cattle would remain as presently grazed. Grazing numbers would not change for the following reasons: 1) the Lake Creek, North Fork, and Starvation units are currently disconnected from the main body of the allotment and therefore are not often grazed; 2) The three grazing units (Cow Camp, Government Flat, and Ridge) remaining in the allotment are primarily upland areas reducing the potential for concentrations of livestock within the Lake Creek riparian area and bull trout habitat.

Improvements and Structures

The Dry and Ridge units would be combined into a single unit (as currently managed) requiring removal of 1 mile of fence. The combined units would be identified as the Ridge unit, providing better livestock distribution.

Adaptive Management

No additional adaptive management strategies are proposed.

Summit Prairie Allotment

Grazing System

The Summit Prairie allotment would be managed with periods of rest or deferment during seasons of use. Deferment and rest periods would be determined based on resource needs and would not be a systematic or scheduled rotation. The rest periods would vary from a period critical to plant development, full growing season or one forage crop (one year). Emphasis would be placed on resting units with aquatic habitat recovery needs. See Table 2-10 for minimum rest requirements.

Upon the completion of the boundary fences to incorporate the portion of the Bosenberg unit (4,449 acres) into the Summit Prairie allotment, the Sagehen unit would be rested 3 years out of the 10 year period. This would provide a period of non-use or rest to allow desired vegetation composition and stream channel characteristics to improve. Until completion of the new boundary fences, the Sagehen unit would continue to be grazed early season with reduced numbers.

Part of the Bosenberg Unit was burned in early 1990 wildfires. To allow continued recovery of Bosenberg Creek, specific monitoring criteria and stream bank alteration standards would be applied. See Chapter 2 (Monitoring) and Appendix E (Move Triggers and Allowable Use Levels).

Table 2-9 below shows the grazing units and associated acres.

Table 2-9: Alternative 2, Proposed Summit Prairie Allotment Grazing Units

Unit	Acres
Bosenberg unit	4,449
Crane Rock unit	7,838
Little Logan unit	3,270
North Summit unit	195
Sagehen unit	3,767
South Summit unit	45
Summit Rock unit	10,222
West Summit unit (holding unit/handing facility)	27
West Summit Recovery unit (temporary)	19
Total	**29,832**

The following table shows the rest requirements for the grazing units in the Summit Prairie Allotment.

Table 2-10: Alternative 2, Summit Prairie Allotment Minimum Rest Requirements

Unit	Required Rest
Sagehen	3 years out of 10 year period (season long rest).
West Summit Recovery unit (temporary fence)	Rest would occur for 3-5 years after the fence is constructed (estimated 2012). Grazing would resume after management objectives have been achieved with rest (season long rest) required 3 years out of a 10 year period after grazing is resumed. When grazing is resumed the move trigger and use levels in Appendix E would be applied.
Bosenberg	Rest 3 years out of 10 year period (season long rest).
Little Logan	Rest 3 years out of 10 year period (season long rest).

Note: Entire unit would be rested.

Boundary Changes

The present allotment consisting of 25,331 acres would increase to 29,832 acres. Changes to the allotment include the following:

- The Front Field unit (52 acres) from the Logan Valley allotment would be absorbed into the Little Logan unit to provide a larger unit for better livestock distribution.
- The Bosenberg unit (4,449 acres) from the vacant Lake Creek allotment would be added as a separate grazing unit.

Livestock numbers and Grazing Season

The permitted livestock number and grazing seasons would remain as currently permitted, distributed over the larger landscape provided by adding areas from the Lake Creek allotment to the Logan Valley allotment.

Up to 260 head of cattle would be authorized for a season generally between June 10th and October 24th. Authorized use would not exceed 1,546 AUMs. Forage allowable use, move triggers, and endpoint indicators are listed in Appendix E.

Since direct impacts to bull trout spawning is not likely to occur from livestock activities, livestock may use the North Summit Unit after August 15 (start of the bull trout spawning period).

Table 2-11: Alternative 2, Summit Prairie Allotment Summary

Allotment Name	Acres	Number of Livestock	AMU's	Season of Use	Grazing System
Summit Prairie	29,832	*260	1,546	06/10-10/24	Periods non-scheduled rest and deferment

* Cow/calf pairs or individual steers or heifers not to exceed AUMs.

Improvements and Structures

Approximately 0.7 miles of fence would be removed to absorb the Front Field unit (52 acres) from the Logan Valley allotment with the Little Logan unit.

Adding the Bosenberg unit (4,449 acres) from the Lake Creek allotment would require construction of approximately 7 miles of additional fence. Water gaps in the fence line would be located where Forest Service road 1648 crosses Bosenberg Creek and an unnamed tributary of Big Creek. Three ponds would be developed in the uplands to provide alternative water away from perennial streams. Ponds would be constructed in the far northeastern portion of the unit well above the headwaters of Bosenberg Creek and Corral Basin Creek. A spring would be developed off a headwater spring for Bosenberg Creek. The spring source would be fenced and water piped to a water trough located 300 feet from the spring. The spring is located approximately 1.5 miles from the junction of the Forest Service road 1648 and 1649. Water would also be piped from Bosenberg Creek to a trough located approximately 100 feet from the stream. The withdrawal site would be located approximately ½ mile from the junction of Forest Service road 1648 and 1649. To ensure adequate protection of all streams in the unit, riding in the Bosenberg unit would be required to maintain livestock concentrations in the uplands.

To alleviate current safety concerns on Forest Service Road 1647, a loading ramp with attached catch pen would be constructed in the uplands of the Sagehen unit near the private property boundary (T. 16 S. , R. 34 E., NE corner of Section 1). The loading ramp would be constructed with railroad timbers. The attached catch pen would be approximately 300 feet by 500 feet in size and constructed out of wood or wire material.

Adaptive Management

Adaptive management strategies shown in Appendix A (part 3) are summarized in Table 2-12 below.

Table 2-12: Alternative 2, Summit Prairie Allotment Adaptive Management Strategies

Stream/Unit	Adaptive Management Strategy
Bosenberg Creek/Bosenberg unit	Scheduled rest or additional rest
Summit Creek/Sagehen unit	Scheduled rest or additional rest
Summit Creek/Little Logan unit	Scheduled rest or additional rest
Summit Creek & West Fork Summit Creek/ Summit Rock unit	Change allowable use levels (see Appendix E)
Summit Creek/North Summit unit	Change allowable use levels (see Appendix E)
West Fork Summit Creek/West Summit Recovery unit	Additional rest within the Recovery unit

Alternatives 3

Alternative 3 was developed in response to the public's concern over bull trout critical habitat. All of the Lake Creek allotment would remain vacant in this alternative. The Lake Creek allotment contains all or portions of Lake Creek, Big Creek, Corral Basin Creek, and Bosenberg Creek which are designated critical habitat for bull trout.

In the Logan Valley, McCoy Creek, and Summit Prairie allotments, proposed move triggers and allowable use levels for herbaceous forage and shrub use, and bank alteration vary by pasture based on the existing condition of the specific riparian area, its resiliency to grazing effects and other disturbances, and the presence of critical bull trout habitat. See Appendix E for specific details.

Ongoing water developments in the Logan Valley allotment would provide opportunities to defer the season of grazing and a change to a deferred grazing system.

Proposed allotment boundary and pasture adjustments in the McCoy Creek allotment establish a deferred rotation grazing system allowing flexibility to change the time of year when units would be used. Ongoing activities described in Chapter 1 (Current Management) would construct fences that exclude grazing from most of the Lake Creek riparian area to recover hardwoods and stream shade.

Riparian pastures and exclosures would be constructed on Summit Creek in the Little Logan and Sagehen pastures. Riparian pastures would be rested for several years to accelerate recovery of riparian vegetation to enhance stream shade, riparian vegetation composition and vigor, and streambank stability.

Management plans for each allotment are discussed in detail below and summarized in Table 2-34. See Appendix B (maps) showing allotment and unit configurations and proposed activities.

Lake Creek Allotment

Grazing System

The allotment (Bosenberg, Horse Pasture and McCoy Creek units) would remain vacant with no authorized grazing in the three existing grazing units.

Table 2-13: Alternative 3, Proposed Lake Creek Allotment Units to Remain Vacant

Unit	Acres
Bosenberg unit	6,970
Horse Pasture unit	90
McCoy Creek unit	3,136
Total	**10,196**

Boundary Changes

The entire allotment would remain vacant with no change in the allotment boundary.

Livestock numbers and Grazing Season

No livestock would be authorized on the allotment.

Table 2-14: Alternative 3, Lake Creek Allotment Summary

Allotment Name	Acres	Number of Livestock	AMU's	Season of Use	Grazing System
Lake Creek	10,196	0	0	Vacant	None

Improvements and Structures

There are no proposed improvements or structures. Existing structures needed for other resource management such as existing aspen protection fences would continue to be maintained.

Adaptive Management

No adaptive management strategies are proposed.

Logan Valley Allotment

Grazing System

The grazing system would change to a deferred system with opportunities to defer the season of use.

Table 2-15: Alternative 3, Proposed Logan Valley Allotment Grazing Units

Unit	Acres
Big Creek Riparian pasture	623
Big Field unit	1,024
Corral holding unit	22
East Bosenberg unit	118
East Lake Creek unit	399
Flat Field unit	595

Unit	Acres
Lake Creek unit	218
Lower Field unit	283
West Bosenberg unit	269
West Bosenberg Riparian pasture	14
West Lake Creek unit	271
West Lake Creek Riparian pasture	135
Total	**3,971**

The following table shows the rest requirements for the grazing units in the Logan Valley allotment.

Table 2-16: Alternative 3, Logan Valley Allotment Minimum Rest Requirements

Unit	Required Rest
West Bosenberg Riparian pasture	Rest would occur for 3-5 years after the fence is constructed (estimated 2012) and willows are planted. Grazing would resume after management objectives have been achieved with rest (season long rest) required 3 years out of a 10 year period after grazing is resumed. When grazing is resumed the move trigger and use levels in Appendix E would be applied.
West Lake Creek Riparian pasture	Rest would occur for 3-5 years after the fence is constructed (estimated 2012) and willows are planted. Grazing would resume after management objectives have been achieved with rest (season long rest) required 3 years out of a 10 year period after grazing is resumed. When grazing is resumed the move trigger and use levels in Appendix E would be applied.

Boundary Changes

The Logan Valley allotment would increase from 3,756 acres to 3,971 acres. This change would allow for additional rest for this allotment.

The Front Field unit (approximately 52 acres) would be removed from the Logan Valley allotment and absorbed into the Summit Prairie allotment.

The Lake Creek and North Fork units of the McCoy Creek allotment would be absorbed into the into the Logan Valley allotment (approximately 267 acres). The Lake Creek unit would remain as an individual unit, while the North Fork unit would be absorbed into the Flat Field unit. The added acres would allow for additional rest within the Logan Valley allotment.

Livestock numbers and Grazing Season

The permitted livestock number and grazing seasons would remain as currently permitted.

Up to 357 head of cattle would be authorized for a season generally between June 10th and October 15th. Authorized use would not exceed 1,983 AUMs. Forage allowable use, move triggers and endpoint indicators are listed in Appendix E.

The Big Creek Portion of the East Lake Creek, North Big Creek and South Big Creek units that would be combined into a single riparian pasture that would require livestock removal by August 15th to protect bull trout spawning habitat in Big Creek.

Table 2-17: Alternative 3, Logan Allotment Summary

Allotment Name	Acres	Number of Livestock	AMU's	Season of Use	Grazing System
Logan Valley	3,971	*357	1,983	06/10-10/15	Deferred Rotation

***** Cow/calf pairs or individual steers or heifers not to exceed AUMs.

Improvements and Structures

The North Fork unit of the McCoy Creek allotment would be absorbed into the Flat Field unit, requiring the removal of approximately 0.3 miles of fence.

Approximately 0.3 miles of electric fence in the North Fork unit would be converted to a permanent let-down fence to exclude livestock from a small section of Big Creek.

The combining the Big Creek portion of the East Lake Creek, North Big Creek and South Big Creek units would require the removal of 1.2 miles of fence.

Adaptive Management

Adaptive management strategies shown in Appendix A (part3) are summarized in Table 2-18 below.

Table 2-18: Alternative 3, Logan Valley Allotment Adaptive Management Strategies

Stream/Unit	Adaptive Management Strategy
Lake Creek/West Lake Creek Riparian pasture	Additional rest within the riparian pasture
Big Creek/West Bosenberg Riparian pasture	Additional rest within the riparian pasture
Big Creek Riparian pasture	Change allowable use levels (see Appendix E)
Big Field (Fen area)	Install fence around Fen area

McCoy Creek Allotment

The grazing system, boundary changes, livestock numbers and grazing season, improvement and structures, and adaptive management strategies are the same as in Alternative 2.

Summit Prairie Allotment

Grazing System

The grazing system would not change from current management. Livestock would generally move from unit to unit with opportunities to defer the season of use. Riparian exclosures (with no grazing) and riparian pastures would be constructed along portions of Summit Creek. The riparian pastures would be rested as proposed in Table 2-20 below.

Table 2-19 below show the grazing units and associated acres.

Table 2-19: Alternative 3, Proposed Summit Prairie Allotment Grazing Units

Unit	Acres
Crane Rock Unit	7,838
Little Logan Unit	3,191
Lower Little Logan Riparian pasture	64
Upper Little Logan Riparian pasture	15
North Summit unit	108
North Summit Riparian pasture	87
Sagehen unit	3,730
Sagehen Riparian exclosure	8
Sagehen Riparian pasture	29
South Summit unit	45
Summit Rock unit	10,222
West Summit unit (holding unit/handing facility)	27
West Summit Recovery unit (temporary)	19
Total	**25,383**

The following table shows the rest requirements for the grazing units in the Summit Prairie allotment.

Table 2-20: Alternative 3, Summit Prairie Allotment Minimum Rest Requirements

Unit	Required Rest
Sagehen Riparian pasture	Rest would occur for 3-5 years after the fence is constructed (estimated 2012). Grazing would resume after management objectives have been achieved with rest (season long rest) required 3 years out of a 10 year period after grazing is resumed. When grazing is resumed the move trigger and use levels in Appendix E would be applied.
Upper and Lower Little Logan Riparian pastures	Rest would occur for 3-5 years after the fence is constructed (estimated 2012). Grazing would resume after management objectives have been achieved with rest (season long rest) required 3 years out of a 10 year period after grazing is resumed. When grazing is resumed the move trigger and use levels in Appendix E would be applied.
West Summit Recovery unit (temporary fence)	Rest would occur for 3-5 years after the fence is constructed (estimated 2012). Grazing would resume after management objectives have been achieved with rest (season long rest) required 3 years out of a 10 year period after grazing is resumed. When grazing is resumed the move trigger and use levels in Appendix E would be applied.
North Summit Riparian pasture	Rest would occur for 3-5 years after the fence is constructed (estimated 2012). Grazing would resume after management objectives have been achieved with rest (season long rest) required 3 years out of a 10 year period after grazing is resumed. When grazing is resumed the move trigger and use levels in Appendix E would be applied.

Note: Only the riparian pasture or recovery area would be rested.

Boundary Changes

The present allotment consisting of 25,331 acres would increase to 25,383 acres. Changes to the allotment include the following:

- The Front Field unit (52 acres) from the Logan Valley allotment would be absorbed into the Little Logan unit.

Riparian pastures or grazing exclosure would be constructed in the Sagehen, Little Logan and North Summit units allowing portions of Summit Creek to be rested. No grazing would occur within the exclosure.

Livestock numbers and Grazing Season

The permitted livestock number and grazing seasons would remain as currently permitted.

Up to 260 head of cattle would be authorized for a season generally between June 10th and October 24th. Authorized use would not exceed 1,546 AUMs. Forage allowable use, move triggers, and endpoint indicators are listed in Appendix E.

Table 2-21: Alternative 3, Summit Prairie Allotment Summary

Allotment Name	Acres	Number of Livestock	AMU's	Season of Use	Grazing System
Summit Prairie	25,383	*260	1,546	06/10-10/24	Deferred Rotation

* Cow/calf pairs or individual steers or heifers not to exceed AUMs.

Improvements and Structures

Approximately 0.7 miles of fence would be removed to absorb the Front Field unit (52 acres) from the Logan Valley allotment to the Little Logan unit.

Approximately 7.3 miles of fence would be constructed in the Little Logan unit to create the Lower Little Logan Riparian pasture fence (5.9 miles) and the Upper Little Logan Riparian pasture fence (1.4 miles) along Summit Creek.

Approximately 4.1 miles of fence would be constructed in the Sagehen unit to create the Sagehen Riparian exclosure fence (1.5 miles) and the Sagehen Riparian pasture (2.6 miles) fence containing Summit Creek.

Approximately 0.8 miles of fence would be constructed in the North Summit unit to create the North Summit Riparian pasture fence.

To alleviate current safety concerns on Forest Service Road 1647, a loading ramp with attached catch pen would be constructed in the uplands of the Sagehen unit near the private property boundary (T. 16 S. , R. 34 E., NE corner of Section 1). The loading ramp would be constructed with railroad timbers. The attached catch pen would be approximately 300 feet by 500 feet in size and constructed out of wood or wire material.

Adaptive Management

Adaptive management strategies shown in Appendix A (part 3) are summarized in Table 2-22.

Table 2-22: Alternative 3, Summit Prairie Allotment Adaptive Management Strategies

Stream/Unit	Adaptive Management Strategy
Summit Creek/Sagehen Riparian pasture	Change allowable use levels (see Appendix E)
Summit Creek/Sagehen unit (outside of Riparian pasture)	Change allowable use levels (see Appendix E)
Summit Creek/Little Logan unit	Additional rest within the Riparian pasture
Summit Creek/Lower Little Logan	Additional rest within the Riparian pasture
Summit Creek/Upper Little Logan	Additional rest within the Riparian pasture
Summit Creek & West Fork Summit Creek/ Summit Rock unit	Change allowable use levels (see Appendix E)
West Fork Summit Creek/West Summit Recovery unit	Additional rest within the Recovery unit
Summit Creek/North Summit Riparian pasture	Additionally rest within the riparian pasture

Alternatives 4

Alternative 4 was developed using public scoping comments and recommendations from Summit Prairie allotment grazing permittee.

Part of the vacant Lake Creek allotment would be added to the Logan Valley allotment. The portions of the Lake Creek allotment containing Lake Creek, Big Creek, Corral Basin Creek, and Bosenberg Creek (critical bull trout streams) would remain vacant.

In the Logan Valley, McCoy Creek, and Summit Prairie allotments, proposed move triggers and allowable use levels for herbaceous forage and shrub use, and bank alteration vary by pasture based on the existing condition of the specific riparian area, its resiliency to grazing effects and other disturbances, and the presence of critical bull trout habitat. See Appendix E for specific details.

Adding acres from the Lake Creek allotment to the Logan Valley allotment establishes a larger grazing landscape providing the flexibility to rest and defer (flexibility in season of grazing) grazing to recover important attributes of aquatic habitat, while maintaining enough acres to be grazed annually to support a viable grazing operation.

Proposed allotment boundary and pasture adjustments in the McCoy Creek allotment establish a deferred rotation grazing system allowing flexibility to change the time of year when units would be used. Alternative 4 in combination with ongoing activities described in Chapter 1 (Current Management) was developed to address the purpose and need to improve resource conditions for aquatic habitat. Ongoing activities would construct fences that exclude grazing from most of Lake Creek within the allotment.

Management changes are proposed in the Summit Prairie allotment to encourage recovery of riparian vegetation to enhance stream shade, riparian vegetation composition and vigor, and streambank stability. Daily riding by the permittee would be required when livestock are within the Sagehen and Little Logan units to move and distribute animals into the uplands away from Summit Creek. Small exclosures would be constructed and cages placed in the Sagehen and Little Logan units. A riparian pasture would be constructed from a portion of the Summit Rock and North Summit units containing portions of Summit Creek and West Fork Summit Creek.

Management plans for each allotment are discussed in detail below and summarized in Table 2-34. See Appendix B (maps) showing allotment and unit configurations and proposed activities.

Lake Creek Allotment

Grazing System

Portions of the allotment would be added to the Logan Valley allotment. The remaining 9,459 acres would remain vacant in the McCoy Creek and Bosenberg units.

Table 2-23: Alternative 4, Proposed Lake Creek Allotment Units to Remain Vacant

Unit	Acres
McCoy Creek unit	2,581
Bosenberg unit	6,878
Total	**9,459**

Boundary Changes

Approximately 388 acres of the Lake Creek allotment would be absorbed into the adjacent Logan Valley allotment. Areas containing Lake Creek, Big Creek, Corral Basin Creek and Bosenberg Creek would remain vacant. Lake Creek and Big Creek contain occupied bull trout habitat.

The southwest corner of the McCoy Creek unit (349 acres) would be removed from the Lake Creek allotment. This area may be added to the Dollar Basin allotment in the future. A separate environmental analysis would be required to add this area to the Dollar Basin allotment.

Livestock Numbers and Grazing Season

No livestock would be authorized on 9,459 acres of the allotment.

Table 2-24: Alternative 4, Lake Creek Allotment

Allotment Name	Acres	Number of Livestock	AMU's	Season of Use	Grazing System
Lake Creek	9,459	0	0	Vacant	None

Improvement and Structures

The removal of the southwest corner of the McCoy Creek unit from the Lake Creek allotment would require the construction 2.5 miles of new fencing.

Adaptive Management

No adaptive management strategies are proposed.

Logan Valley Allotment

Grazing System

The Logan Valley Allotment would be managed with periods of rest or deferment during the season of use. Deferment and rest periods would be determined based on resource needs and would not be a systematic or scheduled rotation. The rest periods would vary from a period critical to plant development, full growing season or one forage crop (one year). Emphasis would be placed on resting units with aquatic habitat recovery needs. See Table 2-26 for minimum rest requirements.

Table 2-25: Alternative 4, Proposed Logan Valley Grazing Units

Unit	Acres
Big Creek Riparian pasture	623
Big Field unit	1,024
Corral holding unit	22
Deardorff unit	388
East Bosenberg unit	118
East Lake Creek unit	399
Flat Field unit	595
Lake Creek unit	218
Lower Field unit	283
West Bosenberg unit	269
West Bosenberg Riparian pasture	14
West Lake Creek unit	271
West Lake Creek Riparian pasture	135
Total	**4,359**

The following table shows the rest requirements for the grazing units in the Logan Valley allotment.

Table 2-26: Alternative 4, Logan Valley Allotment Minimum Rest Requirements

Unit	Required Rest
West Bosenberg Riparian pasture	Rest would occur for 3-5 years after the fence is constructed (estimated 2012) and willows are planted. Grazing would resume after management objectives have been achieved with rest (season long rest) required 3 years out of a 10 year period after grazing is resumed. When grazing is resumed the move trigger and use levels in Appendix E would be applied.
West Lake Creek Riparian pasture	Rest would occur for 3-5 years after the fence is constructed (estimated 2012) and willows are planted. Grazing would resume after management objectives have been achieved with rest (season long rest) required 3 years out of a 10 year period after grazing is resumed. When grazing is resumed the move trigger and use levels in Appendix E would be applied.
Big Creek Riparian pasture	Rest 3 years out of 10 year period (season long rest).

Boundary Changes

The Logan Valley allotment would increase from existing 3,756 acres to 4,359 acres. Approximately 655 acres from the Lake Creek and McCoy Creek allotments would be added to the Logan Valley allotment. Specific allotment and unit changes include:

- The Horse Pasture and a portion of the McCoy Creek unit of the Lake Creek allotment would be absorbed into the Logan Valley allotment (approximately 388 acres). This new unit is identified as the Deardorff unit.
- The Lake Creek and North Fork units of the McCoy Creek allotment would be absorbed into the Logan Valley allotment (approximately 267 acres). The Lake Creek unit would remain as an individual unit and North Fork unit would be absorbed into the Flat Field unit for better livestock distribution.

The Big Creek portion of the East Lake Creek, North Big Creek, and South Big Creek would be combined into a single large unit known as Big Creek Riparian pasture.

The Front Field unit (approximately 52 acres) would be removed from the Logan Valley allotment and absorbed into the Summit Prairie allotment.

Livestock Numbers and Grazing Season

The permitted livestock number and grazing seasons would remain as currently permitted, distributed over the larger landscape provided by adding areas from the Lake Creek and McCoy allotments to the Logan Valley allotment.

Up to 357 head of cattle would be authorized for a season generally between June 10th and October 15th. Authorized use would not exceed 1,983 AUMs. Forage allowable use, move triggers and endpoint indicators are listed in Appendix E.

The Big Creek Portion of the East Lake Creek, North Big Creek and South Big Creek units that would be combined into a single riparian pasture that would require livestock removal by August 15th to protect bull trout spawning habitat in Big Creek.

Table 2-27: Alternative 4, Logan Valley Allotment Summary

Allotment Name	Acres	Number of Livestock	AMU's	Season of Use	Grazing System
Logan Valley	4,359	*357	1,983	06/10-10/15	Periods of deferment and non-scheduled rest

* Cow/calf pairs or individual steers or heifers not to exceed AUMs.

Improvement and Structures

The North Fork unit of the McCoy Creek allotment would be absorbed into the Flat Field unit requiring removal of approximately 0.3 miles of fence.

Absorbing a portion of the McCoy Creek unit along with the Horse Pasture from the Lake Creek allotment into the Logan Valley allotment would require 2.5 miles of additional fence and 0.8 miles of fence removal. The new unit would be identified as the Deardorff unit.

Combining the Big Creek Portion of the East Lake Creek, North Big Creek and South Big Creek units would require removal of 1.2 miles of fence.

Approximately 0.3 miles of electric fence in the North Fork unit would be converted from a permanent to a let-down fence to exclude livestock from a small section of Big Creek.

Adaptive Management

Table 2-28: Alternative 4, Logan Valley Allotment Adaptive Management Strategies

Stream/Unit	Adaptive Management Strategy
Lake Creek/West Lake Creek Riparian pasture	Additional rest within riparian pasture
Big Creek/West Bosenberg Riparian pasture	Additional rest within riparian pasture
Big Creek/Big Creek Riparian pasture	Scheduled rest or additional rest
Big Field (Fen area)	Install fence around Fen area

McCoy Creek Allotment

The grazing system, boundary changes, livestock numbers and grazing season, improvement and structures, and adaptive management strategies are the same as in Alternatives 2 and 3.

Summit Prairie Allotment

Grazing System

The grazing system would change to a deferred system with opportunities to defer the seaon of use. Riparian exclosures (with no grazing), willow cages and a riparian pasture would be constructed along portions of Summit Creek and West Fork Summit Creek. The riparian pasture would be rested as proposed in Table 2-30 below.

Daily riding by the permittee would ensure livestock stay in the uplands, reducing grazing use along Summit Creek in the Sagehen and Little Logan units during the season of use.

Table 2-29 below show the grazing units and associated acres.

Table 2-29: Alternative 4, Proposed Summit Prairie Allotment Grazing Units

Unit	Acres
Crane Rock Unit	7,838
Little Logan Unit	3,270
North Summit unit	143
Prairie Riparian pasture	126
Sagehen unit	3,767
South Summit unit	45
Summit Rock unit	10,148
West Summit unit (holding unit/handing facility)	27
West Summit Recovery unit (temporary)	19
Total	**25,383**

The following table shows the rest and season of use requirements for the grazing units in the Summit Prairie allotment.

Table 2-30: Alternative 4, Summit Prairie Allotment Minimum Rest Requirements

Unit	Required Rest
Prairie Riparian pasture	A deferred rest grazing system would be applied. The riparian pasture would be grazed early season one year and late season the following year.
West Summit Recovery Unit (temporary fence)	Rest would occur for 3-5 years after the fence is constructed (estimated 2012). Grazing would resume after management objectives have been achieved. When grazing is resumed, the area within the recovery unit would be grazed as part of the Prairie Riparian pasture utilizing the same use levels and use triggers (see Appendix E).

Boundary Changes

The Front Field unit (approximately 52 acres) from the Logan Valley allotment would be absorbed into the Little Logan unit.

The total acres in the allotment would increase from 25,331 to approximately 25,383 acres. A riparian pasture named Prairie Riparian pasture would be constructed from a portion of the Summit Rock and North Summit units containing portions of Summit Creek and West Fork Summit Creek.

Livestock numbers and Grazing Season

The permitted livestock number and grazing seasons would remain as currently permitted.

Up to 260 head of cattle would be authorized for a season generally between June 10th and October 24th. Authorized use would not exceed 1,546 AUMs. Forage allowable use, move triggers, and endpoint indicators are listed in Appendix E.

Table 2-31: Alternative 4, Summit Prairie Allotment Summary

Allotment Name	Acres	Number of Livestock	AMU's	Season of Use	Grazing System
Summit Prairie	25,383	*260	1,546	06/10-10/24	Deferred Rotation

* Cow/calf pairs or individual steers or heifers not to exceed AUMs.

Improvements and Structures

Approximately 0.7 miles of fence would be removed to absorb the Front Field unit (52 acres) from the Logan Valley allotment to the Little Logan unit.

Small exclosures (combination of buck and pole, and wire) and cages would be constructed along approximately 10% of the total riparian length along Summit Creek within the Little Logan and Sagehen units. Exclosures and cages would be located in areas with the highest potential for willow development (as identified by the Carex Working Group).

The Prairie Riparian pasture would absorb 86 acres from the North Summit unit and 311 acres of the Summit Rock unit. Approximately 3.1 miles of fence would be constructed to create a riparian pasture.

To alleviate current safety concerns on Forest Service Road 1647, a loading ramp with attached catch pen would be constructed in the uplands of the Sagehen unit near the private property

boundary (T. 16 S. , R. 34 E., NE corner of Section 1). The loading ramp would be constructed with railroad timbers. The attached catch pen would be approximately 300 feet by 500 feet in size and constructed out of wood or wire material.

Adaptive Management

Adaptive management strategies shown in Appendix A (part 3) are summarized in Table 2-32 below.

Table 2-32 Alternative 4, Summit Prairie Allotment Adaptive Management Strategies

Stream/Unit	Adaptive Management Strategy
Summit Creek/ Prairie Riparian pasture	Rest riparian pasture
Summit Creek/Sagehen unit	Change allowable use levels (see Appendix E)
Summit Creek/Little Logan unit	Change allowable use levels (see Appendix E)
West Fork Summit Creek/West Summit Recovery unit	Additional rest within the recovery unit
Summit Creek/Little Logan unit	Construct exclosure around a higher percentage of the area
Summit Creek/Sagehen unit	Construct exclosure around a higher percentage of the area

Consistency with Forest Plan Standards and Guidelines, as Amended

Alternatives 2, 3, and 4 propose amendments to the Malheur Land and Resource Management Plan as amended by Amendment #29. Specifically, the numeric value for shade in hardwood/meadow complexes from Forest Plan Amendment #29 would be modified for site specific stream reaches.

The proposed percent shade values developed for hardwood/meadow complexes within the Summit Logan allotments are based on work by the Carex Working Group (2012) and the Malheur River Basin Total Maximum Daily Load (TMDL) and Water Quality Management Plan completed by State of Oregon Department of Environmental Quality (2010). Work carried out by the Carex Working Group involved estimating the expected (and perhaps maximum) level of streamside shade (height and density) that could be attained from willows, sedges, and other hardwoods under near-natural rates of recovery at two time scales: (a) five years, and (b) twenty years from all stream reaches on Summit Creek. To determine the historic range of variability of the various reaches of Summit Creek the Carex Working Group considered the habitat characteristics of each reach, the habitats occupied by mature willow thickets, alder thickets, and sedge meadows on the reference sites, and similar plant communities we have observed elsewhere in Grant and Harney Counties (Carex Working Group 2010, 2011a, and 2011b).

The stream reaches where modifications are proposed to Amendment #29 Numeric Values are shown in Table 2-33. Potential values for shade in the TMDL were derived using Ecoregion Based Effective Shade Curves if reference data was not available. These effective shade curves are general heat load allocations that are identified by region and channel width for various riparian plant communities. The given values represent the maximum possible effective shade if the potential height and density are present. The curves account for latitude, critical summertime period and stream aspect. The Carex Working Group only collected reference data for alder and/or willow riparian plant communities. As a result, the Native Floodplain Grasses effective shade curve was used from the TMDL.

Table 2-33 Proposed Modifications to the Malheur Land and Resource Management Plan

Stream/ Reach	Amendment #29 Numeric Value to be Modified				Proposed Modification and Reference Source
	Forest Plan Source	Amendment #29 Element	Location	Specific Value	
Summit Creek Reach 1	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/Meadow Complex 80% shaded	Shade 65% or greater (TMDL 2010)
Summit Creek Reach 2	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/Meadow Complex 80% shaded	Shade ≥60% in areas with hardwoods (CWG 2012) or ≥25% in areas with native floodplain grasses (TMDL 2010)
Summit Creek Reach 4	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/Meadow Complex 80% shaded	Shade ≥60% in areas with hardwoods (CWG 2012) or ≥25% in areas with native floodplain grasses (TMDL 2010)
Summit Creek Reach 5	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/Meadow Complex 80% shaded	Increase hardwood shade component; shade ≥ 60% (CWG 2012)
Summit Creek Reach 6	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded	≥ 25% for native floodplain grasses (TMDL 2010)
Summit Creek Reach 7	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded	Increase hardwood shade component; shade ≥ 80% for alder-dominated areas (Amendment #29), ≥ 60% for mixed shrub areas (Carex Working Group 2012), or ≥ 25% in areas with native floodplain grasses (TMDL 2010).
West Fork Summit Creek Reach 1	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded	≥ 25% for native floodplain grasses (TMDL 2010).
West Fork Summit Creek Reach 2	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded	Increase hardwood shade component; shade ≥ 80% for alder-dominated areas (Amendment #29), ≥ 60% for mixed shrub areas (CWG 2012), or ≥ 25% for

Stream/ Reach	Amendment #29 Numeric Value to be Modified				Proposed Modification and Reference Source
	Forest Plan Source	Amendment #29 Element	Location	Specific Value	
					native floodplain grasses (TMDL 2010).
Lake Creek Reach 1	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded	Increase hardwood shade component; shade ≥ 60% in hardwood areas (CWG 2012) or ≥ 25% in areas with native floodplain grasses (TMDL 20 10).
Lake Creek Reach 2	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded	Increased hardwood shade component: shade ≥ 60% (Carex Working Group 2012) or ≥ 25% for native floodplain grasses (TMDL 2010).
Lake Creek Reach 3	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded	Shade 60-80% in mixed shrub and conifer (Carex Working Group 2012) or ≥ 25% for native floodplain grasses (TMDL 2010).
Lake Creek (no PFC assessment)	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded	Shade 60-80% in mixed shrub (Carex Working Group 2012) or ≥ 25% for native floodplain grasses (TMDL 2010).
Big Creek (no PFC assessment, south side of FS rd 16 for 0.15 miles)	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	b) Mixed Conifer species d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded 50-65% canopy closure	Shade 60-80% in mixed shrub (Carex Working Group 2012) or ≥ 25% for native floodplain grasses (TMDL 2010).
Big Creek Reach 1	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	b) Mixed Conifer species d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded 50-65% canopy closure	Shade 60-80% in mixed shrub and conifer (Carex Working Group 2012) or ≥ 25% for native floodplain grasses (TMDL 2010).
Big Creek Reach 2	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	b) Mixed Conifer species d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded 50-65% canopy closure	Shade 60-80% in mixed shrub and conifer (Carex Working Group 2012) or ≥ 25% for native floodplain grasses (TMDL 2010).
Big Creek Reach 3	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	b) Mixed Conifer species d) Hardwood/ Meadow Complex	Hardwood/meadow complex 80% shaded 50-65% canopy closure	Shade 60-80% in mixed shrub and conifer (Carex Working Group 2012).
Bosenberg Creek	Amendment #29	D. Riparian Vegetation: 4) Shade/Canopy Closure	b) Mixed Conifer species	Hardwood/meadow complex 80% shaded	Shade 60-80% in mixed shrub (CWG 2012) or ≥ 25% for native floodplain grasses (TMDL 2010).

Summary of Alternatives

Table 2-34: Summary of Alternatives 2, 3, and 4

		Alternative 2	Alternative 3	Alternative 4
Lake Creek Allotment	**Grazing System**	Portion of this allotment would be added to the Logan Valley and Summit Prairie allotments. The remaining 5,069 acres would remain vacant.	Allotment would remain vacant.	Portions of this allotment would be added to the Logan Valley allotment. 9,459 acres would remain vacant.
	Boundary Changes	4,778 acres would be would be absorbed into the adjacent Logan Valley and Summit Prairie allotments. The southwest corner of McCoy Creek (349 acres) would be removed from the Lake Creek allotment.	No change in allotment boundary. Boundary would remain as approximately 10,196 acres.	Approximately 388 acres of the allotment would be absorbed into the Logan Valley allotment. The southwest corner of McCoy Creek (349 acres) would be removed from the Lake Creek allotment.
	Unit and Acres (all units would remain vacant)	McCoy Creek unit: 2,639 acres Corral Basin unit: 2,430 acres	Bosenberg unit: 6,970 acres Horse Pasture unit: 90 acres McCoy Creek unit: 3,136 acres	McCoy Creek unit: 2,581 acres Bosenberg unit: 6,878 acres
	Livestock numbers and Grazing	0 Head of Cattle 0 AUMs No Season of Use	See Alternative 2 for details.	See Alternative 2 for details.
	Improvements and Structures	2.5 miles of fence construction to remove the southwest corner of the McCoy Creek unit from this allotment.	No improvements or structures are proposed.	See Alternative 2 for details.

		Alternative 2	Alternative 3	Alternative 4
Logan Valley Allotment	**Grazing System**	This allotment would be managed with periods of rest of deferment during the season of use. Rest or deferment would be determined based on resource needs.	The grazing system would change to a deferred system with opportunities to defer the seaon of use.	See Alternative 2 for detail.
	Boundary Changes	The Big Creek Portion of the East Lake Creek, North Big Creek and South Big Creek would be combined into a single large unit (Big Creek Riparian pasture). The Front Field unit (approximately 52 acres) would be removed from this allotment. Approximately 655 acres from the Lake Creek and McCoy allotments would be added to the Logan Valley allotment:	Alternative 3 would include the same boundary changes as described in Alternative 2, expect Alternative 2 would not create the Deardorff unit (excluding 388 acres from this alternative). The allotment size would be approximately 3,971 acres.	See Alternative 2 for details.

L o		Alternative 2	Alternative 3	Alternative 4
		▪ Horse Pasture and a portion of McCoy Creek unit of the Lake Creek allotment (388 acres). New unit identified as Deardorff unit. ▪ Lake Creek and North Fork units of the McCoy Creek allotment would be absorbed into Logan Valley allotment (267 acres). The Lake Creek unit would remain as an individual unit while the North Fork unit would be absorbed in to the Flat Field unit. The allotment size would be approximately 4,359 acres.		
	Unit and Acres	Big Creek Riparian pasture: 623 acres Big Field unit: 1,024 acres Corral Holding unit : 22 acres Deardorff unit: 388 acres East Bosenberg unit: 118 acres East Lake Creek unit: 399 acres Flat Field unit: 595 acres Lake Creek unit: 218 acres Lower Field unit: 283 acres West Bosenberg unit: 269 acres West Bosenberg Riparian Pasture: 14 acres West Lake Creek unit: 271 acres West Lake Creek Riparian Pasture: 135 acres	Acres for this alternative are the same as Alternative 2, excluding the Deardorff unit and acres.	See Alternative 2 for details.
	Livestock numbers and Grazing	357 Head of Cattle 1,983 AUMs June 10th to October 15th	See Alternative 2 for details.	See Alternative 2 for details.
	Improvements and Structures	Absorbing the North Fork unit of the McCoy Creek allotment into the Flat Field would require removal of 0.3 miles of fence. Approximately 0.3 miles of electric fence in the North Fork unit along Big Creek converted to a permanent let-down fence.	Alternative 3 would include all of the improvements and structures as described in Alternative 2 except the creation of the Deardorff unit.	See Alternative 2 for details.

L o		Alternative 2	Alternative 3	Alternative 4
		Absorbing a portion of the McCoy Creek unit along with the Horse Pasture from the Lake Creek allotment creating the Deardorff unit (2.5 miles of additional fence and 0.8 miles of fence removal). Combining the Big Creek Portion of the East Lake Creek, North Big Creek and South Big Creek units would require removal of 1.2 miles of fence.		

		Alternative 2	Alternative 3	Alternative 4
McCoy Creek Allotment	**Grazing System**	A deferred rotation grazing system would be applied throughout the allotment.	See Alternative 2 for details.	See Alternative 2 for details.
	Boundary Changes	The present allotment consisting of 980 aces would decrease to 660 acres. The Dry and Ridge units would be combined into a single unit (called Ridge unit) as currently managed. The Lake Creek and North Fork units (267 acres) would be absorbed into the Logan Valley allotment. The Starvation unit (53 acres) would be removed from the Lake Creek allotment.	See Alternative 2 for details.	See Alternative 2 for details.
	Unit and Acres	Cow Camp unit: 157 acres (23 acres excluded in riparian protection exclosure) Ridge unit: 292 acres Gov't Flat unit: 211 acres	See Alternative 2 for details.	See Alternative 2 for details.
	Livestock numbers and Grazing	63 head of Cattle 416 AUMs June 1st to October 30th	See Alternative 2 for details.	See Alternative 2 for details.
	Improvements and Structures	Combining the Dry and Ridge units would require 1 mile of fence removal.	See Alternative 2 for details.	See Alternative 2 for details.

		Alternative 2	Alternative 3	Alternative 4
Summit Prairie Allotment	**Grazing System**	This allotment would be managed with periods of rest or deferment during the season of use. Rest or deferment would be determined based on resource needs.	The grazing system would change to a deferred system with opportunities to defer the seaon of use.	The grazing system would mirror Alternative 3. Additionally, daily riding by the permittee to ensure livestock stay in the uplands in the Sagehen and Little Logan units.
	Boundary Changes	The total allotment acres would be increased to approximately 29,832 acres: ▪ The Front Field unit (52 acres) from the Logan Valley allotment would be absorbed into the Little Logan unit. ▪ The Bosenberg unit (4,449 acres) from the vacant Lake Creek allotment would be added as a separate grazing unit.	The total allotment acres would be increased to approximately 25,383 acres: ▪ The Front Field unit (52 acres) from the Logan Valley allotment would be absorbed into the Little Logan unit.	See Alternative 3 for details.
	Unit and Acres	Bosenberg unit: 4,449 acres Crane Rock unit: 7,838 acres Little Logan unit: 3,270 acres North Summit unit: 195 acres Sagehen unit: 3,767 acres South Summit unit: 45 acres Summit Rock unit: 10,222 acres West Summit unit: 27 acres (holding unit/handling facility) West Summit Recovery unit: 19 acres	Crane Rock unit: 7,838 acres Little Logan unit: 3,191 acres Lower Little Logan Riparian pasture: 64 acres Upper Little Logan Riparian pasture: 15 acres North Summit unit: 108 acres North Summit Riparian pasture: 87 acres Sagehen unit: 3,730 acres Sagehen Riparian exclosure: 8 acres Sagehen Riparian pasture: 29 acres South Summit unit: 45 acres Summit Rock unit: 10,222 acres West Summit unit: 27 acres (holding/handling facility) West Summit Recovery unit: 19 acres	Crane Rock unit: 7,838 acres Little Logan unit: 3,270 acres North Summit unit: 143 acres Prairie Riparian pasture: 126 acres Sagehen unit: 3,767 acres South Summit unit: 45 acres Summit Rock unit: 10,148 acres West Summit unit: 27 acres (holding/handling facility) West Summit Recovery unit: 19 acres
	Livestock numbers and Grazing	260 head of Cattle 1,546 AUMs June 10th to October 24th	See Alternative 2 for details.	See Alternative 2 for details.
	Improvements and Structures	Removal of approximately 0.7 miles of fence to absorb the Front Field from the Logan Valley allotment to the Little Logan unit. Adding the Bosenberg unit would require construction	Removal of approximately 0.7 miles of fence to absorb the Front Field from the Logan Valley allotment to the Little Logan unit. Approximately 7.3 miles of fence constructed to create	Removal of approximately 0.7 miles of fence to absorb the Front Field from the Logan Valley allotment to the Little Logan unit. Small exclosures

		Alternative 2	Alternative 3	Alternative 4
		of 7 miles of fence. Three upland ponds would be developed. A spring would be developed off a headwater spring for Bosenberg Creek. A loading ramp with attached catch pen would be constructed in the Sagehen unit near the private property boundary.	Lower Little Logan and Upper Little Logan Riparian pastures in Little Logan unit. Approximately 4.1 miles of fence construction to create the Sagehen Riparian exclosure and the Sagehen Riparian pasture in Sagehen unit. Approximately 0.8 miles of fence construction in North Summit unit to create North Summit Riparian pasture. A loading ramp with attached catch pen would be constructed in the Sagehen unit near the private property boundary.	(combination of buck and pole, and wire) and cages would be constructed along approximately 10% of the total riparian length along Summit Creek within the Little Logan and Sagehen units. Exclosures and cages would be located in areas with the highest potential for willow development. Approximately 3.1 miles of fence would be constructed to create the Prairie Riparian pasture along Summit and West Fork Summit Creeks. The new pasture would absorb 86 acres from the North Summit unit and 311 acres from the Summit Rock unit. A loading ramp with attached catch pen would be constructed in the Sagehen unit near the private property boundary.

Design Criteria and Resource Protection Measures

The Forest Service developed the following additional design criteria to be used as part of the alternatives.

Design Criteria for Alternative 1 (No Grazing)

- All equipment used to remove fences and water developments would be cleaned in a manner sufficient to prevent noxious weeds from being carried onto the analysis area. Cleaning would occur off of National Forest System lands. Cleaning would be inspected and approved by the Forest Officer in charge of administering the project.
- Any restoration of disturbed sites would follow the Malheur Native See Policy. Any seed used in restoration would be certified weed free.

Design Criteria for Alternative 2, 3 and 4

Throughout the project, all applicable Watershed Management and Vegetative Management Best Management Practices (BMPs) (General Water Quality Best Management Practices, Pacific Northwest Region 2011) would be used to enable the achievement of water quality standards.

Table 2-35: Design Criteria (Alternatives 2, 3, and 4)

Objective	Design Criteria	Alternative	Responsible Person
To avoid	Place salt blocks outside of conifer where the	2,3,4	Range

Objective	Design Criteria	Alternative	Responsible Person
damaging regeneration	trees are less than 6' high. Salt blocks would not be placed in aspen stands or aspen plantations.		Management Specialist, Silviculturist
To avoid over utilization of hardwoods	Reference to Use Level Table (Appendix E)	2,3,4	Range Specialist
Protect Water Quality	Livestock would be herded when moving to a new unit on or off the Forest. Drift movement (e.g., simply opening a gate and allowing stock to move of their own accord) would not be allowed.	2,3,4	Range Specialist, Hydrologist, or Fish Biologist
	Throughout the project, all applicable Watershed Management and Vegetative Management Best Management Practices (Nonpoint Source Pollution Control for Water Quality Management on National Forest System Lands, 2011) would be used to facilitate the achievement of water quality standards, including: ▪ RM-1: Rangeland Management Planning ▪ RM-2: Rangeland Permit Administration ▪ RM-3: Rangeland Improvements	2,3,4	Range Specialist, Hydrologist, Fish Biologist
Reduce Impacts to Riparian Areas and Spring Developments	Avoid impacting vegetation and creating wheel tracks in wet meadows or riparian areas. Time project implementation when sites and access are dry is preferred. Alternately, access routes would be designated to cross areas of higher and drier ground. Any impact to vegetation would be rehabilitated after project implementation to remove visible wheel tracks (to avoid encouraging additional use by the general public).	2,3,4	Rangeland Specialist, Wildlife Biologist
	Water source must be fenced if wet or boggy	2,3,4	Range Specialist, Hydrologist, Fish Biologist
	Do not place water troughs in draw bottoms or ephemeral channels.	2,3,4	Range Specialist, Hydrologist, Fish Biologist
	Bosenberg unit (spring developments): developed spring source would be fenced and water piped to troughs located a minimum of 300 feet from the spring. Bosenberg unit (Bosenberg Creek): The trough from the developed water source that withdraws	2	Range Specialist, Hydrologist, Fish Biologist

Objective	Design Criteria	Alternative	Responsible Person
	water from the stream channel would be located at a minimum of 100 feet away from the channel. Trailing along changes associated with springs should be avoided.		
	Water not utilized shall be returned to the existing draw or channel with the appropriate slope in order to prevent cutting of the channel banks.	2,3,4	Range Specialist, Hydrologist, Fish Biologist
	Trench excavation for pipe shall be buried in a manner that does not impede overland flow of water nor concentrate/capture overland flow on hill slopes. Trech excavation area would be re-vegetated using natural grass seed.	2,3,4	Range Specialist, Hydrologist, Fish Biologist
	For channel protection trees larger then 21 inches in diameter would not be cut.	2,3,4	Range Specialist, Hydrologist, Fish Biologist
	Where available in forested areas, retain effective shade of water developments and associated channels at >50%.	2,3,4	Range Specialist, Hydrologist, Fish Biologist
	Use suitable measures to protect the spring when preparing the site for construction or maintenance activities. ▪ Locate access and staging areas near the project site but outside of work area boundaries, streamside management zones, wetlands and sensitive soil areas. ▪ Refuel and service equipment only in designated staging areas ▪ Consider using small, low ground pressure equipment and/or hand labor where practicable. ▪ Ensure all equipment operated in or adjacent to the waterbody is clean of aquatic invasive species as well as oil and grease.	2,3,4	Range Specialist, Hydrologist, Fish Biologist
	Use suitable measures to protect the waterbody when clearing the site. ▪ Clearly delineate the geographic limits of the area to be cleared. ▪ Use suitable drainage measures to improve the workability of wet sites. ▪ Avoid or minimize unacceptable damage to existing vegetation, especially plants that are stabilizing the spring.	2,3,4	Range Specialist, Hydrologist, Fish Biologist

Objective	Design Criteria	Alternative	Responsible Person
	Use suitable measures to avoid or minimize impacts to the waterbody when implementing construction and maintenance activities. ▪ Minimize heavy equipment entry into or crossing water as is practicable. ▪ Conduct operations during dry periods. ▪ Promptly rehabilitate or stabilize disturbed areas as needed following construction or maintenance activities. ▪ Stockpile topsoil for reuse in site re-vegetation. ▪ Properly compact fills to avoid or minimize erosion. ▪ Contour site to disperse runoff, minimize erosion, stabilize slopes and provide a favorable environment for plant growth. ▪ Use suitable species and establishment techniques to re-vegetate the site in compliance with local direction and requirements per FSM 2070 and FSM 2080 for vegetation ecology and prevention and control of invasive species.	2,3,4	Range Specialist, Hydrologist, Fish Biologist
	Head boxes would be excavated by shovel and hand tools or small low ground pressure excavator.	2,3,4	Range Specialist, Hydrologist, Fish Biologist
	All troughs will have a float to conserve water and will be turned off when the pasture is not in use.	2	Range Specialist, Hydrologist, Fish Biologist
Protect Wildlife	To avoid disturbance or potential trampling of nesting upland sandpipers, delay grazing Big Field pasture (upland sandpiper nesting area) until late season (August 1). To negotiate early season grazing of this pasture, monitoring would be required for upland sandpiper presence in May and June. If upland sandpipers are documented in any given year, turn-out in affected pastures would be postponed to avoid impacts to nesting sandpipers during critical breeding and nesting periods. Avoid grazing Big Field and Flat Field at the same time; upland sandpipers may use areas north and south of the FS 16 road.	2,3,4	Rangeland Specialist, Wildlife Biologist
	Retain wildlife snags (dead trees) at levels to provide for 100% population levels of primary	2,3,4	Rangeland Specialist,

Objective	Design Criteria	Alternative	Responsible Person
	cavity excavators. Avoid as much as possible layout of new fencelines through snag patches or near large snags (12 inch dbh or greater).		Wildlife Biologist
	If active nests (raptors, sensitive species, sandhill cranes) are discovered during project implementation (fence construction, construction of water developments, etc.), the District wildlife biologist would be consulted to determine appropriate buffers or timing restrictions, if necessary, to minimize disturbance for nesting birds.	2,3,4	Rangeland Specialist, Wildlife Biologist
	Chainsaw or large equipment use (for fence construction, spring/pond development, etc) within ½ mile of occupied goshawk nest sites within or adjacent to the project area are prohibited between April 1-September 30. Management activities are prohibited at all times within occupied nest stands. Exceptions to this element would require clearance from District Wildlife Biologist and Ranger.	2,3,4	Rangeland Specialist, Wildlife Biologist
	Chainsaw or large equipment use (for fence construction, spring/pond development, etc) within 666 feet of occupied raptor nest sites (including osprey and eagles) within or adjacent to the project area are prohibited between April 1-September 30. Management activities are prohibited within 100 feet of occupied nest tree. Exceptions to this element would require clearance from District Wildlife Biologist and Ranger.	2,3,4	Rangeland Specialist, Wildlife Biologist
	In known calving/fawning areas, off-road vehicle use is restricted from May 1 through June 31 (LRMP 36, IV-29). Most of these animals readily move and avoid areas of human activity. However, if newborn fawns (antelope, mule deer) or elk calves are observed, the area should be avoided, allowing the mothers to move the young away from the project.	2,3,4	Rangeland Specialist, Wildlife Biologist
	Four-wire fence construction would consist of smooth wire on the lower wire, to facilitate fawn movement. Lower wire height would be a minimum of 16 inches above the ground. Maximum height of the topmost wire would be 42 inches. Spacing between top wire and next wire down would be a minimum of 10 inches to avoid catching back legs (between the two wires) of animals jumping the fence (ODFW, 2011).See handbook “A Landowner’s Guide to	2,3,4	Rangeland Specialist, Wildlife Biologist

Objective	Design Criteria	Alternative	Responsible Person
	Wildlife Friendly Fences" (Paige 2008) for additional recommendations for increasing fence visibility to reduce impacts to big game as well as raptors, bats, and neotropical songbirds.		
	Minimize impacts to riparian vegetation by placing fences on higher ground outside of the active floodplain, except where crossing are necessary for designed water gaps.	2,3,4	Rangeland Specialist, Wildlife Biologist
	To protect amphibians: Avoid early season pond clean-out or resealing, to reduce impact to egg masses or tadpoles.	2,3,4	Rangeland Specialist, Wildlife Biologist
	Wildlife escape ramps**:** Expanded metal ramps would be installed to provide a means of escape for birds and small mammals that may fall into the trough when seeking water. (See "Water for Wildlife" handbook for examples of effective placement and design of escape ramps.	2,3,4	Rangeland Specialist, Wildlife Biologist
Protect NRHP eligible and potentially eligible sites from significant grazing related impacts	If site inspection indicates a need for mitigation measures at any archaeological or historic sites these would be developed in consultation with the Oregon State Historic Preservation Office (SHPO) and would be tailored to the specific conditions at each site.	2,3,4	District Archaeologist, Range Specialist
	Cultural sites identified in the project report that were not monitored during this project would be placed on a monitoring schedule to be visited in the future.	2,3,4	District Archaeologist, Range Specialist
	If cultural resources are located during implementation of the alternatives, work would be halted and the District Archaeologist would be notified. The cultural resource would be evaluated and a mitigation plan would be developed in consultation with Oregon SHIP, if necessary.	2,3,4	District Archaeologist, Range Specialist
	Salt blocks would not be located on archeological and historic sites. Site specific salting areas would be established for each grazing unit.	2,3,4	District Archaeologist, Range Specialist
	For proposed range improvement projects, clearances under Section 106 of the National Historic Preservation Act would be completed and concurred with as needed by the Oregon State Historic Preservation Office before the projects are implemented.	2,3,4	District Archaeologist, Range Specialist
To maintain visual quality	Move prolonged congregation of livestock at the junction of Forest Service roads 1600-815	2,3,4	Range Specialist,

Objective	Design Criteria	Alternative	Responsible Person
along the visual corridor	and 1600 (visual corridor).		Recreation Specialist
	Watering troughs would be built with natural colored materials to blend with the surrounding landscape if visible from Forest Service road 1600 (visual corridor).	2,3,4	Range Specialist, Recreation Specialist
	Structures such as fences would be constructed with materials that would blend with the existing landscape where they can be seen from Forest Road 1600 (visual corridor).	2,3,4	Range Specialist, Recreation Specialist
To reduce the risk of introducing noxious weeds	Any gravel, fill, sand and rock used in the construction, reconstruction or maintenance of water developments would be judged to be weed free by district weed specialists.	2,3,4	Range Specialist
	Native plant materials are to be used for re-vegetation unless accepted extenuating circumstances are identified.	2,3,4	Range Specialist
	Permittees would identify infestations of noxious weeds and report these annually to the Forest Service. New populations of weeds would be scheduled for treatment (introduction, spread and establishment of noxious weeds).	2,3,4	Range Specialist
	All equipment used (including ATVs) would be cleaned in a manner sufficient to prevent noxious weeds from being carried onto the project area. This requirement does not apply to passenger vehicles or other equipment used exclusively on roads. Cleaning would occur off of National Forest System lands. Cleaning would be inspected and approved by the Forest Officer in charge of administering the project.	2,3,4	Range Specialist
Defer season of use to maintain vegetation health	Rotation of livestock from unit to unit may change from one year to the next and would be reflected in the annual operating instructions. This would be worked out jointly between the Forest Service and grazing permittee with end of the season allowable use levels.	2,3,4	Range Specialist
ARBO ESA compliance and minimize effects to Bull Trout Critical Habitat	Fence placement should allow for lateral movement of stream.	2,3,4	Range Specialist, Hydrologist, Fish Biologist
	Minimize vegetation removal, especially potential large wood recruitment source, when constructing fence lines.	2,3,4	Range Specialist, Hydrologist, Fish Biologist
	When constructing livestock crossings and water gaps, use the following design criteria: ▪ Locate crossings or water gaps where	2,3,4	Range Specialist, Hydrologist,

Objective	Design Criteria	Alternative	Responsible Person
	streambanks are naturally low. ▪ When possible, crossings and gaps should not be constructed within known or suspected spawning areas (e.g. pool tailouts where spawning may occur). ▪ Fences at stream crossings and water gaps should not inhibit upstream or downstream movement of fish or significantly impede bedload movement. Where appropriate, construct fences at water gaps as to allow passage of large wood and other debris. ▪ If necessary, the streambank and approach lanes can be stabilized with native vegetation and angular rock to reduce chronic sedimentation. The stream crossing or water gap should be armored with cobble-size rock, and use angular rock if natural substrate is not of adequate size. ▪ Livestock crossings or water gaps must not be located in areas where compaction or other damage can occur to sensitive soils and vegetation (e.g., wetlands) due to congregating livestock. ▪ The maximum width of a water gap or stream crossings should be no less than 10 feet and no more than 20 feet in the upstream-downstream direction. ▪ When using pressure treated lumber for fence posts only, complete all cutting/drilling offsite so that treated wood chips and debris do not enter water or flood prone areas.		Fish Biologist
	If other aquatic restoration activities are used as complementary actions, follow the associated design criteria and conservation measures.	2,3,4	Range Specialist, Hydrologist, Fish Biologist

Monitoring

Monitoring is a key component of successful management and compliance with pertinent laws and policy. Decisions regarding identifying any need to change management, and the direction that the change should take are based upon evaluation of the results of monitoring. Monitoring should be targeted at those indicators that are both annually influenced by livestock grazing (implementation monitoring) and those that indicate the long term condition (effectiveness monitoring) from annual effects. The management objectives (Appendix A, part 2) were

developed with the most pressing issues identified for each site specific reach during data collection and analysis. This was primarily developed from analyzing the departure of the existing to desired conditions in Appendix A, part 1 and reviewing the PFC assessments. Annual implementation monitoring, including allowable use are used to make short-term adaptive decisions regarding removal of livestock and adjustments in timing, intensity, duration, and frequency of grazing. The long term effectiveness monitoring is used to determine if satisfactory progress is being made toward meeting the management objectives and thus the desired conditions (Appendix A, part 1). If not, this would inform the decision maker to determine what additional changes to management would be needed from the suite of adaptive management options.

Annual Implementation and Compliance Monitoring for Range and Aquatics

Use Levels

Allowable use levels proposed for annual implementation monitoring of Riparian and Upland Vegetation are found in Appendix E. Riparian implementation monitoring for bank alteration, stubble height and woody browse would be collected as outlined in Multiple Indicator Monitoring (MIM) of Stream Channels and Streamside Vegetation (Interagency Technical Reference 1737-23 2011). Implementation monitoring would be done at Designated Monitoring Areas (DMA).

Compliance with Permit and AOI

Follow FSH 2209.13 Grazing Permit Administration Handbook and Terms and Condition of the Term Grazing Permit parts 1, 2 and 3.

Future Consultation (BA for project)

Consultation for this project with the Regulatory Agency may identify additional monitoring needs that would supplement this plan.

Long Term Effectiveness for Range and Aquatics

Overview

The MNF LRMP established utilization standards for grass and grass-like species and shrubs. In 1995, the LRMP was amended by PACFISH and INFISH. PACFISH/INFISH amendments identified six Riparian Management Objectives (RMOs) and four Standards & Guidelines (S&Gs) for grazing management activities (GM-1 to GM-4).

Among other things, PACFISH/INFISH S&Gs call for modification of grazing practices that retard or prevent the attainment of RMOs[8]. Enclosure B of the PACFISH Grazing Guidelines (1995) clarifies this direction by stating that its primary objective to not "retard" or "measurably slow" recovery of degraded riparian features is to avoid authorizing grazing practices that are likely to "carry over to the next year." Any effect of sufficient magnitude such that its influence is still present in some meaningful way at the beginning of the following grazing season has the potential to result in cumulative negative effects, and therefore measurably slow recovery of

[8] More specifically, GM-1 states as follows: "Modify grazing practices (e.g., accessibility of riparian areas to livestock, length of grazing season, stocking levels, and timing of grazing) that retard or prevent attainment of Riparian Management Objectives or are likely to adversely affect listed anadromous fish. Suspend grazing if adjusting practices is not effective in meeting Riparian Management Objects and avoiding adverse effects on listed anadromous fish."

degraded riparian features to an unacceptable rate under the PACFISH/INFISH S&Gs. Thus, a primary focus of the S&Gs is to avoid negative effects, the influence of which is likely to still be existent at the beginning of the next grazing season to a degree that would meaningfully impede recovery. Some environmental impacts are inherent with the presence of livestock. However, "near natural" rates of recovery can be provided if environmental impacts are limited to those that do not carry through to the next year, thereby avoiding cumulative, negative effects (PACFISH/INFISH Enclosure B).

The PACFISH/INFISH RMOs that may be most directly affected by grazing activities are: 1) bank stability, 2) bank angle, 3) width to depth ratio, 4) and percent undercut banks. As reported in the Multiple Indicator Monitoring (MIM) 2011 Tech Reference (1737-23), unstable banks can lead to accelerated bank erosion and subsequent channel widening, increased sediment supply, decreased sediment transport capability, and damaged fisheries habitat. Of all the indicators of a correct channel type, the relation between its width and depth is perhaps the most revealing (Bengeyfield, 2006). It is this relationship that determines whether or not the stream can perform the various tasks that lead to a healthy riparian area (Bengeyfield, 2006).

Clearly understanding the direction of change would ensure compliance with Forest Plan, Amendment 29 and INFISH's Goals, Objectives and Standards, The Clean Water Act and The Endangered Species Act. INFISH Provide overview related to long-term trends, INFISH, Appendix A (part 1 and 2). The effectiveness monitoring would show if plant communities and channel characteristics are moving towards desired conditions. Monitoring grazed and exclosed reaches in Summit Creek Reaches 2 and 5 would best illustrate the natural rate of recovery that should be expected in herbaceous and hardwood plant communities, bank stability and habitat complexity characteristics that are ideal for aquatic dependent species.

Monitoring protocols for each indicator may change into the future. Research is actively being done to reduce the variability of monitored data and trying to make it as accurate to the measured disturbance that is cost effective.

Management objectives that were developed identify which Riparian Monitoring protocol that would be used in Appendix A (part 2).

<u>Riparian Monitoring</u>

Monitoring Locations

Three types of DMAs that inform land managers include Representative, Reference and Critical. Representative DMAs are monitoring sites in a riparian complex that is representative of the riparian resources found in a pasture. If more than one riparian complex is present in a pasture, the most sensitive complex is chosen for monitoring. Reference DMAs are monitoring sites in riparian complexes that are not grazed and representative of grazed riparian complexes in adjacent pastures. Critical DMAs are monitoring sites that warrant monitoring because of higher sensitivity within the riparian complex. Critical DMAs are not representative of the larger area. Monitoring would occur at all established representative DMAs other than for Big Creek (see Appendix B).

The representative DMA in the Big Creek Riparian Pasture would be moved to a more sensitive riparian complex than where it is currently located. This is due to the pasture increasing in size and adding different riparian complexes to the larger unit. A representative DMA would be established in the Bosenberg Unit on Bosenberg Creek in a riparian complex in 2013.

Reference DMAs would be established in the exclosure on Summit Creek Reach 2 in the Sagehen Unit and in the ¼ mile buck and pole fence that would be built in Summit Creek Reach 5 in the Little Logan Unit. These DMAs would serve to provide a baseline in ungrazed natural recovery rates of vegetative and channel attributes. This would validate if the management objectives are achievable.

One Critical DMA would be established in the Bosenberg Unit on Bosenberg Creek. The purpose of this DMA is to monitor grazing effects on the areas that were burnt in the 1990 High Roberts Wildfire. A 10% bank alteration endpoint indicator was established for this DMA to ensure bank stability and bankfull width/depth characteristics continue to maintain and improve.

DMAs may not be monitored if livestock grazing is not authorized for any unit.

Monitoring Types

Pacfish/Infish Biological Opinion (PIBO) monitoring sites exist within the Project Area. This information would provide effectiveness monitoring of riparian vegetation species, channel characteristics and macroinvertebrate assemblages every five years. PIBO monitoring was read in 2001, 2006, 2011 and would be read again in 2016 and 2021. PIBO monitors riparian vegetation species composition along the greenline and perpendicularly across the stream channel. They monitor channel attributes of undercut bank, bank stability, bank angle, bankfull width/depth, pool quality and quantity that would inform us of the channel characteristics. PIBO also monitors Macroinvertebrate assemblages. PIBO has a crew from Logan, Utah that monitors indicators. Information on PIBO monitoring can be found http://www.fs.fed.us/biology/fishecology/emp/

The Multiple Indicator Monitoring (MIM) of Stream Channels and Streamside Vegetation (Interagency Technical Reference 1737-23) protocol would be used to monitor both implementation and effectiveness indicators. MIM monitors riparian vegetative species composition along the greenline only. MIM monitors channel characteristics for the greenline to greenline width and bank stability. MIM is collected by District interdisciplinary teams of a Range and Aquatics (Fisheries or Hydrologist) Specialists. Effectiveness monitoring is usually conducted every five years on riparian areas and stream banks. This period of time is usually necessary to detect long term changes.

Channel characteristics would be monitored using surveyed cross sections and longitudinal profiles to assess changes in bankfull width and width/depth, pool quality and quantity. These sites would be located mainly at DMA and would be permanently benchmarked. Survey procedures would follow principles outlined in Harrelson et al. 1994. Channel characteristics would be collected by District Aquatics Specialists.

Carex Working Group (CWG) monitoring sites were used to describe a baseline of riparian shrub heights and densities across 32 representative plots across all reaches of Summit Creek. The CWG monitoring protocol was developed to be a rapid, simple, and easily repeatable assessment of key riparian vegetation types over relatively long stream reaches. The method provides basic data useful for monitoring changes in important plant community traits, such as density and height classes of riparian shrubs. CWG monitoring would be collected by District Range and Aquatics (Fisheries or Hydrologist) Specialists.

Shade measurements would be monitored at DMAs in coordination with PIBO, MIM and channel characteristic measurements. Shade would be measured using a Solar Pathfinder on the order of every 10 years.

Monitoring of the fen areas and associated sensitive species populations and habitats would be accomplished using (1) the USFS's Groundwater Dependent Ecosystem (GDE) Level 2 protocol with modifications to adequately assess the extent and distribution sensitive moss populations, (2) methods described in the Fen PFC assessment guide, (3) the Threatened, Endangered, and Sensitive Species module of the USFS's Natural Resource Information System, and (4) photopoints. This would achieve the goal of monitoring key components of fen condition and function, such as peat formation and peatland maintenance, as well as trends of the extent and distribution sensitive species.

Photopoint monitoring would occur at benchmarked locations to ensure photos are repeatable and can be used to illustrate clearly change in vegetative and channel characteristics. Photopoint locations would be selected by the IDT.

USFS Region 6 Stream Surveys may be collected into the future on the creeks in the Project Area. This may inform land managers on changing channel conditions from previous Stream Surveys for larger geographical areas than already mentioned monitoring sites. Stream Surveys are identified as an inventory and not a monitoring tool and should be used with caution. With this, they are not tested for repeatability and accuracy as rigidly as MIM and PIBO monitoring designs are. However, using Stream Surveys with monitoring results may provide a better understanding of trends across larger areas.

Upland Monitoring

Beginning in the 1930s, permanent camera points were established on the Malheur National Forest. Their purpose was to monitor the effects of management on the resources of the Forest (Fifty Years of Change on the Range, R6-Mal-035-89). Many camera points have been re-photographed a number of times. This monitoring would continue.

In the 1950s and early 1960s Parker Three-Step C&T (Condition & Trend) Transects were installed throughout the Forest. The majority of these were established in the uplands. Over the last five years some of these transects have been re-examined. The procedure has been to read the transect using the original Three-Step method and then reread the transect using a modified Daubenmire cover /frequency method (see Technical Reference 1734-4). This allows comparisons between old and new information to determine ecological condition and trend and establishes a baseline using the more accurate cover/frequency method for gathering future data. The re-examining of these established transects would continue. If new trend transects are established the modified Daubenmire cover/frequency would be used.

There are a variety of additional or other monitoring methods available for use**.** The method or methods to be used would depend on the questions needing to be answered and considering other priorities. In some cases ocular observation (qualitative) would be sufficient to measure utilization, but when specific concerns are identified the forest may need quantitative methods such as Paired Clipped plots or development and use of height/weight curves may be necessary. Some of the more commonly used methods can be found in *"Utilization Studies and Residual Measurements"* (Interagency Technical Reference 1996, BLM/RS/ST-96/004+1730). (Please

refer to *Malheur National Forest Range Monitoring Guidelines*, October 16, 2006 for additional accepted methodology)

All of the monitoring methods used by the Forest are also intended to facilitate communications between forest range and resource personnel, grazing permittees and consulting agency personnel. This would largely be accomplished through participation and one-on-one interaction during the interdisciplinary, on the ground implementation.

Other Resources

Wildlife

For any early season grazing (prior to August 1) of the Big Field pasture, monitoring for upland sandpipers would occur. If upland sandpipers are documented in any given year, turn-out in affected pastures would be postponed to avoid impacts such as trampling to nesting sandpipers during critical breeding and nesting periods.

Monitoring would consist of qualified birders (district wildlife biologist, district wildlife technician, trained volunteers, etc.) walking, watching, and listening for upland sandpipers in vicinity of their historic nesting and use areas within the Big Field pasture. Monitoring would occur weekly during morning hours (dawn to noon) from May 1st through June 15th. Weather conditions would be calm, with no rain, to maximize potential detection of the birds. If upland sandpipers are discovered, no further walk-throughs of the area would occur to minimize disturbance from Forest Service personnel and volunteers as well.

Areas covered during monitoring, and results (upland sandpipers found or not found) would be documented in the NRIS wildlife database, with a summary report shared with district range management personnel.

Heritage

All monitoring activities would be in accordance with the Grazing Allotment Review Strategy for Section 106 Compliance, which implements the Regional Forester policy letter of May 19, 2006 "Grazing Permit Reauthorization and the National Historic Preservation Act". See Section 5: Monitoring, in the Grazing Allotment Review Strategy for Section 106 Compliance.

Summary of Effects in Relation to Issues

Table 2-36 compares the effects of the alternatives in relation to the issues identified in Chapter 1.

The information used to compare alternatives in Table 2-36 is summarized from Chapter 3, "Affected Environment and Environmental Consequences." For a full understanding of the effects of the alternatives, refer to Chapter 3, as well as the specialist reports available in the project file at the Prairie City Ranger District.

Comparison of Alternatives

The following tables provide a summary comparison of the effects of implementing each alternative in regard to purpose and need and the Significant and Analysis issues identified in Chapter 1.

Table 2-36: Summary Comparison of Alternatives

Significant Issue	Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Bull Trout Critical Habitat	Miles of occupied bull trout habitat grazed during spawning season by stream	0	0	0	0
	Miles of critical bull trout habitat for occupied and unoccupied: ▪ Not grazed	35	9.9	14.3	14.3
	▪ Grazed annually	0.0	7.3	12.1	15.4
	▪ Grazed with periods of rest	0.0	14.5	0.0	0.0
	▪ Riparian pasture with rest	0.0	2.7	7.4	4.8
	▪ Riparian exclosures not grazed	0.0	0.0	0.8	0.0
	Rate of Recovery: ▪ Miles of Critical Habitat expected to achieve PFC in 5 years	31.1	29.6	33.3	31.7
	▪ Miles of Critical Habitat expected to achieve PFC in 10years	35	30.9	34.4	34.5
	▪ Miles of Critical Habitat expected to achieve desired vegetation and channel conditions in 10 years	31	17.2	32.1	25.5
Economic Impacts to Permittees and the Local Community	Animal Month Units by Allotment and Alternative	0	AMUs are the same for every alternative: Lake Creek: 0 Logan Valley: 1,983, McCoy Creek: 416 Summit Prairie: 1,546		
	Costs of Improvements by Allotment and Alternative: Lake Creek	$0	67,500	0	67,550
	Logan Valley		74,400	12,600	80,100
	McCoy Creek		3,000	3,000	3,000
	Summit Prairie		224,100	333,800	155,600

Significant Issue	Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Acres Rested or Not Grazed (average minimum on an annual basis over the next 10 years): Lake Creek	10,196	5,056	10,196	9,459
	Logan Valley	3,756	232	45	232
	McCoy Creek	980	0	0	0
	Summit Prairie	25,331	3,452	74	18
	Acres available for Grazing (average)[9]: Lake Creek	$0	0	0	0
	Logan Valley		4,127	3,926	4,127
	McCoy Creek		660	660	660
	Summit Prairie		26,380	25,310	25,365
	Miles of Added Fence Maintenance[10] : Lake Creek	$0	0	0	0
	Logan Valley		4.8	2.3	2.3
	McCoy Creek		1.4	1.4	1.4
	Summit Prairie		7.3	12.5	6.4

Analysis Issues	Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Fences are movement barriers to wildlife	Miles of Fence Removed: Lake Creek	0	0	0	0
	Logan Valley		2.3	1.5	1.5
	McCoy Creek		1.0	1.0	1.0
	Summit Logan		0.7	0.7	0.7
	Miles of Fence Constructed	The miles of fence construction is the same as listed in under the Significant Issue "Miles of Added Fence Maintenance". See Table S-8 for fence miles.			
	Design Elements to Reduce Impacts	Not Applicable	To reduce the impact of fences to big game, Design Elements are in place requiring a smooth bottom wire at least 16 inches above the ground to facilitate fawn movement, with a maximum top wire height of 42 inches, and spacing of 10 inches between the top and next lower wire to reduce the potential of back legs being caught when animals jump the fence.		
Proposed Move Triggers, End-Point Indicators	Move Triggers and End-Point Indicators	See DEIS Appendix E			

[9] Acres do not include existing exclosures that would not be grazed.
[10] Miles are cumulative, including acres from ongoing projects (see current management in Chapter 1 for further detail).

Analysis Issues	Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4
not capable of allowing for riparian recovery					
Limited hardwoods have resulted in a loss of beaver habitat and reduction in beaver populations	Short – and Long – Term Effects on Shrub Development	Not Applicable	Grazing management that allows for recovery of herbaceous vegetation and riparian hardwoods could increase the expansion of beaver within the project area.		
Shifting parts of vacant allotments into active livestock use	Acres of Currently Vacant Allotment Grazed	0	4,478	0	388
	Miles of Critical Bull Trout Habitat Grazed in Currently Vacant Allotment	0	4.4	0	0
Livestock Stocking Levels Should be Reduced	Capability, Suitability and Forage Production	No Grazing	The AUMs proposed are maximum limits and may be adjusted to allow flexibility for annual adjustment of both numbers and/or season. The analysis of available forage and stocking rates shows that adequate forage is available to support AUMs levels currently permitted including any proposed allotment boundary and management changes.		

Implementation and Management Schedule

Depending on which alternative is selected by the Responsible Official, activities included in the decision would occur in approximately the following timescale. All activities and improvements are expected to occur within 10 grazing seasons of the decision. All improvements would be maintained during the same time period. Boxes checked represent the approximate time period when all or portions of the proposed activity would be completed.

Table 2-37: Implementation Schedule by Alternative

Alternative 1 – Not Grazing			
Activity	**2012**	**2015**	**2019-2022**
Notices of permit cancellation given to permittees	**X**		
No grazing implemented		**X**	

Alternative 2 – Proposed Action			
Activity	**2013-2015**	**2016-2019**	**2020-2023**
Lake Creek Allotment: No AMP needed.			

Alternative 2 – Proposed Action			
Activity	**2013-2015**	**2016-2019**	**2020-2023**
Logan Valley Allotment: Complete AMP Logan Valley allotment.	**X**		
Application of grazing use levels and move triggers as shown in Appendix F.	**X**		
Fence removal to combine Big Creek portion of East Lake Creek, North Big Creek and South Big Creek units. New unit called Big Creek Riparian pasture.	**X**		
Fence removal to absorb the North Fork unit of the McCoy allotment into the Flat Field unit of the Logan Valley allotment.	**X**		
Begin resting (3-5 years rest) the West Lake Creek Riparian pasture and West Bosenberg riparian pasture.	**X**		
Approximately 0.3 miles of electric fence in the North Fork unit along Big Creek converted to a permanent let-down fence.	**X**		
Absorb Lake Creek unit of the McCoy Creek allotment into the Logan Valley allotment.	**X**		
Construction of new fence and removal of exiting fence to absorb a portion of the McCoy Creek unit with the horse pasture from the Lake Creek allotment (new unit would become part of the Logan Valley allotment, named the Deardorff unit).		**X**	**X**
Begin resting the Big Creek Riparian pasture (3 years out of 10).		**X**	**X**
Begin rest and deferment grazing system in the Logan Valley allotment.		**X**	**X**
McCoy Creek Allotment: Complete AMP McCoy Creek allotment.	**X**		
Application of grazing use levels and move triggers as shown in Appendix F.	**X**		
Fence removal to combine the Ridge and Dry units. Combined areas would be called the Ridge unit.	**X**		
Begin deferred rotation grazing system in the McCoy Creek allotment.	**X**		
Summit Prairie Allotment: Complete AMP for Summit Prairie allotment.	**X**		
Application of grazing use levels and move triggers as shown in Appendix F.	**X**		
Begin resting the West Summit Recovery unit for 3-5 years.	**X**		
Fence removal to absorb Front Field unit from the	**X**		

Alternative 2 – Proposed Action			
Activity	**2013-2015**	**2016-2019**	**2020-2023**
Logan Valley allotment to into the Little Logan unit. The additional 52 acres would be grazed as part of the Summit Prairie allotment.			
Construct a loading ramp with catch pen in the Sagehen unit near the private property boundary.		**X**	
Fence and water gap construction to add the Bosenberg unit of the Lake Creek allotment to the Summit Prairie allotment. New unit would be named the Bosenberg unit.		**X**	**X**
Pond construction and spring development in the Bosenberg unit.		**X**	**X**
Being grazing the Bosenberg unit.		**X**	**X**
Begin resting the Sagehen, Little Logan and Bosenberg units (3 years out of 10 years).		**X**	**X**
Begin rest and deferment grazing system in the Summit Prairie allotment.		**X**	**X**

Alternative 3			
Activity	**2013-2015**	**2016-2019**	**2020-2023**
Lake Creek Allotment: No AMP needed.			
Logan Valley Allotment: Complete AMP Logan Valley allotment.	**X**		
Application of grazing use levels and moves triggers as shown in Appendix F.	**X**		
Fence removal to combine the Big Creek portion of the East Lake Creek, North Big Creek and South Big Creek units. New unit would be named the Big Creek Riparian pasture.	**X**		
Fence removal to absorb the North Fork unit of the McCoy Creek allotment into the Flat Field unit of the Logan Valley allotment.	**X**		
Approximately 0.3 miles of electric fence in the North Fork unit along Big Creek converted to a permanent let-down fence.	**X**		
Begin resting (3-5 years rest) the West Lake Creek Riparian pasture and West Bosenberg Riparian pasture.	**X**		
Absorb the Lake Creek unit of the McCoy Creek allotment into the Logan Valley allotment.	**X**		
Begin rest and deferment grazing system in the Logan	**X**		

Alternative 3			
Activity	**2013-2015**	**2016-2019**	**2020-2023**
Valley allotment.			
McCoy Creek Allotment: Complete AMP McCoy Creek allotment.	**X**		
Application of grazing use levels and move triggers as shown in Appendix F.	**X**		
Fence removal to combine the Ridge and Dry units. Combined areas would be named the Ridge unit.	**X**		
Begin deferred rotation grazing system in the McCoy Creek allotment.	**X**		
Summit Prairie Allotment: Complete AMP for Summit Prairie allotment.	**X**		
Application of grazing use levels and move triggers as shown in Appendix F.	**X**		
Begin resting the West Summit Recovery unit for 3-5 years.	**X**		
Fence removal to absorb the Front Field unit from the Logan Valley allotment into the Little Logan unit.	**X**		
Construct a loading ramp with catch pen in the Sagehen unit near the private property boundary.		**X**	
Fence construction to create the Lower Little Logan, Upper Little Logan, North Summit, Sagehen, Riparian pastures and the Sagehen Riparian exclosure.		**X**	**X**
Begin resting the Lower Little Logan, Upper Little Logan, North Summit, Sagehen Riparian pastures and the Sagehen Riparian exclosure. All areas would be rested from 3-5 years after fences are constructed.		**X**	**X**
Begin deferment rotation on Summit Prairie allotment.		**X**	**X**

Alternative 4			
Activity	**2013-2015**	**2016-2019**	**2020-2023**
Lake Creek Allotment: No AMP needed.			
Logan Valley Allotment: Complete AMP Logan Valley allotment.	**X**		
Application of grazing use levels and moves triggers as shown in Appendix F.	**X**		
Fence removal to combine the Big Creek portion of the East Lake Creek, North Big Creek and South Big Creek units. New unit would be named the Big Creek Riparian pasture.	**X**		
Fence removal to absorb the North Fork unit of the McCoy Creek allotment into the Flat Field unit of the	**X**		

Alternative 4			
Activity	**2013-2015**	**2016-2019**	**2020-2023**
Logan Valley allotment.			
Begin resting (3-5 years rest) the West Lake Creek Riparian pasture and West Bosenberg Riparian pasture.	**X**		
Approximately 0.3 miles of electric fence in the North Fork unit along Big Creek converted to a permanent let-down fence.	**X**		
Absorb the Lake Creek unit of the McCoy Creek allotment into the Logan Valley allotment.	**X**		
Construction of new fence and removal of existing fence to absorb a portion of the McCoy Creek unit with the horse pasture from the Lake Creek Allotment (new unit would become the part of the Logan Valley Allotment and called the Deardorff unit).		**X**	**X**
Begin resting the Big Creek Riparian pasture (3 years out of 10 years).		**X**	**X**
Begin rest and deferment grazing system in Logan Valley allotment.		**X**	**X**
McCoy Creek Allotment: Complete AMP McCoy Creek allotment.	**X**		
Application of grazing use levels and move triggers as shown in Appendix F.	**X**		
Fence removal to combine the Ridge and Dry units. Combined areas would be named the Ridge unit.	**X**		
Begin deferred rotation grazing system in the McCoy Creek allotment.	**X**		
Summit Prairie Allotment: Complete AMP for Summit Prairie allotment.	**X**		
Application of grazing use levels and move triggers as shown in Appendix F.	**X**		
Begin resting the West Summit Recovery unit for 3-5 years.	**X**		
Start use of rider in the Sagehen and Little Logan units.	**X**		
Fence removal to absorb the Front Field unit form the Logan Valley allotment into the Little Logan unit.	**X**		
Construct the Prairie Riparian pasture along Summit and West Fork Summit Creeks.	**X**	**X**	
Start resting Prairie Riparian pasture in North Summit unit (3 to 5 years).		**X**	**X**
Start installation of cages and small riparian		**X**	

Alternative 4			
Activity	**2013-2015**	**2016-2019**	**2020-2023**
exclosures in Sagehen and Little Logan units. Begin resting riparian exclosures.			
Construct a loading ramp with catch pen in the Sagehen unit near the private property boundary.		**X**	
Begin deferment rotation on the Summit Prairie allotment.		**X**	**X**

Chapter 3

Introduction

This chapter provides information concerning the affected environment of the Summit Logan Project area, and potential consequences to that environment from the Proposed Action (Alternative 2), Alternative 3, Alternative 4, or the likely results of taking No Action (Alternative 1). All types of effects, including direct, indirect and cumulative effects, are disclosed. Effects are quantified where possible, or discussed qualitatively. The means by which potential adverse effects would be reduced are described (see also Chapter 2).

Specialist Reports and Project Record

This Draft Environmental Impact Statement hereby incorporates by reference the Rangeland Vegetation and Invasive Species, Botany, Soils, Hydrology, Aquatics, Recreation, Visual Quality, Heritage, Social and Economics, and Wildlife Specialist Reports in the Summit Logan Valley Grazing Authorization Record (40 CFR 1502.21). Specialist Reports are located in each specialist's section of Appendix F (Specialist Reports) and contain the detailed data, methodologies, analyses, conclusions, maps, references, and technical documentation that the resource specialists relied upon to reach the conclusions in this environmental impact statement. Appendix F is available for review upon request.

The Project Record for the Summit Logan Valley Grazing Authorization Project includes all project-specific information, including field investigations and other data. The record also contains information resulting from public involvement efforts. The planning record is located at the Prairie City Ranger District Office in Prairie City, Oregon, and is available for review during regular business hours.

Analyzing Effects

Direct, Indirect and Cumulative Effects

Direct environmental effects are those occurring at the same time and place as the initial cause or action.

Indirect effects are those that occur later in time or are spatially removed from the activity.

Cumulative effects are those effects that result from the incremental impact of the action when added to other past, present or reasonably foreseeable future actions regardless of the agency or person that undertakes such other actions (40 CFR 1508.7). Cumulative effects can result from individually minor, but collectively significant actions taking place over a period of time. These "related actions" may be influencing current conditions. If so, their current (or foreseeable) effects are relevant to considerations of whether the proposed action would add to their effects.

In the descriptions of cumulative effects of the proposed action, relevant related actions that are known are identified and discussed. (A full listing of relevant related actions is provided in Appendix C.) Each cumulative effects analysis, for each environmental component, is guided by

and consistent with the Council on Environmental Quality letter, "Guidance on the Consideration of Past Actions in Cumulative Effects Analysis" of June 24, 2005.

Irreversible and Irretrievable Commitments

NEPA regulations also state that the Forest Service must show any irreversible or irretrievable commitments of resources that may result from the alternatives. An irreversible commitment is a permanent resource loss including the loss of future options. It usually applies to nonrenewable resources, such as minerals or cultural resources, or to factors that are renewable only over long periods, such as soil productivity. Such commitments are considered irreversible because the resource has deteriorated to the point that renewal can occur only over a long period of time, at a great expense or because the resource has been permanently destroyed or removed. An irretrievable commitment is the loss of use or production of a natural resource for some time. This analysis determined there are no irreversible or irretrievable commitments of resources due to this project.

Forest Plan Consistency

The proposed action is consistent with the Malheur National Forest Land and Resource Management Plan (Forest Plan, USDA Forest Service 1990) and its amendments. Applicable Forest-wide and land use designation standards and guidelines have been incorporated. The Forest Service uses design elements in the planning and implementation of land management activities. The application of these elements begins during the planning and design phases of a project.

Plans of Other Agencies

The CEQ regulation implementing NEPA requires a determination of possible conflicts between the proposed action and the objectives of Federal, State, and Local land use plans, policies, and controls for the area. The major land use regulation of concern is the Oregon Smoke Management Plan. See the "Other Disclosures" section at the end of this chapter for a discussion of compliance with this and other laws.

Rangeland Vegetation

Introduction

This is a summary of the Rangeland Vegetation Report that evaluates the potential effects of livestock grazing on the rangeland within the Summit Logan Valley Grazing Authorization Project. The full report can be found in Appendix F which is available for review by request.

Regulatory Framework

Granger-Thye Act of 1950

Granger-Thye authorizes the Forest Service to issue grazing permits and use grazing receipts for range improvements; provides direction on establishment of local grazing advisory boards and other purposes.

National Forest Management Act of October 22, 1976

The National Forest Management Act reorganized, expanded and otherwise amended the Forest and Rangeland Renewable Resources Planning Act of 1974, which called for the management of renewable resources on National Forest lands. The National Forest Management Act requires the Secretary of Agriculture to assess forest lands, develop a management program based on multiple-use, sustained-yield principles, and implement a resource management plan for each unit of the National Forest System. It is the primary statute governing the administration of National Forests.

The Rescission Act of 1995 (Public Law 104-19)

Requires each National Forest to establish and adhere to a schedule for completing NEPA analysis and decisions on all grazing allotments within a 15 year period.

Malheur National Forest Land and Resource Management Plan

The principle guiding document relevant to range management on the Forest is the 1990 Malheur National Forest Land and Resource Management Plan, referred to as the Forest Plan for the remainder of this section. The Forest Plan provides standards and guidelines for range management. Standards and guidelines are presented at the Forest level (LRMP, pp. IV-34 to IV-35) or Management Area level (Applicable sections of the LRMP to this report include: Management Area 3A -Non-Anadromous Riparian Areas pp. IV-57 to IV-58)

Analysis Method

Vegetation Information

The project area was mapped using an existing vegetation cover according to the R6 Ecological Classification (Ecoclass) standards. The mapping was completed using existing GIS mapping and field reconnaissance. Forage production is related to the plant communities and species, soil productivity, and tree densities (canopy cover) on the landscape. The Forest Plan established percent allowable use of available forage based on vegetation type (i.e. forested stands, grasslands, and shrublands). Vegetation information was used in combination with Forest Plan direction to conduct the forage production and livestock stocking rate analysis.

Condition and Trend

In the 1950s and early 1960s Parker Three-step C&T (Condition & Trend) Transects were installed throughout the Forest. The majority of these were established in the uplands. Four sites were established in the Summit Logan project area between 1953 and 1956. The procedure has been to read the transect using the original Three-Step method and then reread the transect using a modified Daubenmire cover/frequency method (see Technical Reference 1734-4). This allows comparisons between old and new information to determine ecological condition and trend and establishes a baseline using the more accurate cover/frequency method for gathering future data. These sites have been re-examined which allows comparisons between old and new information to determine ecological condition and trend. In the 1990's and 2000's ecology plots were established across the Blue Mountains with some plots overlapping the project area. Information from C&T transects and ecology plots were used in the analysis to analyze forage conditions and trends.

<u>Forage Condition</u>

Forage condition is a resource value rating for livestock forage condition and is designed to depict grazing impacts on understory vegetation; the condition is derived from species density and species composition (USDA FS 1984). Forage condition evaluates departure from potential under existing environmental conditions, including density of woody cover (USDA FS 1984). There are four classes of forage condition: good, which equals 76-100 percent of species density and composition; fair, which equals 51-75 percent of species density and composition; poor, which equals 26-50 percent of species density and composition; or, very poor, which equals 0-25 percent of species density and composition. Current forage condition was also determined based on the C & T data from 1995 and scored using two sources: Hall 1973 and USDA FS 1967; these sources were chosen over the Tentative Forage Condition Guide (USDA FS 1984) because they are more site specific and comparable to past data.

Photo Points

Beginning in the 1930s, permanent camera points (photo points) were established on the Malheur National Forest. Their purpose was to monitor the effects of management on the resource. Many camera points have been re-photographed a number of times. In the Summit Logan project area several points have been identified from which photographs are taken at periodic intervals. In the analysis photographs were used to supplement data and served as a valuable tool in determining and/or interpreting vegetation trends. Photo point information is available in the Summit Logan Valley Grazing Authorization Project file.

Global Information System (GIS)

An analysis of rangeland capability was completed for the project area using existing GIS data and mapping. Site conditions such as slope, soil type and productivity, and landscape features were used to determine the percentage of the landscape that is capable of producing forage and grazing management at a given level.

Forest Plan

The analysis also considered direction in the Forest Plan regarding range and livestock management for specific management areas. Developed campgrounds (MA-12) and administrative sites (where not compatible with livestock grazing), (MA-19), are designated as unsuitable in the Forest Plan. In addition, fenced road rights of ways, long-term enclosures that exclude livestock grazing, and areas with over-story tree canopy cover greater than seventy percent (70%) were considered to be unsuitable.

Other Information

The analysis also uses information from a variety of sources including:

- Annual compliance monitoring
- Submitted permittee monitoring
- Contracted surveys and assessments
- Actual use records and end of year reports.
- Existing range and environmental analysis files (1950, 2080, 2210/2230/2240/2270)
- Other historical records of the allotments/pastures.

Affected Environment

This section provides an overview of rangeland vegetation and forage conditions, and rangeland management for the Summit Logan Valley project area. The rangeland vegetation section discusses vegetation types in the project area and trends in range and forage conditions. The rangeland management discussions provide an overview of past grazing management, existing grazing management, current monitoring protocols, capability and suitability of the area for grazing, and potential forage production/stocking rates for each of the allotments.

Rangeland Vegetation

Vegetation Types

Vegetation in the project area consists primarily of forested types with shrub and elk sedge/pinegrass understories. At the lower elevations, sagebrush, bunchgrass communities, and dry meadows are some common plant communities. As the elevation rises, ponderosa pine and grand fir become dominant. Lodgepole pine is found on poorly drained cold pockets. Aspen stands are interspersed throughout the project area. The following descriptions of the plant associations found in the project area are from Plant Association of the Blue and Ochoco Mountains (Johnson, Clausnitzer, 1992), Mid-Montane Wetland Plant Associations of the Malheur, Umatilla and Wallow-Whitman National Forests (Crowe, Clausnitzer, 1997), Plant communities of the Blue Mountains in eastern Oregon and southeastern Washington (Hall, F.C. 1973), and Bunchgrass Plant Communities of the Blue and Ochoco Mountains a Guide for Mangers (Johnson, Swanson, 2005).

For this analysis, the project area has been mapped at an existing vegetation cover according to the R6 Ecological Classification (Ecoclass). The mapping was completed using existing GIS mapping and field reconnaissance. In 2007 Forage Production Studies were conducted on these allotments to support that areas are capable of supporting livestock grazing across the project area.

The Summit Logan Valley Grazing Authorization Project Area is a mix of forested and non-forested vegetation types as well as other land features such as rock and water. Forested lands account for 86% of the area, non-forested lands account for 13% of the area and rock and water account for 1% of the area.

Forested Types

Of the forested vegetation types, all but the grand fir associations are considered capable of producing forage for livestock.

The majority of the conifer plant association acres are thought to be outside the range of the natural fire regimes represented by the type with the exception of portions in the Lake Creek allotment which has had two major wildland fires (Snowshoe Fire in 1990 and the High Roberts Wildland Fire in 2002). Commercial thinning activities have recently been completed on this allotment with the Merit Timber Sale.

The Sheep Mountain Fire occurred in 1990, overlapping a small portion of the Summit Rock unit of the Summit Prairie Allotment. Much of the fire area was salvage logged and replanted. Throughout the fire large patches of snowbrush ceanothus exist, some of which are inaccessible to livestock grazing.

Subapline Fir Types

Subalpine fir stands occur across approximately 988 acres within the project area. High elevations, cold, dry habitats, subalpine fir dominants in absence of spruce due to the droughtiness of the sites. The dominant herbaceous plant is elk sedge. Sites are too cold to support pinegrass which requires warmer, moister conditions to complete and persist with elk sedge.

Mixed Conifer, Pinegrass, Elk Sedge Types

Mixed conifer stands occur across approximately 20,063 acres within the project area. The mixed conifer plant community occupies drier sites than grand fir. Soils have the lowest water-holding capacity of the grand fire plants associations. Residual soils are prominent substrates; this reduces pinegrass abundance and favors elk sedge.

Other conifers species found within the mixed conifer stands are lodgepole pine stands which occur across approximately 1,118 acres within the project area. Ponderosa pine stands occur across approximately 4,161 acres within the project area. Douglas-Fir stands occur across approximately 314 acres within the project area. Grand fir stands occur across approximately 5,242 acres within the project area.

Non-Forested Types/Juniper

Juniper stands occur across approximately 120 acres within the project area. This plant community forms a mosaic with scattered western juniper among mountain big sagebrush and bunchgrass.

The majority of the sage types are thought to be outside the range of the historical fire disturbance regime for these types. Fire return intervals of 10 to 50 years maintained these types in a mix of structural height and ecological status. Fire suppression and the focus on timber management have caused these types to miss at least one and probably several fire disturbance events. These plant community types are mostly in late seral condition, with sagebrush dominating and grasses and forbs decreasing as cover components. Fire suppression has also contributed to the encroachment of conifer into non-forested vegetation types.

Other non-forested types of lands found within the project area are grassland which is comprised 853 acres. Aspen which includes 126 aspen stands totals approximately 372 acres in the project area. Encroachment by conifers is typical with the suppression of fire. Lack of fire, as well as a combination of historic overuse by livestock combined with timing of grazing and use by wildlife has resulted in a decrease of aspen regeneration. Decadent stands benefit from the introduction of fire and thinning of encroaching conifers. Where aspen stands have been treated by removal overstory conifers or protection to exclude or restrict browsing, regeneration has been successful. Within the project area approximately 39 acres of aspen have been protected with fences.

Meadows comprise 2,864 acres. Non-forested uplands within the watershed are characterized by dry, moist, and wet meadows. The majority of the Logan Valley and McCoy Creek allotments are comprised of moist and dry meadows. Logan Valley is the most expansive grassland area and is dominated by several introduced grasses which were seeded after the valley was plowed and disked in the 1920s. These species have replaced the native Idaho fescue and bunchgrass communities that were native to the area. Introduced grasses including timothy, crested wheatgrass, orchard grass, and red fescue are the dominant grasses within the Logan Valley and

McCoy grazing allotments. Listing of bull trout (1998), resulted in grazing season changes to protect bull trout spawning areas. With season of use changes these species have become "wolfy" and decadent, which has started to reduce their vigor and palatability to ungulates. Lodgepole pine is currently encroaching into Logan Valley as a result of fire suppression.

Low sage is comprised of 898 acres. These sites are characterized by shallow to very shallow soils with rock fragments common while big sage is comprised of 714 acres. The majority of the sagebrush-dominated communities are in mid-to-late seral ecological status, primarily due to the suppression of fire on these rangelands.

Measured upland vegetative conditions varied throughout all of the pastures under analysis from poor to excellent. Factors which resulted in poor condition did not appear to be related only to livestock grazing.

The data collection forms for specific monitoring sites provide additional detail on the reasons for individual condition determinations. This data is maintained within the ecology database located on the Wallow-Whitman National Forest Tri-Forest Ecology Department. A print out of these sites is located in the analysis file for this project at the Prairie City Ranger District Office.

Condition and Trend

Available data shows that forage condition and trends are improving in the project area. At the most recent reading, forage condition ranges from fair to good and trend range from fair to good at all C&T and Ecology plot sites. The general trend for the C&T plots is an increase in litter and canopy cover and a decrease in bare soil in ponderosa pine and western juniper sites.

Rangeland Management

History and Past Livestock Grazing Management

Domestic livestock grazing first occurred in the project area as early as the mid-1850's when the first miners and homesteaders entered the area. The Malheur National Forest, like many areas in the Western United States, has a reputation of livestock overuse that started in the late 1800's and continued into the mid 1930s. Thousands of sheep grazed the planning area from the late 1860's until the 1940's. From the 1940's until the present day, domestic livestock grazing in the area has been primarily cattle. Sheep and cattle utilized available forage in a continuous season grazing regime. Early grazing was essentially unregulated and resulted in significant impacts, some of which are still observable today. High stocking levels, stock driveways, and lack of management resulted in degraded upland and riparian conditions (Report on the Proposed Blue Mountain Forest Reserve 1906).

Livestock use was not managed until the early 1900's with establishment of the Forest Reserves in 1906 and the Malheur National Forest in 1908. Historical livestock grazing data for Grant County ranges from 1890 through 1959, after that time actual use records were reported. In 1918, the Forest Service instituted a permit system, which defined areas to be grazed, set the season of use and established the number of livestock to be permitted. During the early part of the century, the Forest Service also took significant action to regulate numbers and seasons, and to establish workable grazing seasons and allotments. This action continued into the latter half of the century when emphasis shifted to development of management systems and regulation of effects on specific resources.

Allotment Management Plans (AMPs) were developed in the 1960-70's to manage livestock grazing. The allotment and unit boundaries in the analysis area have been changed numerous times.

Improved grazing systems and pasture designs were implemented to accelerate riparian area recovery in the late 70s to the present. Specific changes have included construction of fences, installation of water tanks and ponds, and herding and strategic salt placement to improve livestock distribution while reducing riparian area impacts. Implementation of the Malheur National Forest Land Management Plan (FLMP) in the early 90s lowered the allowable use standard for livestock grazing to accelerate the rate of recovery in riparian areas. In the late 1990's, when bull trout were listed as threatened under the ESA, changes to utilization levels of grass and riparian species were further.

More recent management changes have occurred and are ongoing to improve upland and riparian area conditions, reduce negative effects to aquatic species and increase management flexibility. In 2011, three Decision Memo's were signed by the Prairie City District Ranger authorizing projects within the Logan Valley, McCoy Creek and Summit Prairie Allotments to enhance livestock management and improve shade and hardwood communities associated with bull trout habitat on Big Creek and Lake Creek; and to provide aquatic restoration and improve livestock distribution along Summit and West Fork Summit Creeks. All projects are scheduled to be implemented between 2012 and 2013. Projects include construction of exclosure and riparian pasture fences, water and pond development, and hardwood planting (see Current Livestock Grazing Management below for a summary of projects).

Grazing Utilization Standards (History)

In 1990, Region 6 of the Forest Service developed grazing utilization standards to be included in the Forest Land Management Planning process. Upon approval, the Forest Plan incorporated the Region 6 utilization standards and guidelines. The Malheur Forest Plan lists a range of allowable use standards to be applied based upon:

1. Management Area Designation (Riparian or Non-riparian). See Forest Plan Table IV-2, page IV-35 (non-riparian areas) and Table IV-4, page 58 (non-anadromous riparian areas) for more detail.
2. The allotment condition classification. Is the area in a satisfactory or unsatisfactory condition (to be determined in a site-specific analysis completed in accordance with the activity schedule in Forest Plan Appendix A, Table A-10 on page A-18 through 21
3. The management intensity level (Stewardship or Extensive).

The four allotments in the Summit Logan analysis have been managed under an extensive management strategy since the Forest Plan was approved in 1990. The Forest Plan (page IV-35) defines extensive management as a strategy where "management seeks full utilization of forage available to livestock. Cost-effective management systems and techniques, including fencing and water development, are designed to obtain relatively uniform livestock distribution and use of forage to maintain plant vigor."

Range forage conditions in the project area were evaluated using a combination C&T transects, ecology plots, and photo point information. The evaluation determined that forage conditions on suitable rangeland are in a satisfactory condition[11] based on the Forest Plan definition.

Table R-1 summarizes the Forest Plan allowable use levels for allotments in satisfactory condition under extensive management.

Table R-1: Allowable Use of Forage by Percent Weight Removed

Plant Community	Sub-type	Range Condition	
		Satisfactory	Unsatisfactory
Non-Anadromous Riparian	Grassland	45	0-35
	Shrubland	40	0-30
Non-riparian	Grassland	55	0-35
	Shrubland	50	0-30
	Forestland	45	0-35

Note: Utilization of grasslands is based on percent removed by weight for grass, grasslike, and forbs. Utilization of shrubs is based on weight and twig length.

After bull trout were listed as threatened in 1998, utilization standards were developed for allowable use of herbaceous riparian species, riparian woody shrubs, grass and grasslike species, and bank alteration through the consultation process with the US Fish and Wildlife Service (USFWS). From 1998 through 2004, utilization levels were 6-inch stubble height along the greenline, moderate browse use, 45% utilization in uplands, and 10% bank alteration.

From 2005 through 2011, utilization standards were 4-inches stubble height along the greenline, light to moderate browse use, 45% utilization in uplands, and 20% bank alteration. These levels are used as both livestock move triggers and end-point indicators.

Between 2005 and 2011 utilization standards have been met consistently in most grazing units with the exception of the West Lake Creek unit in the Logan Valley allotment and the North Summit and Sagehen units in the Summit Prairie Allotment.

Rangeland Capability and Rangeland Suitability Analysis

Forest planning regulations require the determination of capability and suitability at the Forest level. These regulations are derived from the Forest and Rangeland Renewable Resources Planning Act of 1974 (Section 6, (g) (2) (a) & (3).

The 1990 Malheur Forest Plan FEIS (USDA Forest Service 1990, FEIS V-20, and Appendix B, B-60 and B-71-75) used FORPLAN to estimate Animal Unit Months (AUMs) and rangeland capability/suitability of the Forest, including Lake Creek, Logan Valley, McCoy Creek and Summit Prairie allotments. A capability/suitability analysis was conducted during the development of the Forest Plan for the Malheur National Forest, which made management direction determinations based upon Management Area designation. Subsequent changes to the definitions of capability and suitability have been made since the Forest Plan was completed. Information queries have been performed that updated the capability and suitability analysis to

[11] The Forest plan defines Satisfactory Range Condition as "on suitable range, forage condition is at least fair with stable trend, and allotment is not classified as PC (basic resource damage) or PD (other resource damage)".

incorporate the most current information available and most recent Region 6 Guidance attached as Attachment C (USDA 2003).

Rangeland Capability

Capable rangelands comprise approximately 94% of the total acres within the allotments in the Planning Area. Capability is defined as 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 a given level of management intensity. Capability depends upon current resource 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.

The analysis of capability began with all lands in the project area. The following were subtracted from these acres.

- Soil types that are dominated by large percentage of rock, areas with highly erosive soils, very wet and boggy soils and sites with high mass movement risk.
- Areas with soil types that are not inherently capable of producing more than 200 pounds or forage/acre.
- Lakes, reservoirs, and ponds.
- Major rivers
- Perennial streams
- National Forest System Roads
- Steep slopes

The remaining acres were considered Capable Rangeland.

Rangeland Suitability

Forest Service Manual 1905 (91) indicates that suitability is a determination of "the appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequence and alternative uses forgone…".

Most Forest Plan management areas in the Summit Logan Valley Grazing Authorization project area are suitable for grazing. The project area includes the Big Creek and Murray Campgrounds (MA 12), and Lake Creek Organization Camp (MA 19) which were determined to be unsuitable for grazing.

In the suitability analysis for the project area fenced road rights of ways, long-term enclosures, areas with over-story tree canopy cover greater than seventy percent (70%) were also considered to be unsuitable. Within the project area unsuitable acres total approximately 689 acres.

Capable and Suitable Rangelands comprise approximately 92% of the project area. Based on this information the majority of the project area is capable and suitable for livestock grazing; and consistent with the analysis in 1990 Forest Plan.

Forage Production and Stocking Rates Analysis

Forage production helps determine a guideline for carrying capacity on allotments. Forage production is related to the plant communities and species on the landscape and determines how

much vegetation is available for forage. There are many different ways to calculate forage production, ranging from collecting data in the field to using maps. To determine production in this analysis, the focus was on plant associations mapped in a GIS database by acres, supplemented with production field data collected in 2007. Forage pounds per acre (lbs/acre), as determined by the Plant Associations of the Blue and Choco Mountains (Hall 1973 and Johnson and Clausnitzer 1991), were calculated with some adjustments, as follows.

- Rangelands not suitable or capable were removed from the forage production analysis.
- The average annual production of the Plant Association was used (lbs/acre air dry).
- Percent forage allocated. Allowable utilization levels from the Forest Plan were utilized for areas in satisfactory condition with an extensive management strategy (see Forest Plan Tables IV-2 on page IV-35).
    - Forested 45%
    - Grasslands 55%
    - Shrublands 50%

To determine the carrying capacity (typically expressed in AUMs, or how many 1,000 lb. cows with a calf could graze for one month) you take the total production of an area divided by the pounds of forage required (26 lbs/day) divided by the days in a month (30).

For Example Lake Creek Allotment:

- 2,638,833 lbs. Forage Produced X .45 = 1,187,474 lbs. of Forage Available
- 1,187,474 lbs./26 lbs./30 days = 1,522 AUMS

Table R-2 summarizes forage production and carrying capacity (AUMs) by allotment and pastures; please refer to the project file (Prairie City Ranger District) for further information.

Table R-2: Forage Production and AUMs

Allotment	Total Forage (lbs.)	Available Forage (lbs.)	Calculated AUMs	Permitted AUMs
Lake Creek	2,638,833	1,187,474	1522	0
Bosenberg	1,764,017	793,808	1017	
Horse Pasture	34,122	15,354	20	
McCoy Creek	840,694	378,312	485	
Logan Valley	8,446,623	4,120,092	5,284	1,983
West Lake Creek	548,642	246889	317	
East Lake Creek	1,245,379	560,421	718	
North Big Creek	280,404	126,182	162	
South Big Creek	335,024	167,512	215	
West Bosenberg	189,747	94,874	122	
East Bosenberg	151,086	75,543	97	
Corral Holding	32,489	16,245	21	
Front Field	161,760	80,880	104	
Lower Field	540,948	270,474	347	
Big Field	3,108,510	1,554,255	1,993	
Flat Field	1,853,634	926,817	1,188	
McCoy Creek	4,352,415	2,158,447	2,766	416
Cow Camp	677,669	338,835	434	

Allotment	Total Forage (lbs.)	Available Forage (lbs.)	Calculated AUMs	Permitted AUMs
Dry	162,370	81,185	104	
Gov't Flat	1,227,848	613,924	787	
Lake Creek	355,237	159,857	205	
North Fork	284,436	142,218	182	
Ridge	1,403,222	701,611	899	
Starvation	241,633	120,817	155	
Summit Prairie	56,662,746	25,388,469	33,572	1,546
Sagehen	36,938,136	16,622,161	21,310	
Crane Rock	5,395,628	2,428,033	3,113	
Little Logan	7,246,133	3,260,760	4,180	
Summit Rock	6,543,359	2,944,512	1,141	
North Summit	448,005	91,835	3,775	
South Summit	22,289	10,030	13	
West Summit	69,196	31,138	40	

The analysis of available forage and corresponding animal unit months (AUMs) shows that adequate forage is available to support AUMs at levels greater than what is currently being permitted in the McCoy Creek, Logan Valley and Summit Prairie Allotments.

Permitted Livestock Use

For the most part authorized use has been the same as permitted use over the last 12 years. Actual use of livestock grazing, however, has declined in the allotments over the last several years. Actual use is monitored throughout the season to ensure grazing effects are consistent with meeting Forest Plan standards and bull trout consultation requirements. Over the last five years the average of actual use has decreased on the allotments due to water availability, range readiness, the permittee's grazing operational changes and desire to address previously identified concerns. Actual use (average annual head months) has fluctuated 24% on Logan Valley, 13% on McCoy Creek and 13% on Summit Prairie. The Logan Valley allotment has had one permittee, McCoy Creek allotment has had thee permittees and Summit Prairie has had two permittees in the last 12 years.

Current Livestock Grazing Management

Introduction

Three permittees currently graze livestock on Summit Logan Valley Grazing Autorization project area allotments under term grazing permits. The allotments in the analysis area are currently permitted for livestock grazing as follows:

Table R-3: Summary of Allotment Status and Permitted Use

Allotment	Acres	Status	AMP	Permit Type	Permitted Numbers	Permitted AUMs	Season
Lake Creek	10,196	Vacant	1966	Term	0	0	--
Logan Valley	3,756	Active	1971	Term	357 cow/calf pairs	1,983	6/10-10/15
McCoy Creek	980	Active	1971	Term	63 cow/calf pairs	416	6/1-10/30
Summit Prairie	25,331	Active	1965	Term	260 cow/calf pairs	1,546	6/10-10/24

Lake Creek Allotment

Allotment contains three units (Bosenberg, Horse Pasture and McCoy Creek) with separation fences, although some portions of the fence were burned during the 1990 Snowshoe fire.

Prior to the Snowshoe Fire in 1990, this allotment was unmanageable due to the dense overstory canopy and reduced forage base; the permittee waived the allotment back to the Forest Service. Since then it has been vacant and not been grazed for over 20 years. Currently, range conditions are capable and suitable for grazing.

Logan Valley Allotment

Livestock generally enter the unit on the south side of the 1600 road (East Bosenberg, West Bosenberg, Front Field, Lower Field, and Flat Field) when the range is ready and stock water is available. The livestock are moved to the units on the north side of the 1600 road (North and South Big Creek, East and West Lake Creek, and Big Field) when the range is ready later in the season. Per consultation agreement livestock grazing is not permitted after August 15th in the North and South Big Creek and Big Creek portion of the East Lake Creek units to prevent livestock redd interaction.

In the Logan Valley allotment the lack of off-stream water sources has been a problem. One existing developed water source helps distribute livestock through the Flat Field unit. Other livestock water is provided by Lake Creek and Deardorff Ditch. Because of the lack of water opportunities to defer the season of use has been very limited. Some units can only be grazed early season because water sources are not available later in the year.

Several projects are ongoing in the Logan Valley allotment that reduce the impacts of livestock along Lake Creek and Big Creek by providing functional water sources in the uplands which would provide for better livestock distribution throughout grazing units.

McCoy Creek Allotment

Livestock generally enter the unit on the south side of the 1600 road (Ridge/Dry, Gov't Flat, Starvation and Cow Camp) when the range is ready and stock water is still available. The livestock are moved to Lake Creek unit when the range is ready later in the season.

There are limited opportunities to defer the season of grazing because of current pasture configurations and water availability. Off-stream water sources are needed to reduce livestock use of the Lake Creek riparian area while allowing better use of upland forage. The primary stock water source is Lake Creek. One other existing water development is located within the Lake Creek unit.

Several projects are ongoing in the McCoy Creek allotment that are reducing the impacts of livestock along Lake Creek and allowing vegetation and stream channel recovery while still maintaining a functional water source for livestock.

Summit Prairie Allotment

Livestock would generally enter the Sagehen and Crane Rock units when the range is ready for grazing. Then move up Summit Creek to the Little Logan, Summit Rock, North Summit, West Summit and South Summit units as the range is ready.

Upland water sources are needed to pull livestock use away from Summit Creek and allow better forage utilization in upland areas. Use levels are generally reached in the Summit Creek riparian area before forage can be fully utilized in upland areas.

Several projects are ongoing in the Summit Logan Allotment. These ongoing projects are to improve aquatic habitat conditions on Summit Creek and improve the distribution of cattle through the development of upland water sources.

Environmental Consequences

Alternative 1 - No Grazing

Direct and Indirect Effects

Rangeland Vegetation

Alternative 1, the no action alternative, is the no grazing alternative. No action does not result in direct or indirect effects but rather removes the effects of previous management that authorized and managed livestock grazing. While not technically an effect of a Federal action, when compared to the effects of the action alternatives there would be an evolution of vegetation conditions as biophysical processes continue to occur on the ground in the absence of domestic livestock grazing. The degree that this evolving condition would differ from current conditions for any given portion of land would be determined in part on the past level or degree of the grazing activities impacts on that portion of land. In general, the degree of impact from past grazing activities relates to location on the landscape particularly as that location relates to other resource factors such as water and forage. The primary category division related to landscape location is the split between upland vegetation types and riparian vegetation types.

Removal of livestock grazing as a disturbance to the forest and non-forest vegetative upland portions of the planning area is not expected to result in substantial changes in plant distribution, density, or composition.

The elimination of livestock grazing would result in the fastest improvement to riparian vegetation. The production and composition of sedges, rushes, and hardwoods in riparian areas and mesic meadows should improve more rapidly than uplands due to their inherent productivity and resiliency as a result of greater soil moisture availability. The effects to riparian vegetation are discussed in detail in the Aquatic Habitat Specialist Report.

Discontinuation of grazing and other activities associated with livestock use would allow areas where vegetation has been impacted in the past to recover over time. The rate of recovery would vary based on current site condition and other factors like recreation and wildlife use. Overall an upward trend in range conditions is expected to continue with vegetation compositions slowly changing late seral species in locations where the potential exists.

As vegetation increases, the percentage of bare ground would be expected to decrease. Dead plant matter (litter) would accumulate, helping to protect and stabilize soils. In the absence of grazing, plant matter accumulates on the soil surface. After years of this accumulation (which surpasses the rate of decay in arid environments), some plants (many grass species in particular) go into a “self-imposed stress” whereby the litter chokes out new shoots competing for light (Knapp, et al., 1986). The vigor of the entire plant is reduced. When this occurs over a broad scale rangelands become less productive and healthy. Healthy and productive grass and shrub lands are important for many invertebrate and wildlife species that depend upon them

particularly for winter range. With the accumulation of dead plant matter (litter) fine fuels would build potentially increasing the susceptibility of the landscape to wildfire.

Some grass species that evolved with the periodic removal of vegetative material by fire, insects, or ungulates would probably not benefit over the long term under this alternative. Plant productivity, diversity and species composition may change over time. Plants with low tolerance to grazing may actually increase in abundance. Shrub communities without fire or other disturbance would gradually move towards the predominance of shrubs over grasses and forbs.

Rangeland Management

Under this alternative, all existing Term Grazing Permits would be cancelled two years after the decision and resolution of the appeals process. No permits would be issued for any of the affected allotments until or unless there was a subsequent NEPA analysis and a decision was made to restock any or all of the allotments. The existing permittees would be given two years written advance notice of the cancellation of their permits as provided for under 36 CFR 222.4(a)(1).

With no action (no grazing) all range improvements and fences would be, abandoned, removed, or assigned to another entity (i.e. adjacent permittee, private land owner, etc.) for maintenance. Maintenance of range developments such as fences and water improvements on the allotments would no longer be the responsibility of the permittees. Existing improvements may continue to be maintained by the Forest Service if considered a benefit to other resources.

Elimination of livestock grazing permits in this locality could jeopardize the viability of the ranches associated with those permits. Re-zoning and land use changes such as development of smaller subdivisions on private lands could occur adjacent to Forest Service Lands, and could affect soils and vegetation in watersheds already impacted by other uses, potentially leading to increased runoff and stream sedimentation, and decreased soil productivity.

Cumulative Effects

Because there are no direct or indirect effects with no action (no grazing), there are no cumulative or additive effects. Ongoing and foreseeable activities listed in Appendix C would continue in the project area. However, ongoing activities directly associated with grazing management may be terminated or cancelled.

Effects Common to All Action Alternatives

Direct and Indirect Effects

Rangeland Vegetation (All Allotments)

Grazing Use Levels

Allowable use levels of herbaceous forage for the action alternatives are displayed in detail in Appendix E of the DEIS.

All action alternatives allow use of herbaceous vegetation by livestock. Herbaceous vegetation includes grasses, grasslike, and forbs (nonwoody flowing plants). In general cattle prefer grasses and grasslike vegetation over forbs, but preferences depend on many variables, including season of use and available forage. Application of allowable use is based on the concept that plants can

withstand removal of part of their current year's growth and still achieve normal growth the following year.

A review of available science (summarized below) on the intensity of grazing shows that proposed use levels in all action alternatives are adequate to maintain or improve plant vigor (health) and allow continued improvement in forage condition trends. Studies show that light to moderate levels of livestock grazing have positive effects on maintaining, sustaining, and improving rangelands that are either in a satisfactory or unsatisfactory condition. All alternative propose the same use levels with riparian benches and upland areas of grazing units. Action alternatives vary in the proposed standards for the riparian communities along the "greenline" directly adjacent to streams. The "greenline is defined as the first communities dominated by perennial vegetation as you proceed outward from the center of the channel. The amount of forage left along the stream's edge has been found to be important in catching sediments during the runoff periods, both from the stream channel as well as from overland flow (Clary and Webster 1988). The trapping of sediment is critical in rebuilding of streambanks as well as the maintenance of water quality. The effects of proposed differences in greenline stubble heights between the action alternatives on riparian vegetation and stream function and recovery is discussed in detail in the Aquatic Habitat section.

In an intensive literature review Clary and Webster (1989) concluded that vegetation appears to be more affected by grazing intensity than by grazing systems. They found that the success of grazing systems depend in part upon managerial control of intensity and forage utilization. Eight years of research at Meadow Creek, Starkey, Starkey Experimental Forest and Range, Wallowa-Whitman National Forest, in Northeastern Oregon, indicated that herbage production was increased 1-to-4 fold through timing and intensity of grazing (Bryant 1985). Several grazing rotations were tested including deferred rotation, rest-rotation, and season-long grazing. There was no statistically different change in plant composition among the systems tested however the production of riparian vegetation increased dramatically when utilization was 70% or less.

Use levels for riparian areas have been studied by many authors. Clary and Webster (1988) compiled information from numerous sources and recommended that "utilization of streamside herbaceous forage should be limited to about 65 percent of current growth. Utilization based on current growth, however, does not translate directly to utilization based on annual production. The authors went on to note that recommendations of 40-50% utilization (approximately 3 to 4 inches of residual height) would maintain plant vigor. They noted, however, that stubble height (e.g. 6 inches or more) might be necessary to protect riparian ecosystem function.

In more recent publications, Hall and Bryant (1995) maintain that undesirable grazing impacts can occur any time stubble height in riparian areas reaches three inches or less. Maintaining a minimum stubble height can help preserve forage plant vigor, reduce browsing on willows, stabilize sediments and indirectly limit streambank trampling (Clary and Leininger 2000). Clary and Webster (1989) and Clary (1995) noted when defoliation, compaction, and nutrient return effects are considered in mountain meadows sedge-dominated communities, grazing to a 10 cm (4-inch) stubble height (end of growing season) appears to be adequate for maintenance of biomass production. Clary also noted that non-riparian vegetation grazed to about 5 cm (2-inch) stubble height at end of growing season would maintain vigor and biomass. Clary and Leininger (2000) explain that stubble height is a short-term monitoring tool and not an objective itself. Desired conditions are the long-term objective.

Available data shows that forage condition and trends are improving in the Summit Logan project area. The most recent information from Condition and Trend Transects and Ecology plots shows that forage conditions ranges from fair to good and trend range from fair to good (see Affected Environment for more detail). Literature acknowledges a relationship between range condition and appropriate grazing intensities. Frear 1983, buckhouse et al. 1979, Chaney et al. 1990, Buckhouse 1981, May and Sommes 1982, Clary and Webster 1989, Chaney et al. 1993 documents that light to moderate grazing/proper stocking levels sustains and improved degraded rangeland areas, restoring long-term productivity. Elmore (1998) suggested that 3 to 4 inches of stubble height would maintain plant vigor and sustain riparian conditions. However, Clary and Webster (1989) recommend that a residual standing height of 4 to 6 inches is necessary to improve riparian ecosystem function.

Deferred Rotation Grazing System

All action alternatives propose deferred rotation as part of the grazing system. Rotational grazing, where each area is grazed at a different season each year, was developed because different plant communities and physical features are affected differently at different seasons**.** All sites and species, over the grazing cycle, are grazed equally during seasons beneficial for each characteristic and seasons that are detrimental. This prevents preferred sites from receiving continuous detrimental timing (seasonal) effects and also limits the frequency of use during any one year.

Deferment is defined as a period of non-grazing during part of the growing season. There are several benefits to upland and riparian vegetation with application of deferred grazing. This type of system provides flexibility to change the timing, frequency, and intensity of grazing on an annual basis. The frequency and severity of defoliation of individual plants and species of plants varies depending on preference and availability. In a given grazing season, the result is that most preferred plants would be defoliated more frequently or severely than less preferred plants. With variations in the season of use there is decreased likelihood of multiple defoliations of desired plants species, allowing for longer periods of plant recovery. In general, the year to year variability in pasture use under a deferred rotation grazing system would protect the phonological stages of plant species and improve species compositions. Plant vigor would be increased and species recruitment would improve.

Deferred grazing has been successful in restoring and improving riparian areas. The season of grazing is important factor for willow recovery. Kovalchik and Elmore (1991) documented that early season upland grasses have crude protein levels of 15-17%, but levels fall below 5% as grasses mature. As this occurs, cattle increase the amount of available palatable forbs and browse in their diets and soon move into the riparian zone. In the spring, cattle often avoid riparian zones because of the cold temperatures, soil wetness, and forage immaturity (Kruger 1983). Therefore, spring grazing can encourage cattle to graze uplands where forage maturity and climate are more favorable compared to the riparian zone (Platts 1984). As a result, spring-grazed riparian zoned have less than half the cattle occupancy compared to fall use (Kruger 1983). As spring grazing precludes late-summer use, willow browsing is light and seedling survival high (Kovalchik and Elmore 1991).

Riparian Pastures

All action alternatives propose to construct riparian pastures. The quantity and location of pastures varies by alternative. With riparian pastures there is closer management and control to achieve goals and objectives.

In the project area, pastures along Lake Creek, Big Creek, Summit Creek, and West Fork Summit Creek contain a mix of riparian and upland vegetation. The riparian zones within the pasture are much different from the terrestrial systems, making management of the combined systems difficult. Livestock are selective grazers, therefore the frequency and severity of defoliation of individual plants or species of plants varies depending on preference and availability. The result is that most preferred plants would be defoliated more frequently or severely than less preferred plants. Because of this preference livestock tend to concentrate in the riparian areas, making management of the frequency and intensity of use in these areas a challenge. Use levels and move triggers in the riparian portion of units have historically been reached before authorized forage in upland areas can be utilized.

Rest

All alternatives include rest as part of proposed management. All alternatives proposed resting of riparian pastures or riparian exclosures. Alternatives 2 and 4 propose rest as part of the grazing system (termed periods of non-scheduled rest and deferment). In most cases, rest is proposed as part of the management strategy to meet riparian area recovery objectives. The length of rest proposed in all action alternatives for the West Bosenberg, West Lake Creek, and West Summit Recovery unit pastures is 3 to 5 years. After this period of rest, grazing would resume with management strategies that vary between action alternatives (effects of rest are similar to those discussed under Alternative 1, no grazing.)

Rest proposed in all of the action alternatives would be beneficial to vegetation recovery. With rest, plants are not affected by herbivory, and streambanks are not affected by livestock trampling. Woody riparian plants are allowed to reach escapement height. There is quick recovery period, especially in the first few years after grazing is eliminated. Rest or non-use may be one of the best methods for rapid improvement of woody plant regeneration (Davis 1982). Padgett (1995), noted that while there is not data that specifically state how long it would take a community to change from unsatisfactory to satisfactory condition, the amount of time it takes to move toward desired future condition (DFC) can be decreased through increased rest.

Skovin (1984) found that exclusion of livestock had produced improved riparian and aquatic habitat following 4 to 7 years of rest, woody plant (shrub) recovery following 5 to 8 years of rest. A study on Big Creek in northern Utah concluded that a minimum of 6 to 8 years of rest was necessary to restore a deteriorated streamside riparian area to the point where livestock grazing would be allowed at reduced levels (Duff 1983). However, substantial recovery of streambanks and vegetation was observed following 4 years of rest from grazing.

Adaptive Management

All actions alternatives are based on “adaptive management,” a process that uses monitoring information to determine if management changes are needed. Adaptive management strategies proposed for each alternative are shown in Appendix A (part 3). Strategies have been identified to ensure that riparian recovery objectives are met with specified timeframes. Short-term objectives for riparian areas are primarily focused on vegetation recovery. Specific recovery objectives for the streams in the project area are identified by stream reach and pasture (see

Appendix A (part 2)). If monitoring indicates that specific objectives are not being achieved, at any given time the Line Officer can choose to apply the analyzed adaptive strategy to reduce delays in recovery timeframes. Specific adaptive management strategies with their potential effects are described below:

- Changes in use levels (herbaceous forage use, bank alteration, shrub use) – An increased rate of riparian vegetation recovery is expedited by decreasing the grazing intensity.
- Rest or exclusion from grazing – Rest would benefit vegetation recovery. With rest, plants are not affected by herbivory, and streambanks are not affected by livestock trampling. Woody riparian plants are allowed to reach escapement height. There is quick recovery period, especially in the first few years after grazing is eliminated. Rest or non-use may be one of the best methods for rapid improvement of woody plant regeneration (Davis 1982). Padgett (1995) noted that while there is not data that specifically state how long it would take a community to change from unsatisfactory to satisfactory condition, the amount of time it takes to move toward DFC can be decreased through increased rest, lower utilization levels, and/or rehabilitation.
- Fencing to create riparian pastures – Construction of fences would have minimal ground effects to vegetation. With riparian pastures there is closer management and control to achieve goals and objectives. Each riparian pasture may be managed individually or rested depending on current conditions.

Logan Valley Allotment

All action alternatives would combine the Big Creek portion of East Lake Creek, North Big Creek and South Big Creek units into one large riparian unit. These units are currently being grazed as a single unit which is allowing riparian recovery with noted improvement in density, cover, and composition of stabilizing riparian vegetation species (i.e. sedges and rushes). Removal of fences to combine the pastures is expected to continue the upward recovery trend in vegetation.

Over the last several years a section of electric fence (0.3 miles) has been maintained in the North Fork unit to exclude livestock grazing from Big Creek. All alternatives would replace the electric fence with a permanent let-down fence. The permanent fence would continue to protect the Big Creek Riparian area and effectively distribute livestock into the upland portions of the unit.

The Lake Creek and North Fork units of the McCoy Creek allotment would be absorbed into the Logan Valley allotment (approximately 267 acres). The Lake Creek unit would remain as an individual unit and North Fork unit would be absorbed into the Flat Field unit for better livestock distribution. A larger unit would improve distribution of forage use (effects to vegetation are similar to those in the Effects Common to All Action Alternatives, Deferred Rotation Grazing).

McCoy Creek Allotment

To develop pasture sizes and configurations that would facilitate a rotation of deferment several unit and allotment boundary changes are proposed. The Dry and Ridge units of the allotment would be combined into a single unit as currently managed and would be identified as the Ridge unit.

The Lake Creek and North Fork units (267 acres) of the McCoy Creek allotment would be absorbed into the Logan Valley allotment. Due to past private land fencing, these pastures are

geographically isolated from the main allotment and are best suited for management with the adjacent allotment. Absorbing the Lake Creek and North Fork units into the Logan Valley allotment would decrease fence maintenance.

The Starvation unit (53 acres) would be removed from the McCoy Creek allotment as it is geographically isolated from the main allotment. This area may be added to the Dollar Basin allotment in the future. A separate environmental analysis would be required to add this area to the Dollar Basin allotment.

A deferred rotation grazing system would be applied throughout the allotment (see Deferred Rotation Grazing System under Effects Common for additional effects analysis). This grazing system provides for a systematic rotation of deferment among units and provides flexibility to change the time of year when units would be used.

Summit Prairie Allotment

All the action alternatives propose enlarging the Little Logan unit by adding the Front Field unit (52 acres) from the Logan Valley allotment. The larger unit would provide a larger landscape for better livestock distribution. The Front field unit does not have adequate water for livestock and the Little Logan unit has adjacent water sources. Improve livestock water availability is expected to improve use distribution and continue recovery of forage conditions.

A loading ramp with attached catch pen along Forest Service road 1647 would be constructed in the uplands of the Sagehen unit near the private property boundary under all action alternatives.

Rangeland Management (All Allotments)

Forage Production and AUMs

All action alternatives propose to retain the currently permitted AUMs. The AUMs proposed are maximum limits and may be adjusted to allow flexibility for annual adjustment of both numbers and/or season. The action alternatives identify the permitted livestock numbers (an average number of livestock) and the average season of use which includes the earliest possible "on" dates related to range readiness and the latest dates that livestock are permitted to be on the allotment. Flexibility that allows for annual adjustments provides a management tool to assure that riparian and rangeland objectives are met.

The analysis of available forage and stocking rates shows that adequate forage is available to support AUMs at levels currently permitted, including any proposed allotment boundary and management changes.

Management Practices

Implicit in all action alternatives is active livestock management, with distribution tools, (including additional infrastructure). Each alternative prescribes a series of actions that include physical changes (such as constructing new water developments, fences and changes in allotment/pasture boundaries and configurations) to address the site specific concerns within the planning area.

Management practices may affect cattle distribution. Neither salt placement nor alternate water location away from riparian zones influenced the use of riparian areas in a study by Bryant (1982). A study by Workman indicated that cost effective measures for improving distribution were spring development, salting (18.6% improvement) and herding (20% improvement), but

that fencing was not cost effective (Workman and Hooper, 1968). It may be concluded from these seemingly contradictory study results that water development and salting are effective methods of improving distribution, but by themselves may not be adequate to obtain desired levels of use on riparian areas. Fencing may change the location of excessive use from one site to another, but does little for overall distribution. Fencing may be cost effective if it provides for implementation of improved grazing systems which improve timing and duration of use more than distribution. Salting practices have been utilized for many years and, with few exceptions, appear to be effective to improve livestock distribution, especially on gentle slopes within the project area. Activities proposed are expected to improve livestock forage use and distribution in upland areas while allowing rest and lower use levels in riparian areas.

Fence Maintenance

Fence maintenance would be required as part of the term grazing permit. All action alternatives propose to construct new fences which would increase the miles of fence maintenance required by the permittee. Fence maintenance requirements include replacement or splicing of broken wires, removal of trees or limbs that have fallen across the fence, and replacement of deteriorated wood pieces and structures. The time and cost of completing fence maintenance repairs depends on the terrain (steep or gentle slopes, accessibility (access by ATV or vehicle), age or state of deterioration of the fence, and vegetation type (timbered or grassland). Year to year maintenance needs can vary based on weather conditions. High winds can increase the number of down trees or limbs that fall across the fence. Cold weather and heavy snows can increase wire breakage and structural damage.

Cumulative Effects

Several ongoing projects in the Summit Logan Valley Grazing Authorization project area would provide additive benefits when combined with the actions proposed in the action alternatives. The specific ongoing projects and their effects are described in Tables R: 4, 5, and 6. Additional cumulative effects discussions are provide for each specific alternative.

Logan Valley Allotment

Table R-4: Ongoing Activities in the Logan Valley Allotment

Project Name	Specific Management Technique and General Effects
Big Creek Fence and Water-Gap Creates West Bosenberg Riparian pasture	Constructing a riparian pasture would protect riparian values. The pasture would provide closer management and control to achieve riparian goals and objectives. In the pasture may be managed individually or rested depending on resource conditions. Depending on the type and level of management in the riparian pasture there may be a loss of forage to the livestock operator. For this specific fence construction costs and maintenance labor costs would be incurred by a Forest Service partner. The water gap in the fence would maintain access to Big Creek from the adjacent upland unit for watering. The water gaps would limit access to only a few feet of the stream (approximately 20 feet) minimizing streambank impacts. The water gap would be hardened with rock material to reduce hoof impacts.
Big Creek & Lake Creek Off-Site Water Source	Water developments would provide key water in units that currently lack distributed water sources, and/or units where the available water from streams would be excluded by fences (i.e., exclosures and riparian pastures). Water developments would reduce livestock concentrations in riparian areas allowing recovery of vegetation and aquatic habitat. Water developments would improve livestock distribution and more uniform utilization of forage in the uplands. In some upland pastures operators have not been able to utilize available forage because move triggers and utilization levels in riparian areas are reached first. Improved water and livestock distribution would provide better utilization of forage in some upland pastures.

Project Name	Specific Management Technique and General Effects
West Lake Creek Riparian Fence Creates West Lake Creek Riparian pasture	The effects would be similar to the Big Creek Fence (Bosenberg Riparian Pasture). Effects that are different include: ▪ Fence maintenance labor costs would be incurred by the grazing permittee. ▪ Water gaps would not be constructed.
Big Creek and Lake Creek Riparian Hardwood Planting	Planting of hardwood would increase the rate of willow recovery on Big Creek and Lake Creek. Expediting recovery would improve vegetation resiliency, allowing the pastures to be managed for grazing in the future.

McCoy Creek Allotment

Table R-5: Ongoing Activities in the McCoy Allotment

Project Name	Specific Management Technique
Lake Creek Unit Division Fence Reconstruction	Fencing would control livestock movement and distribution to protect critical bull trout habitat. Fence maintenance labor costs would be incurred by the grazing permittee.
Lake Creek Fence and Water-Gap	Riparian exclosure fence to exclude livestock from this portion of Lake Creek to allow vegetation and stream channel recovery while also providing a functional water source to livestock. Constructed water-gap would maintain livestock water to upland portions of the unit. The fence maintenance labor costs would be incurred by a Forest Service partner.
Lake Creek Willow Gallery Fence	Riparian exclosure to provide protection of a willow gallery along Lake Creek. The stream is being utilized by beaver and is critical habitat for bull trout. The fence maintenance labor costs would be incurred by a Forest Service partner.
Big Creek & Lake Creek Off-Site Water Source	See Big Creek & Lake Creek Off-Site Water Source (above)
Lake Creek Riparian Hardwood Planting	See Big Creek and Lake Creek Riparian Hardwood Planting (above)

Summit Prairie Allotment

Table R-6: Ongoing Activities in Summit Prairie Allotment

Project Name	Specific Management Technique
West Fork Summit Creek Fence and Water Gap Creates West Summit Creek Riparian pasture	Constructing a riparian pasture would protect riparian values and improve degraded stream bank conditions. The pasture would provide closer management and control to achieve riparian goals and objectives. In the pasture may be managed individually or rested depending on resource conditions. Depending on the type and level of management in the riparian pasture there may be a loss of forage to the livestock operator. For this specific fence construction costs and maintenance labor costs would be incurred by a Forest Service partner. The water gap in the fence would maintain access to the stream from the adjacent upland unit for watering. The water gaps would limit access to only a few feet of the stream (approximately 20 feet) minimizing streambank impacts. The water gap would be hardened with rock material to reduce hoof impacts. Fence maintenance labor costs would be incurred by the grazing permittee.
West Fork Summit Creek Parallel Tree Felling	Barriers formed by placing trees and brush on the edge of the stream would discourage livestock use and help stabilize eroding streambanks. Felled trees would protect established hardwoods and other riparian plant communities from livestock and ungulate use.
Little Logan	Riparian exclosure and caging would improve age class and height development of willows on

Project Name	Specific Management Technique
Willow Restoration	Summit Creek.
Sagehen Stock Ponds	Ponds would help reduce impacts of livestock on Summit Creek by providing functional water sources in the uplands.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Rangeland Vegetation

Lake Creek Allotment

Approximately 4,733 acres of the Lake Creek Allotment would remain vacant. Effects to rangeland forage would be same similar to those described under Alternative 1, no action.

Logan Valley Allotment

Portions of the Lake Creek and McCoy Creek allotments would be absorbed into the Logan Valley allotment. The larger landscape (which is made up of larger grazing units) would be managed with periods of rest or deferment during the season of use. The grazing system would allow changes in the timing, frequency, and intensity of grazing which benefit both upland and riparian plant species development and vigor (effects to vegetation are similar to those in the Effects Common to All Action Alternatives, Deferred Rotation Grazing).

The portions of the Lake Creek allotment absorbed into the Logan Valley Allotment have not been grazed since 1988. Initiation of the proposed use levels would keep grass vegetation vigorous by removing the decadence (wolfiness) from the plants which would increase the photosynthetic surface and the plants ability to synthesize carbohydrates. This would increase root mass as well as plant mass.

Summit Prairie Allotment

The addition of approximately 4,449 acres from the Lake Creek allotment to the Summit Prairie allotment would allow periods of rest or deferment during seasons of use. Rangeland vegetation would benefit from periods of rest and deferment in the season of grazing. Effects to vegetation are similar to those in the Effects Common to All Action Alternatives, Deferred Rotation Grazing.

A new fence could be constructed to configure the new Bosenberg unit added from the Lake Creek allotment. Big Creek and Corral Basin Creek would not be included within the new unit. To ensure adequate protection of Bosenberg Creek and other streams in the unit, riding to move livestock away from riparian areas into the uplands would be required. Ponds or springs would be developed in the uplands to provide alternative water away from the streams. The new water developments would facilitate desired cattle distribution in the upland by providing more water in appropriate locations. Upon establishment of the new fences in the allotment, the Bosenberg, Sagehen, and Little Logan units would be rested 3 years out of the 10 year period. This would provide a period of non-use or rest to allow desired vegetation composition and stream channel characteristics to maintained or improved. Until completion of the new boundary fences, the Sagehen unit would continue to be grazed early season with reduced numbers. Herbaceous vegetation recovery has been observed since management was changed in 2008 to early season with reduced numbers. See Aquatic Habitat Specialist Report for more detail.

The Lake Creek allotment has not been grazed since 1988. Initiation of proper grazing would have positive effects to plant physiology including increased photosynthesis, increased tillering, reduced shade, reduction of excessive mulch accumulations that may be inhibiting growth (Holecheck et al. 1989).

Rangeland Management

Lake Creek Allotment

Approximately 4,778 acres of the Lake Creek allotment would be added to the Logan Valley and Summit Prairie allotments. The remaining 5,069 acres of the Lake Creek allotment would continue to be vacant and not managed for livestock grazing. Effects for the vacant acres would be the same as that described under the No Action Alternative (Alternative 1).

Logan Valley Allotment

The Logan Valley allotment would have a larger landscape (gain of 603 acres) for grazing with no net gain in number of grazing units allowing a change from a deferred rotation grazing system to a system that includes rest and deferment. Although there would be an overall increase in allotment acres, there is no proposed change in currently permitted AUMs. The objective of Alternative 2 is to increase flexibility in allotment management to adapt to future changes. The acres added from the Lake Creek and McCoy Creek allotments would increase the overall forage available in the allotment, which would help offset forage losses with resting pastures. The majority of rest would occur in units with riparian habitat. The following table shows the minimum rest requirements for the units in the allotment.

Table R-7: Logan Valley Allotment Minimum Rest Requirements

Unit	Unit Acres	Required Rest
West Bosenberg Riparian pasture	14	Rest would occur for 3-5 years after the fence is constructed (estimated 2012) and willows are planted. Grazing would resume after management objectives have been achieved, with rest (season long rest) required 3 years out of a 10 year period after grazing is resumed.
West Lake Creek Riparian pasture	135	Rest would occur for 3-5 years after the fence is constructed (estimated 2012 or 2013) and willows are planted. Grazing would resume after willows have established, with rest (season long rest) required 3 years out of a 10 year period.
Big Creek Riparian pasture	623	Rest 3 years out of 10 year period (season long rest).
Acres Rested or Not Grazed on an Annual Basis (Average)	261	Note: Average is based on the minimum rest requirements listed above.

Approximately 2.8 miles of additional fences would be constructed and 2.3 miles removed with implementation of Alternative 2.

Summit Prairie Allotment

To ensure adequate protection of Bosenberg Creek and other streams in the Bosenberg unit, riding would be required to maintain livestock concentrations in the uplands. A rider may be able to train cows and calves to use uplands and discourage their use of riparian areas by consistently moving them away from riparian area to other locations. When cattle are regularly herded from riparian areas to uplands, generally the best practice is to herd cattle away from the stream after they have watered. Some research has found that herding combined with strategic

placement of desirable supplement appears to be even more effective in attracting cattle to graze previously underutilized areas. Herding lessens impacts on riparian areas and provides better distribution of livestock. Better distribution increases useable forage and thus capacity of a pasture or allotment. It may also result in the ability to keep livestock in management units longer because they spend less time in riparian area. Use of a rider would be an economic impact to the permittee.

Table R-8: Summit Logan Allotment Minimum Rest Requirements

Unit	Unit Acres	Required Rest
Sagehen	3,767	3 years out of 10 year period (season long rest).
West Summit Recovery unit (temporary fence)	19	Rest would occur for 3-5 years after the fence is constructed (estimated 2012). Grazing would resume after management objectives have been achieved with rest (season long rest) required 3 years out of a 10 year period after grazing is resumed. When grazing is resumed the move trigger and use levels in Appendix E would be applied.
Bosenberg	4,449	Rest 3 years out of 10 year period (season long rest).
Little Logan	3,270	Rest 3 years out of 10 year period (season long rest).
Acres Rested or Not Grazed on an Annual Basis (Average)	3,455	Note: Average is based on the minimum rest requirements listed above.

Approximately 7.0 miles of new fence would be constructed and 0.7 miles removed with implementation of Alternative 2.

Cumulative Effects

Cumulative effects were analyzed at the project area level. All of the activities listed in Appendix C were considered for their cumulative effects on rangeland vegetation and rangeland management. Past activities such as timber harvest, road construction, fire suppression, grazing, and wildfire have combined to create the current condition in the analysis area.

Logan Valley Allotment

In the Logan Valley allotment the combination of offsite water developments in upland areas and construction of riparian pastures (with water gaps) would allow riparian area recovery while still allowing upland areas to be grazed. Resting of riparian pastures would improve herbaceous vegetation and hardwood recovery (see Aquatic report for specific details). Offsite water developments in upland areas would provide better water distribution and opportunities to defer the season of grazing providing for better livestock distribution and even forage utilization. The availability of livestock water in Logan Valley allotment has been problem, limiting the opportunity to vary the season of grazing. Improving livestock watering availability would provide greater flexibility in grazing rotations and the ability to adapt to resource needs in the future.

Areas that were thinned and underburned in the Merit project over the last decade in the vacant Lake Creek allotment would be added to the Logan Valley allotment. Thinning and fuel treatments reduced debris on the forest floor and density of tree thickets. Past wildfires reduced dense tree canopies and excessive down material. Vegetative conditions have recovered from past wildfires. The combined effect of thinning, underburning, and past wildfires has increased water, sunlight and nutrients available to grasses and shrubs, thereby improving forage conditions. Adding acres from the Lake Creek allotment to the Logan Valley allotment would

provide additional forage and the opportunity to rest riparian units with less economic impacts to permittees.

Several vegetation restoration activities are ongoing in the Logan Valley allotment with the Logan Valley Meadow/Grassland Enhancement/Aspen Restoration Project. This project includes removal of encroaching conifers in meadows, underburning, commercial thinning, and aspen restoration on more than 300 acres in the Logan Valley area. Restoration activities exclude livestock grazing within approximately 18 acres of aspen. Thinning, meadow restoration (cutting encroaching conifers in meadows), and underburning would increase the forage production potential for livestock and big game.

Approximately 2.8 miles of additional fences would be constructed and 2.3 miles removed with implementation of Alternative 2. Ongoing projects would add an additional 2.8 miles of fence. Combined a total of 5.2 miles of fence would be constructed, of which 4.8 miles would be permittee maintenance responsibility. The other 0.4 miles of fence would be maintained by a Forest Service partner.

Summit Prairie Allotment

Several ongoing projects would continue to be implemented in the Summit Prairie allotment. The combined effects of these projects and the action proposed in Alternative 2 would provide better livestock water availability and livestock distribution in the Sagehen unit. Creation of the West Summit Creek riparian pasture with schedule rest starting in the 2012 grazing season for 3 to 5 year period plus parallel tree felling (barrier) would aid in vegetation and stream channel recovery on West Fork Summit Creek (see Aquatic report for specific details).

The combined effect of periodic resting of the Little Logan unit (3 years out of 10) combined with ongoing activities of fencing and caging of willows would restore hardwood and herbaceous vegetation recovery on Summit Creek. See Aquatic report for specific details.

Approximately 7.0 miles of additional fences would be constructed under the implementation of Alternative 2. Ongoing projects would add an additional 0.3 miles of fence. Combined a total of 7.3 miles of fence would be constructed. Maintenance of all new fences would be the permittee responsibility.

Alternative 3

Direct and Indirect Effects

Rangeland Vegetation

Lake Creek Allotment

All of the Lake Creek Allotment would remain vacant. The effects of Alternative 3 would be the same as no action (Alternative 1).

Logan Valley Allotment

No acres from the vacant Lake Creek Allotment would be added to the Logan Valley Allotment.

Approximately 267 acres from the Lake Creek and North Fork units of the McCoy Creek allotment would be absorbed into the into the Logan Valley allotment. See effects Common to All Action Alternatives.

The grazing system would not change from current management. Livestock would generally move from unit to unit with opportunities to defer the season of use on an annual basis. Opportunities to utilize more uplands of the allotment would improve with water source development (See cumulative effects discussions).

Summit Prairie Allotment

This alternative would create several riparian pastures and exclosures on Summit creek and West Fork Summit Creek. Portions of Summit Creek in the Sagehen unit would be fenced into riparian pastures (29 acres) and riparian exclosure (8 acres). The riparian pasture (Sagehen Riparian Pasture) would be rested for 3-5 years after the fence is constructed. The constructed Lower Little Logan Riparian Pasture (87 acres) and Upper Little Logan Riparian Pasture (15 acres) would be rested the same as the Sagehen riparian pasture. Grazing would resume after management objectives have been achieved with rest (season long rest) required 3 years out of a 10 year period after grazing is resumed. Within the fenced areas the density, cover and composition of stabilizing riparian vegetation species (i.e. sedges and rushes) are expected to improve. Water gaps would be constructed into the riparian pastures and exclosures on Summit Creek to provide access to water from upland pastures. Management objectives for each of the reaches on Summit Creek and West Fork Summit Creek are identified in Appendix A (part 2). A primary objective in the Sagehen and Little Logan unit is to expand willow species shrub density and heights across the floodplain over the next 5 to 10 years. Excluding livestock use is expected allow recovery to meet these objectives. See Aquatic report for specific details.

Recovery in upland areas of these units is expected with application of proposed use levels. Forage use in upland areas should increase with riparian portions of the units being removed and fenced into exclosures and riparian pastures. With current management, use levels in riparian areas has been a limiting factor with use levels and move triggers being reached before allocated forage in upland areas can be utilized.

The North Summit Riparian pasture (87 acres) would be created containing Summit Creek in the North Summit unit. The riparian pasture would be rested for 3-5 years after the fence is constructed with an objective of improving the greenline vegetation and streambank stability.

Rangeland Management

Lake Creek Allotment

All of the existing 10,196 acres of the Lake Creek Allotment would remain vacant and would not be managed for grazing.

Logan Valley Allotment

The grazing system will not change from current management. Livestock would generally move from unit to unit with opportunities to defer the season of use. The Logan Valley allotment would increase from 3,756 acres to 3,971 acres as a result of adding the Lake Creek and North Fork units (267 acres) from the McCoy Creek allotment into the Logan Valley allotment.

The West Bosenberg and West Lake Creek Riparian pastures (149 acres) would be rested for a minimum of 3-5 years after the fences are constructed. Although this is a relatively small number of acres when compared to the allotment as a whole, the acres are very productive forage areas which may have an impact to the economics of the grazing operation. The added productive forage acreage from the McCoy Allotment is anticipated to offset the planned rest.

Table R-9: Logan Valley Allotment Minimum Rest Requirements

Unit	Unit Acres	Required Rest
West Bosenberg Riparian pasture	14	Rest would occur for 3-5 years after the fence is constructed (estimated 2012) and willows are planted. Grazing would resume after management objectives have been achieved with rest (season long rest) required 3 years out of a 10 year period after grazing is resumed. When grazing is resumed the move trigger and use levels in Appendix E would be applied.
West Lake Creek Riparian pasture	135	Rest would occur for 3-5 years after the fence is constructed (estimated 2012) and willows are planted. Grazing would resume after management objectives have been achieved with rest (season long rest) required 3 years out of a 10 year period after grazing is resumed. When grazing is resumed the move trigger and use levels in Appendix E would be applied.
Acres Rested or Not Grazed on an Annual Basis (Average)	75	Note: Average is based on the minimum rest requirements listed above.

Approximately 0.3 miles of additional fences would be constructed and 1.5 miles removed with implementation of Alternative 3.

Summit Prairie Allotment

The grazing system would not change from current management. Livestock would generally move from unit to unit with opportunities to defer the season of use.

Riparian exclosures (with no grazing) and riparian pastures (with controlled gazing) would be constructed along portions of Summit Creek and West Fork of Summit Creek. Approximately 8 acres would be fenced into exclosures and 218 acres fenced into riparian pastures in this alternative. All riparian pastures would be rested for 3-5 years. Although this is a relatively small number of acres when compared to the allotment as a whole, the acres are very productive forage areas which would have an impact to the economics of the grazing operation. Table R-10 shows the minimum rest requirements for the Summit Logan allotment.

Table R-10: Summit Prairie Allotment Minimum Rest Requirements

Unit	Unit Acres	Required Rest
Sagehen Riparian pasture	29	Rest would occur for 3-5 years after the fence is constructed. Grazing would resume after management objectives have been achieved with rest (season long rest) required 3 years out of a 10 year period after grazing is resumed. When grazing is resumed the move trigger and use levels in Appendix E would be applied.
Upper and Lower Little Logan Riparian pastures	75	Rest would occur for 3-5 years after the fence is constructed. Grazing would resume after management objectives have been achieved with rest (season long rest) required 3 years out of a 10 year period after grazing is resumed. When grazing is resumed the move trigger and use levels in Appendix E would be applied.
West Summit Recovery unit (temporary fence)	27	Rest would occur for 3-5 years after the fence is constructed. Grazing would resume after management objectives have been achieved with rest (season long rest) required 3 years out of a 10 year period after grazing is resumed. When grazing is resumed the move trigger and use levels in Appendix E would be applied.
North Summit Riparian pasture	87	Rest would occur for 3-5 years after the fence is constructed. Grazing would resume after management objectives have been achieved with rest (season long rest) required 3 years out of a 10 year period after grazing is resumed. When grazing is resumed the move trigger and use levels in Appendix E would be applied.

Unit	Unit Acres	Required Rest
Acres Rested or Not Grazed on an Annual Basis (Average)	109	Note: Average is based on the minimum rest requirements listed above.

Note: Only the riparian pasture or recovery area would be rested.

Approximately 12.2 miles of additional fences would be constructed and 0.7 miles removed with implementation of Alternative 3.

Cumulative Effects

Cumulative effects were analyzed at the project area level. All of the activities listed in Appendix C were considered for their cumulative effects on rangeland vegetation and rangeland management. Past activities such as timber harvest, road construction, fire suppression, grazing, and wildfire have combined to create the current condition in the analysis area.

Logan Valley Allotment

In the Logan Valley allotment the combination of offsite water developments in upland areas and construction of riparian pastures (with water gaps) would allow riparian area recovery while still allowing upland areas to be grazed). Resting of riparian pastures would improve herbaceous vegetation and willow recovery (see Aquatic report for specific details). Offsite water developments in upland areas would provide better water distribution and opportunities to defer the season of grazing providing for better livestock distribution and even forage utilization. The availability of livestock water in Logan Valley allotment has been problem, limiting the opportunity to vary the season of grazing. Improved availability of livestock watering sources would provide greater flexibility in grazing rotations and the ability to adapt to resource needs in the future.

Several vegetation restoration activities are ongoing in the Logan Valley allotment with the Logan Valley Meadow/Grassland Enhancement/Aspen Restoration Project. This project includes removal of encroaching conifers in meadows, underburning, commercial thinning, and aspen restoration on more than 300 acres in the Logan Valley area. Restoration activities exclude livestock grazing within approximately 18 acres of aspen. Thinning, meadow restoration (cutting encroaching conifers in meadows), and underburning would increase the forage production potential for livestock and big game on more than 300 acres.

Approximately 0.3 miles of additional fences would be constructed and1.5 miles removed with the implementation of Alternative 3. Ongoing projects would add an additional 0.3 miles of fence. Combined 2.7 miles of fence would be constructed of which 2.3 miles would be permittee maintenance responsibility. The other 0.4 miles of fence would be maintained by a Forest Service partner.

Summit Prairie Allotment

Several ongoing projects would continue to be implemented in the Summit Prairie allotment. The combined effects of these projects and the action proposed in Alternative 3 would aid in vegetation and stream channel recovery of Summit Creek and West Fork Summit Creek. The actions combined would increase the availability of upland water sources, while maintaining access to water in streams through constructed water gaps. The actions combined would allow better utilization forage and more even distribution of forage in upland areas allowing vegetation condition to continue their upward recovery trend.

Construction and resting of riparian pastures and exclosures on Summit Creek and West Fork of Summit Creek as part of ongoing actions and Alternative 3 would reduce the amount of available forage thus having an economic impact to the permittee. All of the exclosures are located within riparian areas would be rested over the next 3-5 years. The forage within these exclosures is higher quality compared to the forage in the upland pastures. The allotment acres would increase slightly in this alternative. This increase would not offset losses in forage from more restrictive move triggers and use levels on the riparian greenline combined with acres rested in exclosures and riparian pastures. This could potentially shorten the season of use.

Approximately 7.0 miles of additional fences would be constructed with implementation of Alternative 3. Ongoing projects listed in would add an additional 0.3 miles of fence. Combined 7.3 miles of fence would be constructed. Maintenance of all new fences would be the permittee responsibility.

Alternative 4

Direct and Indirect Effects

Rangeland Vegetation

Lake Creek Allotment

Approximately 9, 459 acres of the Lake Creek Allotment would remain vacant. Effects to rangeland forage would be same similar to those described under Alternative 1, no action.

Logan Valley Allotment

Effects are the same as described for Alternative 2

Summit Prairie Allotment

The allotment would be managed with a deferred grazing system with livestock generally moving from unit to unit with opportunities to defer the season of use.

A key part of this alternative is the required use of a rider on a daily basis to ensure livestock stay in the upland portions of the Little Logan and Sagehen units. A comparison of the existing and desired conditions for the stream reaches in the Sagehen and Little Logan units shows a difference for stream shade, shrub development, and stable stream banks. The general management objectives established for the stream reaches is to improve willow and stream bank recovery (see Aquatic report for specific details). To accomplish these objectives more restrictive move triggers and allowable use levels for herbaceous riparian species on the greenline, shrubs, and percent bank alteration would be applied with this alternative compared to current management (see Appendix E for specific use levels). With use of a rider, cattle would be consistently moved away from the Summit Creek riparian area and distributed in upland areas. In the past move trigger and use levels in the riparian area have been reached prior to allowable use levels being met in the uplands. The goal in using a rider is to increase upland forage use and distribution, while decreasing the shrub use levels and stream bank impacts on Summit Creek. In addition to using a rider, riparian small riparian exclosures and cages would be placed on approximately 10 percent of the length of Summit Creek within the Sagehen and Little Logan units to provide additional protection and expedited recovery of willows (see Aquatic report for more detail).

Based on these management changes upland and riparian vegetation recovery is expected to improve (see Aquatic report for specific details regarding riparian areas).

A riparian pasture containing portions of Summit Creek and West Fork Summit Creek would be constructed from a portion of the Summit Rock and North Summit units containing portions of Summit Creek and West Fork Summit Creek.

The creation of the Prairie Riparian pasture along Summit Creek and the West Fork Summit Creek in portions of the North Summit and Summit Rock units with the construction of 3.1 miles of fence would allow the rest of the unit to be grazed in the upland portions. Livestock grazing is not expected to slow the upward or improving trend of upland vegetation conditions because riparian management standards would be expected to be met far in advance of substantial livestock grazing impacts occurring on the uplands.

Rangeland Management

Lake Creek Allotment

Approximately 388 acres of the Lake Creek allotment would be added to the Logan Valley allotment. The remaining 9,459 acres of the Lake Creek allotment would continue to be vacant and not managed for livestock grazing. Effects for the vacant ares would be the same as that described under the No Action Alternative (Alternative 1).

Logan Valley Allotment

Effects are the same as described for Alternative 2.

Summit Prairie Allotment

Small riparian exclosures (with no grazing) and riparian pastures would be constructed along portions of Summit Creek. There would be some forage lost by excluding livestock from the exclosures. The exclosures would be small in size (built tight to the steam) and contain approximately 10% of the total length of Summit Creek in these two pastures.

Daily riding by the permittee would ensure livestock stay in the uplands, reducing grazing use along Summit Creek in the Sagehen and Little Logan units during the season of use. Providing the rider would be the permittees responsibility which would increase management costs.

Approximately 6.1 miles of additional fences would be constructed and 0.7 miles removed with implementation of Alternative 4. All new fences would be the maintenance responsibility of the permittee.

Table R-11: Summit Prairie Allotment Minimum Rest Requirements

Unit	Acres	Required Rest
Prairie Riparian pasture	126	A deferred rest grazing system would be applied. The riparian pasture would be grazed early season one year and late season the following year.
West Summit Recovery Unit (temporary fence)	19	Rest would occur for 3-5 years after the fence is constructed (estimated 2012). Grazing would resume after management objectives have been achieved. When grazing is resumed, the area within the recovery unit would be grazed as part of the Prairie Riparian pasture utilizing the same use levels and use triggers (see Appendix E).
Acres Rested or Not Grazed on an Annual Basis	18	Note: Average is based on the minimum rest requirements listed above.

Unit	Acres	Required Rest
(Average)		

Cumulative Effects

Cumulative effects were analyzed at the project area level. All of the activities listed in Appendix C were considered for their cumulative effects on rangeland vegetation and rangeland management. Past activities such as timber harvest, road construction, fire suppression, grazing, and wildfire have combined to create the current condition in the analysis area.

Logan Valley Allotment

Cumulative Effects are the same as described for Alternative 2.

Summit Prairie Allotment

Small riparian exclosures and cages within the Sagehen and Little Logan would exclude livestock while continuing to develop a multiple age class of willows. This would be in excess of the buck and pole exclosure and cages proposed in the Little Logan unit.

Consistency with Direction and Regulations

All alternatives are consistent with the Malheur Forest Plan standards related to Range Management. Key Forest Plan standards include:

- Forest Wide Standard #80, page IV-34
- Forest Wide Standard #84, page IV-34
- Forest Wide Standard #86, Page IV-34
- Forest Wide Standard #87, Page IV-35
- Forest Wide Standard #88, Page IV-35
- Management Area 3A Standard #16, Page IV-57
- Management Area 3A Standard #18, Page IV-57
- Management Area 3A Standard #19, Page IV-58
- Management Area 3A Standard #20, Page IV-58
- Management Area 3A Standard #21, Page IV-58

Irreversible and Irretrievable Commitments

No irreversible or irretrievable effects would occur to rangeland vegetation as the result of implementing the action alternatives.

Invasive Species

Introduction

This is a summary of the invasive weed species report that evaluates the potential effects of livestock grazing on invasive weed species within the Summit Logan Valley Grazing Authorization Project. The full report can be found in Appendix F which is available for review by request.

Regulatory Framework

Forest Service Strategies, Regulations and Policies

- National Strategy and Implementation Plan for Invasive Species Management
- National Interagency "Pulling Together" Strategy
- Federal Noxious Weeds Act
- Invasive Species Executive Order, Feb. 3, 1999
- Forest Service National Noxious Weed Direction, FSM 2080
- Pacific Northwest Region, Preventing and Managing Invasive Plants FEIS and Record of Decision (October 2005)

Oregon Noxious Weeds Laws

- Chapter 452-Vector and Weed Control
- Chapter 541-State Department of Agriculture
- Chapter 570-Plants: Inspection, Quarantine, Pest and Weed Control
- Noxious Weed Quarantine; OAT 603-52-1200

Analysis Methods

Invasive weed species surveys have been conducted throughout the Malheur Forest. All documented weed sites from these surveys are recorded in a National data base, Natural Resources Information System (NRIS). The data base includes individual site records indicating the location, size of infestation, plant numbers and density, type of treatment implemented, follow-up treatments and effectiveness. The NRIS data base was used as a source to identify known weed sites within the Summit Logan Valley Grazing Authorization Project area.

Other sources of information used in this analysis include:

- Malheur National Forest GIS data base
- Malheur National Forest Land and Resource Management Plan
- Pacific Northwest Region Final Environmental Impact Statement for the Invasive Plant Program, 2005.

Affected Environment

The invasive weed species found in the Summit Logan Valley Grazing Authorization Project Area by allotment area as follows:

Table N1: Lake Creek Allotment

Invasive Weed Species	Common Name	Size (acres)
Centaurea biebersteinii	Spotted Knapweed	3
Cirsium arvense	Canada Thistle	0.2
Linaria vulgaris	Yellow Toadflax	0.2

Table N2: Logan Valley Allotment

Invasive Weed Species	Common Name	Size (acres)
Centaurea biebersteinii	Spotted Knapweed	0.3

Invasive Weed Species	Common Name	Size (acres)
Centaurea diffusa	Diffuse Knapweed	2.1
Cirsium arvense	Canada Thistle	0.1
Linaria dalmatic	Dalmation Toadflax	0.1
Linaria vulgaris	Yellow Toadflax	0.1
Cirsium vulgare	Bull Thistle	0.1

Table N3: McCoy Creek Allotment

Invasive Weed Species	Common Name	Size (acres)
Centaurea diffusa	Diffuse Knapweed	0.1

Table N4: Summit Creek Allotment

Invasive Weed Species	Common Name	Size (acres)
Cynoglossum officinale	Hounds-Tongue	0.1
Centaurea biebersteinii	Spotted Knapweed	0.3
Centaurea diffusa	Diffuse Knapweed	0.2
Cirsium arvense	Canada Thistle	2.1
Linaria dalmatic	Dalmation Toadflax	1.5
Hypericum perforatum	St. Johnswort	0.2

Species known to occur along highways and roadsides accessing the project area are houndstongue, spotted knapweed; diffuse knapweeds, Canada thistle, dalmation toadflax, yellow toadflax, St. Johnswort. These areas can be vectors for the spread of weeds into other areas in the Malheur National Forest.

Environmental Consequences

Alternative 1 - No Grazing

Direct and Indirect Effects

There would be no direct or indirect effects under Alternative 1 because no actions are being proposed. There would be no change to the treatment of noxious weed infestations within the project area under Alternative 1.

Cumulative Effects

Because Alternative 1 has no direct or indirect effects, there would be no cumulative effects.

Alternative 2, 3 & 4

Direct and Indirect Effects

Under Alternatives 2, 3, and 4 the lands comprising the Summit Logan Valley Grazing Planning area would be managed to achieve a desired condition as described in the Forest Land and Resource Management Plan (Forest Plan) and would maintain a healthy ecosystem. The proposed activities would foster a healthy, weed-resistant plant community consisting of a collection of species diverse enough to fill all the niches.

Under all the action alternatives, new structural improvements are proposed. The ground disturbance for the new structural improvements could create an opportunity for invasive weed species to be introduced.

The action alternatives would allow livestock to continue to act as a vector for invasive weed species to spread throughout the allotments. The presence of livestock on the landscape results in a risk of invasive weed species being introduced into non-infested site because livestock can carry weed propagates in their hair, hooves, and digestive tract. However, based on the current invasive weed species population, the risk of spread is low.

Livestock grazing or associated permittee actions have not been identified as a major factor in the establishment and spread of invasive weed species in the project area. Although the action alternatives may increase the chances for the spread of invasive weed species the permittees and Forest Service range management personnel presence on the allotments would assist in detection and control of infestations.

District personnel and permittees would continue to work together to develop an accurate and up to date inventory of the invasive weed species present on the allotments within the project area. Once inventoried, each site would be treated. Permittees are encouraged to monitor high-risk sites (loading and unloading sites, corrals, high impact sites) and take immediate action if invasive species are found. This would continue to reduce the risk of subsequent invasive weed species invasion and therefore, would reduce the risk of systemic alteration of: resource partitioning, hydrologic, nutrient and erosion/sedimentation processes. Grazing fee funds (range betterment funds) would be available for the treatment of invasive weed species.

All action alternatives propose adaptive management. Adaptive management gives the land manager greater opportunity to tailor utilization rates and the amount of disturbance to specific areas which are not meeting desired conditions. All action alternatives would allow control of livestock impacts if prescribed standards are not met. Herbaceous plant communities respond differently to grazing impacts; the duration of rangeland recovery and increased resilience to invasive species invasion is better met with more options to control livestock.

Mitigation measures for all action alternatives would be followed to prevent any new infestations and the spread of invasive weed species (see Ch. 2 for specific measures).

Adaptive management under the action alternatives provides a range of use rates that can shorten the recovery period if more stringent standards need to be implemented.

Cumulative Effects

The project area has very few invasive species sites. Livestock impacts, both as a physical vector of spread and herbivory effects on native plants, would be different across the project area. The cumulative effect of disturbance caused by livestock grazing would recover at a slower rate compared to no livestock grazing. The longer the duration of recovery, the more susceptible the project area is to invasive species invasion and the resulting consequences to the resources. Certain invasive species populations would almost certainly continue to expand, regardless of the alternative chosen. However, other species that occupy limited area would be managed to prevent further spread.

Cumulatively there are a tremendous number of activities that occur within the Rangeland Planning Area which can and do provide a moderate to high probability of the introduction and

spread of invasive species propagules. These reasonably foreseeable future activities (Appendix C) include (but are not limited to): timber harvest, mining, motorized and nonmotorized recreation, road construction and maintenance, and resource enhancement projects.

Although the action alternatives continue as a disturbance factor that provides a potential risk of invasive weed species introduction and spread, and provides for a greater level of disturbance, all actoin althernative retain current levels of recognition and reporting of new infestations. The increased spread and establishment of invasive weed species would be expected to be imperceptible when viewed in the context of all of the other ongoing activities.

Consistency with Direction and Regulations

All alternatives are consistent with Forest-wide standards for rangeland resources and noxious weeds, including Forest plan modifications made by the Pacific Northwest Region Invasive Plant Program FEIS.

Irreversible and Irretrievable Commitments

None of the alternatives result in irreversible or irretrievable effects to herbaceous vegetation for the establishment of invasive weeds species.

Botany

Introduction

This is a summary of the Biological Evaluation which analyzes the effects or impacts from the proposed action and alternatives of the Summit Logan Valley Grazing Authorization Project to plant and lichen species that are federally-listed as threatened, endangered, or proposed for federal listing under the Endangered Species Act of 1973 as amended, and species currently identified as sensitive (FSM 2670.5, USDA Forest Service 2011) by the Regional Forester of the Pacific Northwest Region (collectively called TES species). The full Biological Evaluation can be found in Appendix F which is available for review by request.

Only sensitive plant and lichen species that are documented or suspected to occur within general biophysical area where the project would occur (i.e. the headwaters of the Malheur River watershed) are analyzed. Furthermore, only those species which may possibly be directly, indirectly, or cumulatively affected by the proposed actions are considered. Species that are not suspected to occur within the analysis area, or are eliminated from consideration due to other factors, are not described and are not considered in the detailed effects analysis [as per 40 CFR §1500.4, 40 CFR §1500.1(b)]. However, information on these species is available at the Supervisor's Office of the Malheur National Forest, upon request.

Regulatory Framework

Regional Forester's Sensitive Species List

There are not threatened, endangered or proposed plant species documented or suspected to occur on the Forest. However, forty-seven sensitive plant species listed on the 2008 Regional Forester's Sensitive Species List are documented or suspected to occur in the Malheur National Forest. This Biological Evaluation fulfills the applicable standards and guidelines of Malheur National forest Land and Resource Management Plan.

Analysis Methods

A pre-field analysis (or pre-field review) was used to determine the probability that TES species, and/or their respective habitats, are located within or adjacent to the project area, and to determine the extent and intensity of previous survey efforts. Information from the pre-field review, in conjunction with the project description, was used to determine the need and intensity of field surveys and, in part, fulfills the standards and procedures for conducting a biological evaluation (FSM 2672.42).

A complete list of previous and historical surveys for sensitive and rare plants in the project area were determined by querying the Forest Service's Natural Resource Information System for Threatened, Endangered, and Sensitive Plant Species (NRIS-TESP 2012) and by examining historical survey forms and maps, NEPA records, and electronic botanical databases.

The following sources of information were used to determine which TES species and their respective habitats, occur or may occur within or near the project area:

- The Regional Forester's most current Sensitive Species List, released December 2011 (USDA Forest Service 2011);
- The Forest Service's Geographic Information System (GIS) corporate database: Natural Resource Information System – Threatened, Endangered, and Sensitive Plant species (NRIS-TESP 2012);
- The Malheur National Forest sensitive plant species database and Geographic Information System (GIS) layer, and other pertinent GIS mapping layers;
- *Rare, Threatened, and Endangered Species of Oregon* (Oregon Biodiversity Information Center 2010);
- *Sensitive Plants of the Umatilla and Malheur National Forests* (USDA Forest Service 2006);
- *Sensitive Plants of the Malheur, Ochoco, Umatilla, and the Wallowa-Whitman National Forests* (Brooks et al. 1991);
- *Flora of the Pacific Northwest* (Hitchcock and Cronquist 1973);
- *Flora of North America* (FNA 2007);
- *Moonwort (*Botrychium*) Workshop* handbook (Farrar and Johnson-Groh 2004) and *Conservation Assessment for 13 Species of Moonworts (*Botrychium *Swartz Subgenus* Botrychium*)* (Ahlenslager and Potash 2007);
- *Field Guide to the Sedges of the Pacific Northwest* (Wilson et al. 2008) and *Field Guide to Intermountain Sedges* (Hurd et al. 1998);
- Species Fact Sheets provided by the Interagency Special Status / Sensitive Species Program website [http://www.fs.fed.us/r6/sfpnw/issssp/] of the Pacific Northwest Region, Forest Service and Bureau of Land Management's Oregon and Washington State Offices;
- Available literature, reports, conservation plans, conservation assessments, and species descriptions on file at the Malheur National Forest Supervisor's Office; and
- Project maps and aerial photographs provided by the Interdisciplinary Team.

More than 46 separate surveys have been conducted in the Summit Logan Valley analysis area, over a nine year period (2003-2012). This includes work accomplished by District, Forest, Area, and Regional staff, as well as contractors, partners, universities, and numerous volunteers. In

total, over 120 individuals have participated in the survey efforts; this easily represents over 3,000 personnel-hours of equivalent work covering more than 2,000 acres of rare plant habitat.

Affected Environment

As a result of all of the survey efforts, 14 sites of five different sensitive species have been discovered: three sensitive mosses, *Helodium blandowii* (Blandow's feather moss), *Tomentypnum nitens* (tomentypnum moss), and *Meesia uliginosa* (meesia moss), and two sensitive moonwort ferns *Botrychium crenulatum* (crenulate moonwort) and *Botrychium montanum* (mountain grape-fern). All of these species were found in or near the fen/peatland complex in the Big Field unit, West Lake Creek Riparian pasture, and Big Creek Riparian pasture of the Logan Valley Allotment. Table B-1 lists the sensitive species populations, management units, and approximate extent of the population. No sensitive species were found in the Lake Creek, McCoy Creek, and Summit Creek Allotments, even though the Summit Creek is one of the most intensively surveyed riparian areas on the Forest.

Table B-1: Documented Sensitive Species Populations

Sensitive Species	Population Location by Unit	Extent of Population*
Botrychium montanum	Big Field unit	> 2 m^2
Botrychium crenulatum	Big Field unit	> 1 m^2
Helodium blandowii	Big Field unit	1.0 acres
	West Lake Creek Riparian pasture	0.8 acres
	Big Creek Riparian pasture	0.3 acres
	Big Creek Riparian pasture	0.5 acres
Meesia uliginosa	Big Field unit	0.1 acres
	Big Field unit	0.7 acres
	Big Field unit	0.1 acres
	Big Creek Riparian pasture	0.3 acres
	Big Creek Riparian pasture	0.1 acres
Tomentypnum nitens	Big Field unit	0.3 acres
	Big Creek Riparian pasture	0.1 acres
	Big Creek Riparian pasture	0.3 acres

* This represents the geographic extent of the population; not all of this area is occupied by the species

In addition to the discovery of the fen-dependent sensitive species listed above, qualitative and quantitative assessments of their habitats in the fen complex were also conducted. Habitat assessments utilized standardized procedures and protocols designed for evaluating and monitoring conditions of fens and other groundwater-dependent ecosystems (Weixelman and Cooper 2007, USDA Forest Service 2010, 2012).

The fen complex, which houses the sensitive species populations and habitats, can be described as a broad helocrene spring system with a mosaic of peatlands, fen pools, wet and moist meadows, mesic shrublands, aspen stands, lodgepole pine swamps, and occasional mixed conifer stands. The fen complex and associated wetland systems are primarily dominated by wetland mosses, graminoids, and willow species (Malheur NF 2009, Rausch 2009, Mellmann-Brown and Rausch 2010).

The three sensitive moss species occur exclusively on permanently saturated or flooded peatlands. Peatlands, or fens, are some of the most sensitive, endangered, and fragile ecosystems in the western United States (ISSSSP 2012, Mitsch and Gosselink 2007, USDA Forest Service 2010, Vitt & Wieder 2008, Weixelman and Cooper 2007; and references cited herein). Damage

or substantial degradation to peatland systems should be avoided to prevent loss of rare species habitat integrity, among many other reasons (Ibid.). Hydrologic function, peat development, and species composition are some of the general components used to evaluate peatland condition. Appendix A, Part 1 of the Summit Logan Valley Grazing Authorization DEIS describes the existing condition of the Logan Valley fen complex as it relates to sensitive plant habitat and ecosystem integrity.

Twenty-six sensitive species are further analyzed for potential effects (Table B-2). These species are either documented or are suspected to occur in the project area, and the specific characteristics of the species' habitat, ecology, and/or biology are such that a more detail analysis of potential effects are needed.

Table B-2: Selected Sensitive Species Habitats, and Presence in the Area

Sensitive Species (Common Name)	Habitat(s)	Presence in the Project Area
Carex cordillerana (Cordilleran sedge)	Woodlands and forested lands in the shade of conifers, deciduous trees, and shrubs; rocky slopes, grassy slopes, and stream benches; often growing in leaf litter and duff.	Suspected – high probability
Muhlenbergia minutissima (Annual dropseed)	Intermittent and ephemeral streams, sandy or gravelly drainages; open, lightly-disturbed areas; also on rocky slopes, flats, and old roads.	Suspected – low probability
Trifolium douglasii (Douglas' clover)	Moist meadows, prairie remnants, vernally wet areas, riparian areas along streams.	Suspected – low probability
Botrychium ascendens (Upward-lobed moonwort)	Moist meadows, riparian zones, openings in cold forests, grassy fields, and moist roadsides.	Suspected – high probability
Botrychium hesperium (Western moonwort)	Moist meadows, riparian areas, openings and edges of forests, grassy slopes, sand dunes, snow fields, moist roadsides, and road ditches.	Suspected – high probability
Botrychium lunaria (Common moonwort)	Moist meadows, riparian areas, openings and edges of cold forests, open fields, and moist roadsides.	Suspected – moderate probability
Botrychium montanum (Mountain grape-fern)	Dark coniferous forests, usually near swamps, streams, and springs; wet meadows, saturated soils. Often growing in a bed of mosses.	Documented
Botrychium paradoxum (Twin-spiked moonwort)	Moist meadows, riparian zones, openings and edges of cold coniferous forests, grasslands, fallow pastures, forb-dominated meadows, moist roadsides, and snowfields.	Suspected – high probability
Botrychium pedunculosum (Stalked moonwort)	Moist meadows, riparian zones, brushy secondary-growth habitats along streams and roadsides, openings or on edges of cold coniferous forest, moist roadsides.	Suspected – high probability
Bryum calobryoides (Beautiful bryum moss)	Rock outcrops, exposed boulder fields, cliffs, and soils in montane meadows.	Suspected – high probability
Eleocharis bolanderi (Bolander's spikerush)	Vernally wet meadows with poorly drained soils, moist meadows, intermittent stream margins, springs and seeps.	Suspected – high probability
Listera borealis (Northern twayblade)	Springs, seeps, swamps, and cold water streams in moist, rich soils of shady coniferous forests.	Suspected – high probability
Mimulus evanescens (Disappearing monkeyflower)	Vernally wet sites and fluctuating banks of intermittent streams or pools in sagebrush, juniper, and ponderosa pine zones. Often in	Suspected – low probability

Sensitive Species (Common Name)	Habitat(s)	Presence in the Project Area
	sites with sand or heavy gravel.	
Phacelia minutissima (Dwarf phacelia)	Moist meadow and seep edges, or on vernally wet open meadows and barren slopes. Reported to occur with aspen.	Suspected – high probability
Schistidium cinclidodonteum (Schistidium moss)	Intermittent streams, rock outcrops, on wet or dry rocks, on soil in crevices of rocks and boulders.	Suspected – moderate probability
Tortula mucronifolia (Mucronleaf tortula moss)	Springs, seeps, riparian forests, aspen stands, exposed tree roots, sheltered ledges and crevices of rock outcrops and cliffs.	Suspected – moderate probability
Anthelia julacea (Alpine liverwort)	Peatlands, fens; associated with low ericaceous shrubs.	Suspected – moderate probability
Botrychium crenulatum (Crenulate moonwort)	Peatlands, fens, springs, seeps, marshy areas, moist and wet meadows, riparian zones, openings in cold forests, and moist roadsides.	Documented
Harpanthus flotovianus (Great mountain flapwort)	Peatlands, fens, on soil covered rocks and decaying wood in moist forests.	Suspected – moderate probability
Helodium blandowii (Blandow's feather moss)	Peatlands, rich fens, springs, wet meadows, and along streams with highly organic soils.	Documented
Meesia uliginosa (Meesia moss)	Peatlands, rich fens, springs, wet meadows, and other areas saturated with groundwater.	Documented
Ophioglossum pusillum (Adder's-tongue)	Open fens and other peatlands, wet meadows, springs, seeps, marsh edges, pastures, grassy shores, roadside ditches, damp sand, grassy swales, pastures, old fields, and floodplain woodlands in wet acid soil.	Suspected – low probability
Pseudocalliergon trifarium (Blunt water moss)	Peatlands, rich fens, pools, and other areas saturated with groundwater.	Suspected – moderate probability
Splachnum ampullaceum (Small capsule dung moss)	Peatlands or other wetlands on old dung of herbivores, or on soil enriched by dung.	Suspected – moderate probability
Tomentypnum nitens (Tomentypnum moss)	Peatlands, fens, springs, wet meadows, and other areas saturated with groundwater.	Documented
Utricularia minor (Lesser bladderwort)	Open water in peatlands, in low nutrient lakes and ponds, beaver ponds, sloughs, marshes, mudflats, and other low energy waterways.	Suspected – moderate probability, * reported in the area, but report is not confirmed

Environmental Consequences

Alternative 1 - No Grazing

Direct and Indirect Effects

Sensitive Species with Potential Impacts from Grazing/Herbivory

Absence of livestock grazing would result in less overall herbivory in the area (although herbivory from wildlife would continue) would likely have beneficial consquences for these species.

Sensitive Species with Potential Impacts from Trampling and Defecation

These species are often reconized as being threatened by livestock grazing therefore the absence of livestock gazing could be a beneficial consquences for these species.

Potential Impacts to Sensitive Peatland Species

Absence of livestock grazing would have a beneficial consquences for these species and their associated habitats.

Alternative 2, 3, 4

Direct and Indirect Effects

The twenty-six sensitive plant species that may be affected are analyzed for potential effects from the action alternatives. These species are either documented or are suspected to occur in the project area and are listed and analyzed by three *potential impact groups*: (1) impacts from grazing and herbivory, (2) impacts from trampling and/or defecation, and (3) impacts to peatlands and peatland-dependent species from trampling, trailing, herbivory, and defecation. Potential impact group are roughly based on groupings of species by preferred habitat, but also takes into consideration the general biology, growth habits, and taxonomy of the species.

Table B-3 Direct/Indirect Effects to Sensitive Species by Alternative

Concern / Impacts	Sensitive Species	Alternative(s)		Rationale
		1	2, 3, 4	
Species where impacts from herbivory / grazing is a concern.	*Carex cordillerana* *Muhlenbergia minutissima* *Trifolium douglasii*	BI	MDI	These three species are palatable and have the potential to be negatively impacted by intensive grazing (Bakker et al. 2010, NatureServe 2012, Wilson et al. 2008).
Species where impacts from trampling and defecation is a concern.	*Botrychium ascendens* *Botrychium hesperium* *Botrychium lunaria* ***Botrychium montanum*** *Botrychium paradoxum* *Botrychium pedunculosum* *Bryum calobryoides* *Eleocharis bolanderi* *Listera borealis* *Mimulus evanescens* *Phacelia minutissima* *Schistidium cinclidodonteum* *Tortula mucronifolia*	BI	MDI	These species are very small, delicate, and exists in areas with high soil moisture. Livestock are often concentrated in these areas. For these species, a single hoof print or cow pie can destroy an individual plant, and even a relatively small amount of hoof action and/or defecation can eliminate a small population.
Species where impacts from trampling, trailing, herbivory, and defecation in peatlands is a concern.	*Anthelia julacea* ***Botrychium crenulatum*** *Harpanthus flotovianus* ***Helodium blandowii*** ***Meesia uliginosa*** *Ophioglossum pusillum* *Pseudocalliergon trifarium* *Splachnum ampullaceum* ***Tomentypnum nitens*** *Utricularia minor*	BI	MDI/BI	Adaptive management strategies that benefit these species would be implemented if detrimental effects are occurring and management objectives are not met within a 5 year period (SLVGA DEIS, Appendix A, parts 2 and 3).

BI = Beneficial Impact, NI = No Impact, MDI = May Detrimentally Impact, but will not lead to a trend toward federal listing [40 CFR §1508.8, FSM 2672.42(5)]. Species identified in bold font are documented within the project area.

Sensitive Species with Potential Impacts from Grazing/ Herbivory

Species in this group are those which are known to be palatable to livestock, and are unlikely to be affected by any other potential impacts from livestock grazing. This includes the sedge *Carex cordillerana*, the grass *Muhlenbergia minutissima*, and the clover *Trifolium douglasii*. Currently, there are no known populations in the area. While these three species occur in different habitats, each species is palatable to livestock and have the potential to be negatively impacted by grazing (Bakker et al. 2010, NatureServe 2012, Wilson et al. 2008). Continued grazing under any of the three "action" alternatives may detrimentally impact these species, but would not lead to a trend toward federal listing.

Sensitive Species with Potential Impacts from Trampling and Defecation

This species group includes those species that are susceptible to impacts from trampling or defecation from livestock. These plants are all too small and/or devoid of nutritional value to be consumed by livestock. This group is comprised of tiny plants that often occur in isolated patches (i.e. individuals are less than 3 inches high and occurrences are often less than 1 square foot in total area). These are most often found in areas with high levels of soil moisture for all or some of the growing season. Such species include many *Botrychium* species, bryophytes, and other inconspicuous plants. There is one documented population of *Botrychium montanum*; all other species are suspected to occur in the area.

As stated above, these species are very small, delicate, and exists in areas with high soil moisture (e.g. springs, intermittent streams, glades, aspen stands, and moist to wet meadows). Livestock are often concentrated in these areas. For these species, a single hoof print or cow pie can destroy an individual, and even a relatively small amount of hoof action and defecation can eliminate an entire population. These species are often recognized as being threatened by livestock grazing (ISSSSP 2012). Conversely, continued grazing under any of the three "action" alternatives may detrimentally impact these species, but should not lead to a trend toward federal listing.

Potential Impacts to Sensitive Peatland Species

Peatlands are unique and important types of wetlands. In the Blue Mountains, peatlands are dependent upon a constant supply of groundwater. Groundwater-dependent peatlands are referred to as fens. Fens require thousands of years to develop, are hotspots of biodiversity, and cannot be easily restored once degraded or destroyed (Rydin and Jeglum 2009; USDA Forest Service 2010a, 2010b, 2012a, 2012b; Vitt and Wieder 2008; Weixelman and Cooper 2009). They often contain a disproportionate amount of rare and sensitive plant and animal species (NRIS 2012, Weixelman and Cooper 2009).

Domestic livestock grazing is often recognized as a potential threat to fen ecosystems (ISSSSP 2012, Weixelman and Cooper 2009). The following impacts that are recognized as major contributors to the degradation of fens: exposed peat and subsequent peat loss due to livestock trampling, loss of peat forming species due to trampling and grazing, alteration of hydrologic regimes due to entrenched livestock trails and effluent channels, and introduction of non-native and non-peat-forming species in areas with substantial soil disturbance.

The fen complex in the Logan Valley Allotment can be described as a broad helocrene spring system with a mosaic of peatlands, fen pools, wet and moist meadows, mesic shrublands, aspen stands, lodgepole pine swamps, and occasional mixed conifer stands. The fen and wetland

systems are primarily dominated by wetland moss, graminoids, and willow species (Rausch 2009 and references in Appendix A). Portions of the fen complex exist throughout the allotment.

Four sensitive plant species are documented within the fen complex (*Botrychium crenulatum* and the mosses *Helodium blandowii*, *Meesia uliginosa*, and *Tomentypnum nitens*,), and six other sensitive plants are suspected to occur. These species can be impacted by cattle in the same way as described in the section above ("Potential Impacts from Trampling and Defecation"). Additionally, these species are intricately dependent on an intact peatland system. Thus, any negative changes to the water table, peat, or species composition of the peatland habitat would cause the loss of these species from the system. To address this, a series of management objectives and associated adaptive management strategies have been developed.

Management objectives for peatland habitats and peatland-dependent sensitive species focus on three general topics which address the integrity and resiliency of these sensitive ecosystems: hydrologic function, peat development, and species distribution and composition. Within five years the following management objective shall be met (Appendix A, parts 1 and 2):

- Exposed or bare peat is less than or equal to 15%.
- Livestock trails are re-vegetating and are diverting less early season flow of water.
- The proportion of peat forming species is equal to or greater than 90%.
- The proportion of obligate wetland plant species is equal to or greater than 90%.
- Non-native and invasive plant species are absent or are not expanding.
- Sensitive plant species populations are maintained at current extent or are expanding.
- Sensitive plant habitats are maintained at current extent or are expanding.

A more detailed description of the management objectives and existing conditions are provided in Appendix A, parts 1 and 2, of the Summit Logan Valley Grazing Authorization DEIS. Failure to meet these management objectives within a five year period will trigger an adaptive management strategy. In this case, a riparian pasture fence shall be constructed around the fen complex; this is common to all three "action" alternatives (Appendix A, part 3). Construction of a riparian pasture would allow better control of livestock use in the fen complex, and would provide the option of rest or non-use of the riparian pasture(s).

Continued grazing under any of the three "action" alternatives may detrimentally impact documented populations of these species in the short-term, but would not lead to a trend toward federal listing. Furthermore, in the long-term (> 5 years), there should be a beneficial impact if either (1) the management objectives are met, or (2) adaptive management strategies are enacted.

Cumulative Effects

Potential cumulative effects to sensitive plant species may include past, present, and foreseeable future activities described in Appendix C. Possible effects from past activities, such as grazing, timber harvest, road construction, fire suppression, and other activities, are unknown. These are difficult to accurately assess as the details of the activities and existing condition of sensitive species at the time of the actions were either not known or not described. However, since 1990, protection and management of sensitive species has been included in analysis and design of all projects. Therefore, present and future projects, and those that have occurred in the recent past are not likely to contribute any negative impacts to the sensitive species described above. In addition to Forest activities, browsing and herbivory from insects, wild ungulates, and other

wildlife, or trampling and trailing from wild ungulates, may also possibly contribute to cumulative effects on sensitive plant species.

Consistency with Direction and Regulations

This analysis has shown that the Summit Logan Valley Grazing Project is consistent with the Malheur National Forest Land and Resource Management Plan, as ammended. This analysis also indicates that there may potentially be detrimental impacts individuals, populations, and habitats of some sensitive plant species, but that this would not result in the loss of population or species viability nor cause a trend toward federal listing under the Endangered Species Act. Furthermore, with adaptive management strategies in place, there may be beneficial impacts to individuals, populations, and habitats of some sensitive plant species.

Irreversible and Irretrievable Commitments

The Summit Logan Valley Grazing Authorization Project should not result in an irretrievable and irreversible commitment of resources.

Soils

Introduction

For soils, the following sections describe the Regulatory Framework, Affected Environmentand Environmental Consequences of the alternatives.

Regulatory Framework

The Malheur National Land and Resource Management Plan (Forest Plan) and FSM R6 Supplement 2500-98-1 describe all legal and regulatory requirements for soil conservation for this EIS.

Two Forest Plan standards in particular are applicable to this EIS. Forest Wide Standard 127 (page IV-40) gives minimum percent effective ground cover levels as follows:

Table S-1: Standard 127

Soil Erosion Hazard	Minimum Ground Cover, %
Low	30-40
Medium	40-60
High	60-75
Very High	75-90

If ground cover meets Standard 127, erosion would not be expected. Small amounts of erosion from roads are acceptable and similarly small amounts of erosion from small areas of rangeland are acceptable, as long as water quality standards are met.

Forest Wide Standard 126 says detrimental soil conditions (including compaction and puddling which decrease infiltration rates and productivity) shall not exceed 20% of the total acreage within any activity area. For this soil section "activity area" means each allotment.

Analysis Methods

In order to check on how commonly current livestock use increases erosion, the project soil scientist visited the allotments (except Lake Cr. Allotment), examining selected areas for signs of erosion and overland runoff on September 22 and 26, 2008.

The analysis area for this soil analysis is each allotment. The analysis time period for this soil analysis is the period that the management practices are applied.

Affected Environment

Livestock detrimentally compact and puddle soil in the small areas where they concentrate, such as around salting ground and water troughs. However, on forested areas, current cattle impacts on the soil are minor because of the abundant ground cover and relatively small amounts of forage. Thus, over the whole activity area of an allotment, livestock plus other sources of compaction (such as roads, logging, firewood gathering, and ATVs) cause a cumulative amount of compaction and puddling less than the 20% limit of Forest Wide Standard 126. On parts of Lake Creek Allotment burnt by the 1990 fires, ground cover has recovered so that soils function as forest soils and erosion is close to zero (Table S-2). On parts of the Lake Creek Allotment burnt by the 2002 High Robert fire, ground cover is nearly recovered, and soil erosion is close to zero (Table S-2, between 1997 & 2004).

Table S-2: Ground Cover on C & T Clusters on Forested Sites

Cluster	Year Read	Bare Soil %	Rock + Erosion Pavement %	Moss %	Litter + Plant %
C-201, Lake Cr. Allotment Burned 1990, Erosion Seeded 1990, Logged 1991, Tree Planted ~ 1992	1991	34	15	0	51
	1993	36	12	1	51
	1995	27	13	6	64
	1997	14	13	8	65
	2004	8	5	1	86
	2010	5	1	0	94
C-201, Lake Cr. Allotment Burned 1990, Logged ~ 1991, Trees Planted ~ 1992	1991	43	0	1	56
	1993	32	4	7	57
	1995	20	3	24	53
	1997	14	5	57	54
	2004	5	7	8	77
	2010	7	0	7	92
Logan 11, LO-11, Summit Prairie Alltoment, Stumps in 1956 & 2004 photos	1956	12	1	0	87
	2004	5	0	0	95

However, compaction and puddling caused by cattle can decrease infiltration capacity enough that it increases runoff and erosion. Two types of areas that cattle could detrimentally affect are non-forest upland soil, and grassy riparian areas and meadows.

Erosion effects, of past and ongoing activities listed in Appendix C, on non-forest upland soil and grassy riparian areas, are described in this paragraph. Concentrated water from roads is eroding some soil, especially from shallow soil areas, but this erosion is minor and local. Road prisms produce some sediment, but the loss of soil productivity from this erosion is minor,

because roads already have been removed from the productive land base. Recreational use of ATVs and hiking trails may cause minor, localized erosion in grassy riparian areas and meadows, but these effects are minor, because these soils have low erosion hazard, and because of the small amount of soil affected. No erosion from ATVs or hiking trails was seen during the soil scientist's inspections. Dispersed camping may have compacted and puddled a negligible amount of soil. Cumulative loss of soil productivity from these erosion sources combined is negligible. Water withdrawals and irrigation has increased the production of some meadows, but may have reduced production along some streams. Other past and on-going activities listed in Appendix C (including timber harvest, stand replacing fire, activities on private land, and meadow restoration) have had no effect on non-forest upland soil areas or meadows or grassy riparian areas in the allotments.

On Lake Creek Allotment, soil and vegetation effects from livestock grazing have partially recovered during the period of rest. The soils are as vulnerable to erosion as similar soils elsewhere in the planning area.

Non-Forest Upland Soil

Soil Types

The Malheur Soil Resource Inventory (SRI) (Carlson 1974) is the best source of information about soils at the scale of this project.

Non-forest upland soils tend to occur in two environments: 1) outwash in Logan Valley, and 2) dry environments with shallow, rocky soils. These include soils that support juniper woodland, as well as stands of shrubs or herbaceous plants. Gravel and cobble content, both of outwash and shallow soils, range from 30 to 80%. The outwash soil (soil type 15 in the SRI) has slopes less than 10%, and it has loam to sandy loam texture, with soil depth greater than 120 inches. The shallow soils, (soil types 7, 44, and 46), have slopes between 2 and 70%, and they have loam texture, with soil depth between 4 to 20 inches. Parent materials for the shallow soils are andesite and basalt, with some tuffaceous materials.

Soil type 15 underlies perhaps 80% of the Logan Valley and McCoy Creek Allotments. Summit Prairie and Lake Creek allotments are mostly forested. The shallow soils are scattered, mostly in the southwestern part of Summit Prairie Allotment. Perhaps 5% of Summit Prairie Allotment is occupied by shallow soil. Shallow soil occupies perhaps 2% of Lake Cr. Allotment and 0% of the other two allotments.

Soil Erosion on Non-Forest Upland Soils

The USDA Forest Service (1990) noted "Many of the adverse ... grazing impacts occurred before the Malheur became a National Forest. Early sheep and cattle grazing was particularly damaging to meadows and upland range sites, many of which were compacted and eroded" (p. III-4). Also "Early sheep and cattle grazing practices have accelerated erosion over a good portion of the range and more open timber types." (p. IV-5). The "grazing practices" were unregulated over-grazing that severely reduced ground cover. These generalizations probably apply to the planning area. However, some non-forest soils in the planning area show only minor signs of accelerated erosion; either they were never heavily impacted, or they have recovered.

Probably some non-forest upland sites in their natural state, before the unregulated grazing, had less ground cover than prescribed by Standard 127. The unregulated grazing increased the area that has sub-standard ground cover. Some non-forest upland soils have not recovered from the

historic erosion, and still Standard 127. They continue to erode at rates greater than prior to the unregulated grazing. In places like these, plant production and resultant ground cover may have been decreased for hundreds of years. However, rates of erosion are fairly low in these allotments because of the relatively level ground.

Almost all of the non-forest uplands observed during field visits by the soil scientist show no signs of erosion, because they are so flat. If sediment is produced from steeper slopes, most of the sediment produced is deposited on flatter areas below, before it reaches a stream.

Impacts from livestock grazing on uplands generally are minor under current management. Livestock tend to prefer places where water, shade, or better forage are available. However, cattle do decrease ground cover where non-forest areas are adjacent to good forage, water, and/or salting ground, such as part of the North Fork Unit of McCoy Cr. Allotment, and places along lower Summit Creek. Areas such as this occupy probably well under 1% of any allotment. Burrowing mammals also decrease ground cover on some soils. Any sediment that may be produced from areas with decreased ground cover probably is filtered out on flat, well vegetated riparian soils before it reaches a stream. These observations are similar to other undocumented observations by the soil scientist elsewhere on Malheur National Forest. In summary, because impacts from current grazing on uplands are localized to small areas that do not affect water quality, Standard 127 is being met.

Biological Soil Crusts on Non-forest Uplands

It is unknown how much biological soil crust was present on non-forest soils in the planning area before unregulated grazing. Crusts were probably less abundant in the planning area than in drier, hotter arid and semi-arid areas which have less plant and litter cover and less frequent fires (Belnap and coworkers 2001, pp. 14, 42). So it is difficult to know which, if any, reports of biological soil crusts can be extrapolated to the Planning Area.

Crusts were probably variable, and covered perhaps between 0% and 50% of the ground on various shallow soil areas. For instance, Kaltenecker and coworkers (1999) reported between 5% and 60% ground cover by moss and lichens in sagebrush communities. On the other hand, on desert sites Hansen, Ostler, & Hall (1999) found only 31 to 50 % of the stands had visible crusts. The planning area may have had less, because it had more plant and litter cover, and more fires. Despite their probable relative scarcity, biological soil crusts probably contributed to erosion control.

The unregulated grazing decreased the amount of biological soil crusts. Recovery after unregulated grazing has not been complete, due to erosion where ground cover was reduced. In addition, in many places crusts probably were never abundant. The existing crust is mostly moss.

Meadows and Grassy Riparian Areas

Soil Types

Soils in meadows and riparian areas are highly variable, often changing within a few feet. In riparian areas, the parent material has been deposited from adjacent slopes by colluvial transport or from upstream by alluvial transport. In some riparian areas, volcanic ash is important. These soils vary from wet to dry, and from clayey to sandy. In comparison to upland soils in the area, they are usually less steep, with thicker darker, more root-filled topsoil, with more organic matter, with fewer coarse fragments, and often deeper. They vary greatly in these and other

properties. Most of these soils are not steep, often less than 5% slope so the erodibility is low. Some meadows grade into non-forest, shallow soil areas around their edges.

Grassy riparian areas are found along named and several unnamed streams in Logan Valley and McCoy Cr. Allotments and are also found along Summit Cr. Meadow soils are found away from streams in the Big Field, East Lake Cr, and West Lake Cr. Units of Logan Valley Allotment and Summit Prairie part of Summit Prairie Allotment.

Soil Erosion in Meadows and Grassy Riparian Areas

Conditions in meadows and grassy riparian areas in the project area probably are similar to those in in north-eastern Oregon, where Kauffman and coworkers (2002 p.20) found an average of 84% ground cover and a minimum of 64% ground cover. In a meadow in Logan Valley Allotment, ground cover is probably 94% (Table S-3). On the other hand, cattle do severely decrease ground cover in small areas (for instance near salting grounds). The soil scientist's field inspection indicates that some spots in dry parts of meadows and riparian areas have ground cover less than 40%. However, the soil scientist's field inspection indicates that where the soil is moist, even heavily grazed areas often have 90% or more ground cover. The high ground cover in moist or wet parts of meadows compensate for areas where burrowing mammals or concentrated cattle use decreased ground cover. Meadows and riparian areas are usually on level ground so they have low erodibility. In summary, current grazing meets Standard 127 on meadows and grassy riparian areas, as indicated by ground cover levels mentioned above and low erodibility.

Table S-3: Ground Cover on a C&T Cluster on a Meadow

Cluster	Year Read	Bare Soil %	Rock + Erosion Pavement %	Moss %	Litter + Plants %
Logan 3, LV3 Logan Valley Allotment	1954	28	16	19	37
	2003	6	4	30	60

Moss provides some ground cover in some moist meadows. However, this is not usually considered "biological soil crust," which is a term used on dry rangelands.

The minor effects of ongoing livestock use described above have been decreasing, or have disappeared, on Lake Cr. Allotment.

Environmental Consequences

The general principle for the following section is that decreased grazing (compared to current grazing) would cause decreased effects, and vice versa.

Alternative 1 - No Grazing

Direct and Indirect Effects

Non-Forest Upland Soils

Ground cover, erosion, detrimental soil conditions, and biological soil crusts would continue their slow recovery on non-forest soils that were degraded by early 20th and late 19th century

grazing. In addition the small areas near water, good forage, and/or salting ground where current grazing is affecting ground cover would start recovering.

Meadows and Grassy Riparian Areas

In places where ground cover has been decreased below potential, it would increase above current levels. Erosion of soil from outside stream channels would decrease. The decrease would be negligible because cattle are causing a negligible amount of soil erosion. Detrimental soil conditions would decrease.

Compaction would decrease back to natural levels within 8 years (Kauffman and coworkers 2004), as root growth, animal burrowing, and soil freezing loosens the soil.

Cumulative Effects

The areas considered for cumulative effects are each allotment individually.

Effects from past and on-going actions are described in the Affected Environment section. Detrimental impacts on areas outside non-forest uplands, meadows and grassy riparian areas would remain at about current levels, as recovery from past activities (such as logging) is counter-balanced by impacts from future activities.

For future actions, implementation of the Travel Management plan would result in negligible decreases in soil erosion, because cross country travel is currently causing negligible erosion. Treatments of invasive weeds would comply with laws, regulations, and the Forest Plan. Thus, these treatments would not significantly increase erosion or detrimental soil conditions. No other foreseeable future action would take place on shallow soils, meadows, or grassy riparian areas, so no additional effects are expected.

In summary, for every allotment, there would be a negligible decrease in erosion and detrimental soil conditions under Alternative 1.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Non-Forest Upland Soils

The parts of Lake Creek Allotment that would not be grazed would continue the small, slow recovery of ground cover, erosion, detrimental soil conditions, and biological soil crusts described under Alternative 1. On the parts of Lake Creek Allotment that would be grazed, conditions would become like the other three allotments with slightly reduced ground cover and biological soil crusts and slightly increased erosion and detrimental soil conditions.

On the other three allotments, for the small areas near water, good forage, and/or salting ground where current grazing has decreased ground cover, existing conditions would be maintained. For the rest of the non-forest upland soils ground cover, erosion, detrimental soil conditions, and biological soil crusts would continue their slow recovery on soils that were degraded by early 20th and late 19th century grazing. The recovery under the action alternatives would probably be slower than under Alternative 1.

Meadows and Grassy Riparian Areas

Parts of the Lake Creek Allotment that would not be grazed would continue the slow recovery of ground cover, erosion, and detrimental soil conditions described under Alternative 1. On the

parts of Lake Creek Allotment that would be grazed, conditions would become like the other three allotments with slightly reduced ground cover and slightly increased erosion and detrimental soil conditions.

On the other three allotments, existing soil conditions would be maintained, except as described in the next paragraph. Allotments would continue to meet Standard 127. Soil outside stream channels would continue to contribute a negligible amount of sediment to stream channels.

Places where decreased grazing (compared to current grazing) would decrease effects to ground cover, erosion, and detrimental soil conditions are as follows:

Logan Valley Allotment:

- West Bosenberg Riparian pasture
- West Lake Creek Riparian Pasture
- Big Creek Riparian unit

Summit Prairie Allotment:

- Sagehen unit
- West Summit Recovery unit
- Bosenberg unit
- Little Logan unit

In pastures that are being rested for 3-5 years, ground cover may increase during the rest and then decrease somewhat when they are grazed. However, ground cover would remain above current levels because the grazing would be more closely controlled than at present. Any implementation of adaptive management strategies, such as rest or decreasing allowable use levels, would decrease effects a little more.

Cumulative Effects

Non-Forest Upland Soils and Meadows and Grassy Riparian Areas

The areas considered for cumulative effects are each allotment individually. Cumulative effects from past and on-going actions are described in the Affected Environment section. Generally, the same effects would continue, except as described in the Direct and Indirect Effects section.

See the Alternative 1, Cumulative Effects section for a discussion of the cumulative effects of the Travel Management plan and invasive weeds treatments.

The actions listed in Chapter 2, Recent Changes in Current Management section and in Appendix C would decrease soil impacts in riparian areas and increase them in certain small upland areas. Like existing impacts, these increases in upland effects are expected to be minor.

Because the effects on soil of 1) Alternative 2 grazing (including adaptive management), 2) past and ongoing actions as shown in the Affected Environment section above, and 3) foreseeable actions are so minor, the sum and interaction of these effects on soil would also be minor on all allotments.

Alternative 3

Direct and Indirect Effects

Non-Forest Upland Soils

Lake Creek Allotment would continue the small, slow recovery of ground cover, erosion, detrimental soil conditions, and biological soil crusts described under Alternative 1.

On the other three allotments, effects on non-forest uplands would be similar to Alternative 2.

Meadows and Grassy Riparian Areas

The Lake Creek Allotment would continue the small, slow recovery of ground cover, erosion, and detrimental soil conditions described under Alternative 1.

On the other three allotments, existing soil conditions would be maintained, except as described in the next paragraph. Allotments would continue to meet Standard 127. Soil outside stream channels would continue to contribute a negligible amount of sediment to stream channels.

Places where decreased grazing (compared to current grazing) would decrease effects to ground cover, erosion, and detrimental soil conditions are as follows:

Logan Valley Allotment:

- West Bosenberg Riparian pasture
- West Lake Creek Riparian Pasture

Summit Prairie Allotment:

- Sagehen riparian pasture
- Upper and Lower Little Logan riparian pastures
- West Summit Recovery unit
- North Summit Riparian pasture

Any implementation of adaptive management strategies, such as rest or decreasing allowable use levels, would decrease effects a little more.

Cumulative Effects

Cumulative effects would be similar to Alternative 2.

Alternative 4

Direct and Indirect Effects

Non-Forest Upland Soils

On all four allotments effects would be similar to Alternative 2, except the number of un-grazed acres in Lake Creek allotment is greater under Alternative 4.

Meadows and Grassy Riparian Areas

On all four allotments effects would be similar to Alternative 2, except in Summit Prairie Allotment, where West Summit Recovery unit and Prairie Riparian pasture would be the only areas with increased ground cover and decreased erosion and detrimental soil conditions due to decreased grazing.

Cumulative Effects

Cumulative effects would be similar to Alternative 2.

Consistency with Direction and Regulations

All alternatives would be consistent with LRMP soil protection standards. Under all alternatives, effects of livestock compaction and puddling, on soil erosion would be negligible, in terms of water quality and soil quality.

Irreversible and Irretrievable Commitments

None of the alternatives result in irreversible or irretrievable effects to soil.

Hydrology and Aquatics

Introduction

This is a summary of the Biological Evaluation (BE) that evaluates the potential effects of livestock grazing on aquatic species and their associated habitat within the Summit Logan Valley Grazing Authorization Project. The full Biological Evaluation can be found in Appendix F which is available for review by request.

Regulatory Framework

Malheur National Forest Land and Resource Management Plan

The MNF Land Management Plan (Forest Plan) provides program direction for wildlife and range management. The following elements are applicable to the proposed and other alternatives for the project area analysis (USFS 1990).

Goals

- Provide for improved habitat conditions to support increased populations of anadromous and resident fish (IV-2, #18).
- Provide a diversity of habitat sufficient to maintain viable populations of all species (IV-2, #19).
- Manage rangelands to meet the need of other resources and uses at a level which is responsive to site-specific objectives (IV-2, #21).
- For Non-anadromous Riparian Areas (3A), manage riparian areas to protect and enhance their values for wildlife, resident fish habitat, and water quality. Mange timber, grazing, and recreation to give preferential consideration to riparian-dependent species on that portion of the management area “suitable” for timber management, grazing, or recreation. Design and conduct management in riparian areas to maintain or improve water quality and beneficial uses (IV-55).

Objectives

- Manage fish habitat and riparian areas to achieve increases in fish habitat capability. This habitat improvement will be through the implementation of livestock management activities to achieve better distribution of livestock, and better control of forage utilization in riparian areas. This will help achieve a more diverse and abundant riparian vegetation condition and geomorphic recovery of the stream channel (IV-17).
- All riparian areas will be managed to protect or enhance their values for water quality, fish habitat, and wildlife (IV-19).

Forest-wide Standards

- Provide riparian habitat requirements for steelhead, bull trout, cutthroat trout, and rainbow/redband trout (IV-32, #61).
- Specify all protection or mitigation requirements (36 CFR 219.27(a) (8)) before project implementation begins. Manage all habitats for existing federally classified threatened and endangered species to help achieve recovery objectives (IV-33, #65).

MA 3A Standards

- Manage the composition and productivity of key riparian vegetation to protect or enhance riparian-dependent resources. Emphasis will be on the reestablishment of remnant hardwood shrub and tree communities (IV-56, #8).
- Improve the rate of recovery in riparian areas that are not in a condition to meet management objectives by eliminating or reducing the impacts of management activities that may slow riparian recovery (IV-56, #10).
- Maintain non-stream associated riparian areas such as seeps, springs, bogs, and wallows together with their associated vegetative structure. Develop mitigation measures for management activities during project level environmental analysis (IV-57, #14).
- Manage allotments to protect or enhance riparian-dependent resources (IV-58, #19).
- Manage livestock grazing so that water quality meets Oregon State standards and fish populations are maintained at an acceptable condition or in an upward trend (IV-58, #20).
- Maintain sufficient streamside vegetation to maintain streambank stability and fish habitat capability (IV-58, #21).
- Restrict season long grazing, unless specifically evaluated and approved through the environmental analysis process (IV-58, #22).
- Allowable utilization of available forage in riparian areas (percent allowable use of available forage). Table IV-4 from the Forest Plan (IV-58). Note: all alternatives would use Strategy C.

	Grasses and Grasslikes[1]		**Shrubs[2]**	
Range Resource Management Level	S[3]	U[4]	S	U
Strategy B – Stewardship Management[5]	40	0 – 30	30	0 – 25
Strategy C – Extensive Management[6]	45	0 – 35	40	0 – 30

1. Utilization based on percent removed by weight.
2. Utilization based on weight and twig length. Example if 2/3 of the available leader length is removed than browsed utilization is 50% (USDA-FS-PNW-472, April 1988).
3. Satisfactory condition – See Forest Plan Glossary.
4. Unsatisfactory Condition – See Forest Plan Glossary.
5. Management Controls livestock numbers so that livestock use is within present gracing capacity. Distribution is achieved through riding, herding, and/or salting. Improvements are minimal and construction is only to the extent needed to cost effectively maintain stewardship of the range in presence of grazing.
6. Management seeks full utilization of forage available to livestock. Cost-effective management systems and techniques, including fencing and water development are designed and applied to obtain relatively uniform livestock distribution and use of forage to maintain plant vigor.

In 1994 the Forest Plan was ammended (Amendment 29) to incorporate the *Columbia River Anadromous Fish Habitiat Management Policy and Implementation Guide* into the Forest Plan (USFS 1994). The amendment included changes to both Management Areas 3A (inland fish habitat) and 3B (anadromous fish habitat). The existing Forest Plan direction would stand if it

provides more protection than Ammendment 29. The following elements are applicable to the proposed and other alternatives for the project area analysis.

Manage riparian areas to achieve the following desired conditions by habitat element, sub-element and numeric value. These values are to be measured on a subwatershed basis, and to the degree the indivdual riparian area contains these specific habitat elements:

Sediment/Substrate

- Cobble embeddedness is ≤ 20%

Channel Morphology

- Maintain large woody debris within the following ecosystems:

Ecosystem	# of Pieces	Minimum Length	Diameter	Key Pieces
Ponderosa Pine	20 to 70	35' or 1.5x bankfull	12"	20% > 20"
Mixed-Conifer	80 to120	35' or 1.5x bankfull	12"	20% > 20"
Lodgepole Pine	100 to 350	18' or 1.5x bankfull	6"	10% > 12"

- Pool Frequency (See INFISH objectives where data was measured at wetted width)

Bankfull width (ft)	5	10	20	25	50	75
Pools per mile	151-264	75-132	38-66	30-53	15-26	10-23

- Bank stability for forested ecosystems is 90% stable, no decrease if above 90% stable.
- For non-forested ecosystems, see INFISH bank stability and undercut banks objectives.
- The wetted width to depth ratio is <10 for all systems (same as INFISH objective)

Riparian Vegetation

- Provide a rate of input to maintain large wood debris standard (Channel Morphology).
- The ground cover is at 90% of site potential, covered by herbaceous species, litter, rock, moss, or lichens.
- Stream bank vegetation is at 90% of site potential.
- Maintain shade/canopy closure for the following ecosystems:

Ecosystem	Ponderosa Pine	Mixed-Conifer	Lodgepole Pine	Hardwood/meadow Complex
Shade/Closure	40 – 50%	50 – 60%	60 – 75%	80%

In 1995 the Inland Native Fish Strategy (INFISH) provided riparian goals, management objectives (RMOs), and standard and guidelines (S&Gs) that amended the Regional Guides and the MNF Forest Plan. The existing Forest Plan direction (including ammendment 29) would stand if it provides more protection than INFISH. The RMOS and S&Gs provide the specific measurements and guidance to implement the riparian goals identified in INFISH (USFS 1995a).

The following RMOS are applicable to the proposed and other alternatives for the project area analysis.

- Minimum pool frequency (See Amendment 29 desired condition where data was measured at bankfull width):

Wetted width (ft)	10	20	25	50	75
Pools per mile	96	56	47	26	23

- There is no measurable increase in maximum water temperature (7-day moving average of daily maximum temperature measured as the average of the maximum daily

temperature of the warmest consecutive 7-day period). Maximum water temperatures are below 59°F within adult holding habitat and below 48°F within spawning and rearing habitats.

- Large woody debris; see Amendment 29 desired conditions for large woody debris.
- Bank stability should be greater than 80% for non-forested systems.
- There should be greater than 75% undercut banks for non-forested systems.
- The wetted width to depth ratio is <10 for all systems (same as Amend. 29).

The following S&Gs are applicable to the proposed and other alternatives for the project area analysis.

- Modify grazing practices (e.g., accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent obtainment of RMOs or are likely to adversely affect inland native fish. Suspend grazing if adjusting practices is not effective in meeting RMOs.
- Locate new livestock handling and/or management facilities outside of Riparian Habitat Conservation Areas (RHCAs). For existing livestock handling facilities inside the RHCAs, assure that facilities do not prevent attainment of RMOs. Relocate or close facilities where these objectives cannot be met.
- Limit livestock trailing, bedding, watering, salting, loading, and other handling efforts to those areas and times that would not retard or prevent attainment of RMOs or adversely affect inland native fish.

Executive Order 11990 -- Wetlands

Wetlands would be identified in the Project Area using Cowardin's Classification scheme.

The basic requirement of E.O. 11990 is that a Federal agency would avoid construction or management practices that would adversely affect wetlands unless that agency finds that (1) there is no practicable alternative, and (2) the proposed action includes all practicable measures to minimize harm to the wetlands.

Executive Order 11990 directs all Federal agencies to minimize the destruction, loss, or degradation of wetlands; and preserve and enhance the natural beneficial values of wetlands in the conduct of the agency's responsibilities for:

(1) Acquiring, managing, and disposing of Federal lands and facilities;

(2) Providing Federally undertaken, financed, or assisted construction and improvements; and

(3) Conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

Clean Water Act

Rivers, streams, and lakes within and downstream of the treatment areas are used for boating, fishing, swimming, and other water sports. Additionally, the Forest streams provide habitat and clean water for fish and other aquatic biota, each with specific water quality requirements. The Clean Water Act (CWA) protects water quality for all of these uses.

The CWA requires States to set water quality standards to support the beneficial uses of water.

The Act also requires States to identify the status of all waters and prioritize water bodies whose water quality is limited or impaired. For Oregon, the Department of Environmental Quality (DEQ) develops water quality standards and lists water quality limited waters. In addition, Region 6 of the Forest Service has entered into a Memorandum of Agreement (MOA) with the Oregon State DEQ to acknowledge the Forest Service as the Designated Management Agency for implementation of the CWA on National Forest land. In an effort to support the CWA, the Forest conducts a variety of monitoring and inventory programs to determine status of meeting state water quality standards as well as other regulatory and agency requirements.

By direction of the CWA, where water quality is limited, DEQ develops Total Maximum Daily Load (TMDL) plans to improve water quality to support the beneficial uses of water. For water quality limited streams on National Forest System lands, the USDA Forest Service provides information, analysis, and site-specific planning efforts to support state processes to protect and restore water quality. The Malheur River Basin TMDL Plan for stream temperature was approved by the Environmental Protection Agency on September 2010. Listed streams for water temperature are removed from the 303(d) list and stream recovery would be achieved through the implementation plan specified in the TMDL.

Oregon's stream temperature standard is designed to protect cold water fish (salmonids) rearing and spawning as the most sensitive beneficial use. Numeric criteria are based on temperatures that protect various salmonid life stages. To address stream temperature, effective shade is used as a surrogate measure. Effective shade is measured at the stream surface using a Solar Pathfinder. Effective shade is defined as the percent reduction of potential daily solar radiation delivered to the water surface.

The TMDL addresses overgrazing impacts on riparian vegetation disturbance/removal reducing shade and increasing solar radiation, providing micro-climate effects that can provide cooler day time temperatures (Anderson et al 2007; Chen et al. 1999), and its role in stabilizing the channel characteristics and providing a narrower channel that has less surface area exposed to solar radiation.

The TMDL state that areas which do not meet the current effective shade surrogates, DMAs with an improving trend in riparian vegetation growth, effective shade, channel morphology, large wood abundance or floodplain connectivity would be considered in compliance with TMDL. If improving trends are compromised by natural disturbance factors such as flooding, ice jam scouring and wildfires, DMAs would still be in compliance with the TMDL. Compliance with the TMDL and implementation plans on public lands is evaluated on a 5-year cycle.

The Endangered Species Act (ESA)

ESA of 1976, as amended, directs each federal agency to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitat (Section 7). The ESA also directs each federal agency to confer or consult with the appropriate Secretary on any action, which is likely to jeopardize or affect the continued existence of any species or its habitat. Additionally Section 2(c)(1) of the ESA includes affirmative conservation direction, stating "that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this act."

Bull trout Recovery Plan

Bull Trout Recovery Objectives as Defined by USFWS in the Bull Trout Recovery Plan (USFWS 2006a)

Recovery of bull trout requires reducing threats to the long-term persistence of populations, maintaining multiple interconnected populations of bull trout across the diverse habitats of their native range, and preserving the diversity of bull trout life-history strategies (*e.g.*, resident or migratory forms, emigration age, spawning frequency, local habitat adaptations). To recover bull trout, the following four objectives have been identified:

- Maintain the current distribution of bull trout within the core area and reestablish bull trout in previously occupied habitats in the Upper Malheur River and tributaries and the North Fork Malheur River and tributaries.
- Maintain stable or increasing trends in abundance of bull trout in the Malheur Recovery Unit. This requires increasing abundance within the two local populations (Upper Malheur and North Fork Malheur).
- Restore and maintain suitable habitat conditions for all bull trout life history stages and strategies.
- Conserve genetically diverse populations of bull trout populations within the Malheur Recovery Unit. This can best be achieved by ensuring connectivity between the North Fork Malheur River and the Upper Malheur River.

Bull Trout Recovery Actions Needed as Defined by USFWS in the Bull Trout Recovery Plan (USFWS 2006)

Identify impaired stream channel and riparian areas and implement tasks to restore their appropriate functions.

- Restore shade and canopy, riparian cover, and native vegetation in all bull trout spawning areas. Summit Creek, the Malheur River downstream of Logan Valley, and Crooked Creek in the Upper Malheur subbasin have suppressed woody vegetation in reaches that need this component to become stable, as well as tributary streams to the North Fork Malheur on the lower end of the Malheur National Forest.
- Reduce grazing impacts in all bull trout spawning areas. Implement measures to reduce livestock impacts to streams, (*e.g.*, fencing, changes in timing and use of riparian pastures, off-site watering and salting), to accomplish this task. Areas that would benefit from shade restoration include lower Lake Creek, lower Big Creek, lower Bosenberg Creek, lower McCoy Creek, Crane Creek, and Buttermilk Creek, as well as, private and tribal lands in Logan Valley. The highest grazing management priority for the U.S. Fish and Wildlife Service is that no direct effects occur to spawning fish or redds after August 15.

Bull Trout Protection and Recovery Guidance for Federal Lands in Regards to Grazing Management (USFWS 2000c)

- Modify grazing practices (*e.g.*, accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent attainment of bull trout biological needs or are likely to adversely affect bull trout.

- Suspend grazing if adjusting practices is not effective in meeting bull trout biological needs and avoiding adverse effects on bull trout.
- Locate new livestock handling and management facilities outside of riparian habitat protection zones. For existing livestock handling facilities inside the riparian habitat protection zones, assure that facilities do not prevent attainment of bull trout biological needs or adversely affect bull trout. Relocate or close facilities where these objectives cannot be met.
- Limit livestock trailing, bedding, watering, salting, loading, and other handling efforts to those areas and times that would not retard or prevent attainment of bull trout biological needs or adversely affect bull trout.
- Adjust wild horse and burro management to avoid negative effects that prevent attainment of bull trout biological needs or adversely affect bull trout. Include riparian habitat protection zones in a separate unit with separate management objectives and strategies than the rest of the allotment.
- Fence or herd livestock out of riparian areas for as long as necessary to allow vegetation and stream banks to recover.
- Control the timing of grazing to: (a) keep livestock off stream banks when they are most vulnerable to damage; and (b) coincide with the physiological needs of target plant species.
- Add more rest to the grazing cycle to increase plant vigor, allow stream banks to heal, or encourage more desirable plant species composition.
- Limit grazing intensity to a level that would maintain desired species composition and vigor.
- Permanently exclude livestock from riparian habitat protection zones or streambank areas at high risk and with poor recovery potential when there is no practical way to protect them while grazing adjacent uplands.
- Implement changes consistent with monitoring results. Monitor consistent with the Range Resource Implementation Monitoring Module and Effectiveness Monitoring.

<u>Bull trout designated Critical Habitat: Primary Constituent Elements (PCEs)</u>

Bull trout (Columbia River bull trout population segment) were listed by the U.S. Fish and Wildlife Service (USFWS) as threatened under the federal ESA on June 10, 1998 (63 FR 31647). Critical habitat for Columbia River bull trout was designated on October 18, 2010 (75 FR 63898). Critical habitat is present in the Fisheries Analysis area.

In accordance with section 3(5)(A)(i) of the Act and regulations at 50 CFR 424.12(b), in determining which areas occupied at the time of listing to propose as critical habitat, USFWS considered the physical and biological features that are essential to the conservation of the species and that may require special management considerations or protection. These features are the PCEs laid out in the appropriate quantity and spatial arrangement for conservation of the species.

- Springs, seeps, groundwater sources, and subsurface water connectivity (hyporehic flows) to contribute to water quality and quantity and provide thermal refugia.

- Migratory habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.
- An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.
- Complex river, stream, lake, reservoir, and marine shoreline aquatic environments and processes with features such as large wood, side channels, pools, undercut banks and substrates, to provide a variety of depths, gradients, velocities, and structure.
- Water temperatures ranging from 2 to 15 °C (36 to 59 °F), with adequate thermal refugia available for temperatures at the upper end of this range. Specific temperatures within this range would vary depending on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shade, such as that provided by riparian habitat; and local groundwater influence.
- Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount (e.g., less than 12 percent) of fine substrate less than 0.85 mm (0.03 in.) in diameter and minimal embeddedness of these fines in larger substrates are characteristic of these conditions.
- A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, they minimize departures from a natural hydrograph.
- Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.
- Few or no nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass; inbreeding (e.g., brook trout); or competitive (e.g., brown trout) species present.

Analysis Methods

Project area site visits for the analysis of livestock grazing began during 2007 by Malheur National Forest (MNF) staff and contractors and have continued through the spring of 2012. Data was collected to determine the existing condition of the vegetative, channel, fish habitat attributes, in conjunction with developing a desired condition. During this process we identified where there were differences or gaps between existing and desired condition related to livestock grazing within specific reaches of stream based on vegetative type, channel type, soil type, and slope. Data used in this analysis included: Proper Functioning Condition (PFC) assessment, Carex Working Group Report, USFS Region 6 Stream Surveys, PACFISH-INFISH Biological Opinion Monitoring (PIBO), Multiple Indicator Monitoring (MIM), water temperature data, and MNF Roads Analysis. The table below identifies the strengths and weaknesses associated with the data used for this analysis.

Data used for Analysis

Type of Study	Study	What the Data Provides	What the Data Does NOT Provide
Inventory	Proper Functioning Condition (PFC)	A qualitative assessment by an interdisciplinary team that identifies issues, potential and existing condition in hydrology, vegetative and soils attributes. This data has been collected using a	Does not inform fish habitat condition quantitatively. It was not collected on all of the

Type of Study	Study	What the Data Provides	What the Data Does NOT Provide
		nationally standardized protocol. PFC does provide qualitative indicators of existing vegetation and hydrologic function which are interconnected to fish habitat and related to recovery of riparian areas. PFC provides a way for determining appropriate monitoring sites	riparian areas present in the Project Area. PFC is not appropriate for monitoring or determining long term trend.
	R6 Stream Surveys	Provides site-specific metrics for fish habitat condition. This data has been collected using a nationally standardized protocol.	Not collected regularly across years because of its intensive design for data collection and high economic cost.
Monitoring	Multiple Indicator Monitoring (MIM) includes Implementation (end of year) and Effectiveness (3-5 year trend that indicates condition)	Provides a random, systematic sampling design to collect quantitative metrics for riparian vegetation, hydrological and channel complexity indicators. These indicators are sensitive to changes in livestock management and are used to determine existing condition, trend and for establishing management objectives. Provides linkages between annual effects (herbivory, browsing and bank trampling) on the long term condition (stability). This data has been collected using a nationally standardized protocol. It has been well tested to allow for accurate and repeatable measurements.	Not all data was collected with an interdisciplinary team. The Protocol has been adjusted through the development of a final product. Bank stability and greenline composition are indicators that had protocols changed and can make interpretation of trend difficult.
	Pacfish/Infish Biological Opinion (PIBO)	Strengths are similar to MIM. More discussion of attributes across the Interior Columbia Basin has been done in the scientific literature. Collects more indicators than MIM, such as bankfull width/depth, bank angle and vegetative cross section composition. The data is more informative when there are at least three visits to a site or monitored across 10 years.	Weaknesses are similar to MIM. The indicators are collected using a different protocol than MIM and makes comparison difficult (i.e. bank stability has longer distances between sampled areas). Protocols change across years. Bankfull width/depth protocol has changed for the third reading, but not first two. Making trend interpretations difficult.
	Carex Working Group (CWG)	Provides a linkage for comparing the density and height classes of woody shrubs within the Summit Allotment to reference conditions in the local area. The survey method is repeatable. The survey was quantitative.	Density and height classes were not collected for other areas in the Project Area.
	Water Temperature (collected by USFS, ODFW, and BPT)	Provides continuous data annually that helps identify water characteristics.	Not collected the same years across all sites and may have climatic variability.

Relevant actions relating to riparian vegetation, channel characteristics, bull trout critical habitat and water quality were compared across alternatives for the project area. Specific monitoring indicators that are responsive to changes in land management were selected based on issues

identified during the scoping process and within the ID team. It was assumed that all alternatives are consistent with Forest Amendment 29 direction and INFISH in relation to recovery of fish habitat and riparian areas. Specific actions occurring within each alternative were analyzed for their effects to bull trout critical habitat and existing riparian condition as well as their potential to for facilitating recovery towards or achievement of desired condition in Appendix A part 1 and 2. For analysis purposes the miles of bull trout CH, miles of riparian PFC rating (FAR DN, FAR, FAR UP, PFC) were broken down by unit and allotment for each alternative and those miles were related to the relevant actions within each alternative by allotment and unit. Actions in each alternative were analyzed whether they would facilitate recovery of specific riparian areas identified as having issues towards desired conditions or maintain the condition if near the desired potential. The rate of recovery for riparian area is dependent on the actions proposed and the existing condition of the riparian area. For example, an existing PFC rating of FAR DN to FAR UP or PFC relates to the time it would take for recovery. Changes in management for areas that are FAR is often a high priority since these areas often respond quickly or at the tipping point for being NF. Once a riparian area is NF it usually takes large investments of time and money to recover the area (Pritchard et al. 1998). Rates of recovery or improvement were expected to be faster for those riparian areas demonstrating a mid seral state or already having suitable vegetative components present or channel characteristics for recovery. Riparian areas already at PFC are expected to improve beyond PFC if the actions facilitate continual improvement thus are directly linked to improved bull trout CH, channel characteristics, water quality.

Appendix A part 1 was developed to show the existing and desired condition for stream reaches in the project area utilizing the 2007 PFC surveys, PIBO Monitoring sites, Forest DMA MIM sites, and Carex Working Group Report. Within the Appendix, reaches are broken out by vegetation community potential, existing condition and desired condition. Appendix A, part 2 lists the specific indicators selected for monitoring along with the management objective and target time period the response is expected for. Management objectives were developed that are site specific using measured data that is attainable and time oriented. The attributes identified within a reach that were developed into a management objective had either vegetative or channel characteristics that were not in balance with the potential for the site identified. The numeric values identified per site were based on reviewing data collected at that site. Monitoring is critical to determine if actions specified in the alternatives are facilitating recovery or movement towards desired conditions within the project area. One of the assumptions made is that until vegetation recovers channel characteristics would not recover. Recovery of channel characteristics is expected to occur rapidly at first as the vegetation improves and captures sediment (bank building process). As the vegetation improves less sediment is available for deposition and therefore the bank building and channel forming processes may slow. Additionally channel forming event are often dependent on 20 year flood events which are variable and may occur within the first 5 years, 10 years or not for another 20 years or longer.

Monitoring included a phased approach where vegetative objectives were primarily monitored 5 years out and stream channel objectives related to hydrology, channel complexity, and fish habitat objectives were monitored 10 years. This process was selected based on expected response intervals to changes in management. Vegetation is often the first to respond to changes in livestock management followed by channel characteristics and fish habitat. Normally, the most common return interval high flow (1-2 years) is most important for forming channel characteristics such as flood plains. Flows of 5-10 year intervals are scour and re-deposit events.

Flows of 10-20 year return intervals are largely the ones that provide stream and habitat complexity such as needed by fish. Above these moderately high levels, stream channels are often re-set especially on stream not at PFC (Elmore 2007). Quantitative measurements on several of the parameters such as width:depth ratios or undercut banks are not positively sustainable below PFC, thus lessening their importance for monitoring until a rating of PFC is obtained or vegetation is recovering. It is not unusual for streams below PFC to make a series of recovery/degradation progressions that alter important channel characteristics. Therefore, until a rating of PFC is obtained within those reaches not at PFC within the project allotments the quantitative indicators relating to channel characteristics and fish habitat were assumed to follow vegetative characteristic recovery and monitoring of these characteristics would happen at longer time scales following vegetative recovery. Once the vegetative component of the PFC protocol and desired condition (Appendix A part1) is obtained channel characteristics and fish habitat monitoring would be initiated.

For the small, generally low-gradient stream systems reviewed during the PFC assessment, vegetation is the key component for long-term maintenance and recovery (Elmore 2007).

Stream temperatures and the quality of habitat for bull trout are the major limiting factors within the Malheur River Watershed which includes the Summit, McCoy, Lake Creek and Logan Valley allotments. Primary effects from grazing are related to vegetation removal and hoof action along the banks and areas of saturated soils. Though much of streams in the project areas have improved, wide and shallow streambanks that are open to solar radiation and reduce the cooling effect of deep pools, undercut banks, and hardwood shade. Deep pools, undercut banks, and riparian hardwood are deficient within the mid/lower elevation streams in the project area. Well shaded cover also provides productive terrestrial and aquatic macro-invertebrates for an abundant food base. This complexity of cover also reduces stress to individual trout allowing for productive growth and reproduction.

The Draft Recovery Plan (USFW 2002) indicated past and ongoing human-induced activities have increased stream temperatures, increase sediment delivery, and resulted in the loss of large pools. These activities include the creation and management of Warm Springs and Agency dams, forest management practices, irrigation withdrawals, livestock grazing, past bull trout harvest, and introduction of non-native species (brook trout).

Analysis Process and Rates of Recovery

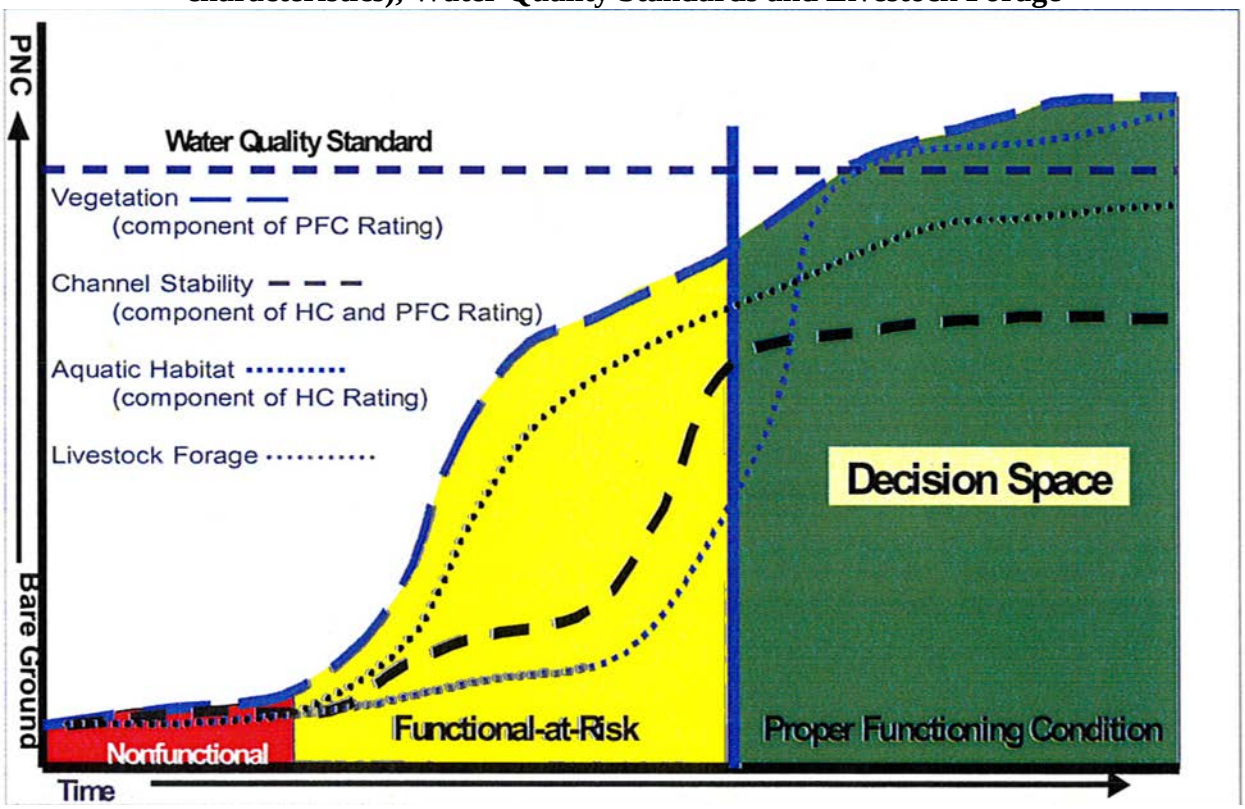
The following premise was used to analyze effects related to proposed actions in each alternative to riparian vegetation, channel characteristics, bull trout critical habitat, and water quality recovery in the project area. Any action to improve PFC ratings especially vegetative characteristics would also improve fish habitat to some degree within a given stream reach because of the inter-connectivity of riparian areas and in-stream hydrological functions for fish habitat. The extent and rate of recovery is dependent on the existing condition, extent of action, and intensity within the alternative. It was assumed that vegetation would respond more quickly to passive/active restoration and hydrological function would follow at a slower rate for the improvement of in-stream fish habitat (Appendix A part 2). Riparian and in-stream functionality conditions are consistently in a state of flux and the ratings can vary from year to year especially for riparian areas rated below PFC. Likewise each stream reach can be in various stages of recovery or degradation. This can be manifested in the resiliency of the streambanks and vegetation along any individual reach (some are more susceptible to impacts than others) for

example streambanks may be well armored with large cobble or boulders and thus more resistant to the actions of overland flow or other actions that may impact streambanks. Additionally riparian areas may be in a more advanced late seral state resulting in resiliency to natural disturbances such as fire and 20-50 year flood events or land management actions such as grazing. The likelihood of recovery beyond a rating of PFC also increases within a more advanced seral state coupled with the extent and intensity of proposed action. These two factors are correlated with the rate of recovery of a riparian area.

Riparian vegetation, channel characteristics (hydrology), and fish habitat are interrelated and interdependent. Because of these attributes mutual linkages, actions that facilitate recovery of one may also facilitate recovery of the other and have a cascade effect. This also can manifest itself for actions that may impact one or more of the attributes in a negative manner. A dynamic feedback loop exists between these attributes. Additionally the rate of recovery of these attributes often varies in space and time.

The difference in rates of recovery for riparian vegetation, channel characteristics, and fish habitat were analyzed between alternatives within the EIS and the responsiveness of these attributes to changes in land management were used to delineate indicators for monitoring 5 and 10 years out (Appendix A part 2). The desired conditions were based on the Malheur Forest Plan as amended by INFISH and Amendment #29. Modifications are proposed to Amendment #29 Numberic Values and INFISH RMOs for some specific stream reaches to better reflect conditions that are attainable based on the stream type and vegetation potential. Specific data used to support these modifications came from monitoring data from the Carex Working Group, PFC, DMA, PIBO, R6 stream surveys and the TMDL. A table depicting the relationships between vegetation community potential, existing condition and long term desired condition is provided in Appendix A part 1 along with the data sources. The relationship between recovery of herbaceous and woody vegetation to channel characteristics (channel stability) and how they relate to specific standards for aquatic habitat, water quality, and livestock forage and are shown in Figure 1. The relationship to PFC ratings are shown at the bottom of the figure.

Figure 1: PFC Rating Relationship to Vegetation, Aquatic Habitat HC (channel characteristics), Water Quality Standards and Livestock Forage



Potential natural condition (PNC) is defined in the PFC protocol as the highest ecological status an area can attain given no political, social, or economical constraints (Pritchard 1998). As a riparian area recovers toward PNC resiliency and resistance to disturbances increases above a minimum rating of PFC. Within the range between PFC and desired condition the range of flexibility for potential management actions increases. Below a rating of PFC, flexibility for the decision maker decreases as a result of the riparian area being functioning at risk and susceptible to impacts related to management actions. The range of values between PFC and desired condition is called the decision space and represents flexibility in management actions and decisions.

Water quality standards are those standards related to 303d listed streams for water temperature with beneficial uses, including salmonid fish rearing and spawning.

Key Assumptions

- Channel characteristics can only improve once the appropriate vegetation has become established and is present in sufficient quantity and quality (vigor, diverse age classes).
- Optimal conditions for riparian shrub development and herbaceous vigor occur annually (climate conditions).
- Rates of recovery for riparian areas would differ between actions identified in the alternatives based on the existing condition.
- Immediate rest of 3-5 years would facilitate recovery of riparian vegetation at a faster rate than rest of 3 years out of 10 especially in regards to riparian hardwood development.

- Improvements in riparian condition would facilitate improvement in bull trout critical habitat, redband trout habitat and to some degree Columbia spotted frog habitat associated with the lotic, fish bearing, and perennial streams in the project area.
- Streams rated as FAR during the PFC surveys were more at risk to the effects of actions proposed in the alternatives than those at PFC.
- The rates of recovery within Appendix A part 2 would occur within the 10 year time frame.
- Riparian areas rated as PFC have the ability to improve beyond a minimum rating of PFC when the appropriate actions are taken as well as the appropriate vegetation and channel characteristics.
- Indicators related to Bull trout critical habitat and fish habitat in general as well as water quality are often achieved beyond a rating of PFC.
- Development of resilient riparian areas would allow for resumption of grazing within the pastures.
- Changes in livestock management would result in expression of riparian vegetation within 5 years for reaches rated as FAR and potential channel characteristics in 10 years.
- Riparian areas for which the existing condition is related to livestock grazing would improve while riparian area whose condition is related to other legacy effects for example roads and railroad grades as well as logging would not improve to the extent as those simply related to livestock grazing by the actions proposed in the alternatives.
- Rates of Recovery for riparian areas would be the same or similar for those areas with no livestock grazing (alternative 1) compared to those where the appropriate management is proposed.

Lennox et al (2009) found that stream channel attributes that improved following restoration of riparian vegetation included bankfull width/depth, streambank stability, and woody debris frequency metrics. Additionally, water columnar attributes that improved following restoration of vegetation included shade, canopy cover, number of pools with project age, maximum pool depth, and mean pool depth. Decreasing the bankfull width/depth ratio from vegetation improvement tends to result in deepening, and narrowing of the channel as sedimentation on floodplains increases following willow re-establishment (Hupp and Osterkamp 1996; Opperman and Meren-lender 2004; Corenblit et al 2007). Thus, until vegetation recovers channel characteristics and criteria associated with bull trout critical habitat and water quality are not expected to achieve desired condition until vegetative criteria is achieved beyond a rating of PFC (Figure 1).

The analysis consisted of determining whether the action contributes to attaining the goals and objectives identified in Appendix A part 1, has a neutral effect, or reduces the likelihood that the goals and objective would be achieved within the time frame identified in Appendix A part 2. Within each of the alternatives, a certain amount of “risk” is associated with actions under the various alternatives as to whether the objectives for riparian management would be met within the 5 and 10 year period identified in Appendix Apart 2. The word “risk” refers to uncertainty such as natural events or unforeseen management actions the less resilient a riparian area is the more risk of set-back there is associated with actions proposed for it. When riparian vegetation and channel characteristics are in balance and composed of resistant vegetation (PFC minimum) the associated risk of these events to riparian areas becomes less and recovery is more likely

following these events. This is referred to as riparian resiliency. Because of this, alternatives may have the same amount of miles of riparian area at risk (<PFC) but the number of actions, intensity, duration, annual use (endpoint indicator), adaptive management strategy, and periods of rest could vary between the alternatives resulting in one alternative being preferable to another for attainment of the riparian objectives identified in Appendix A part1.

Affected Environment

The Affected Environmentsection examines the existing and desired vegetative and channel characteristics, water quality, and aquatic habitat in the project area. Information on climate, hydrology, and channel characteristics were taken from the Malheur Headwaters Watershed Analysis (USFS 2000) to provide a general background on the Project Area and its surrounding watershed.

Background on Malheur Headwaters

The Malheur River is a tributary to the Snake River, which empties into the Columbia River and eventually the Pacific Ocean. Major tributaries (streams) that drain to the Malheur River in the watershed include Big Creek, Bosenberg Creek, Conroy Creek, Crooked Creek, Frazier Creek, Lake Creek, Larch Creek, McCoy Creek, Summit Creek, Tureman Creek, and Wickiup Creek.

The hydrologic regime of the Blue Mountain Ecological Reporting Unit (ERU) is characterized as a snow pack-dominated system. Peak discharge generally occurs from May through June. Generally, base flow in the late summer is maintained by groundwater and is relatively unaffected by precipitation, although occasional thunderstorms and infrequent showers may cause minor rises in streamflow for short periods of time (Quigley and Arbelbide 1997).

Streams start as high-gradient, first-order channels (Rosgen A or B channels) in the upper headwater portions of the watershed, and drop rapidly down to low-gradient third-order streams that bisect the meadow complex of Logan Valley (Rosgen E channels). Upper reaches are confined and have bedrock substrates. Sinuosity is low, and the streams consist predominantly of step-pool reaches (Rosgen B channels). Woody debris is common in these upper reaches and provides complexity and habitat in the stream ecosystem. Stream reaches in the valley bottoms above Logan Valley have occasional beaver dams and associated pond complexes. As stream gradients decrease in the valley bottoms, sinuosity increases and floodplain features become wider and more pronounced. In contrast to upland stream reaches, channel substrates in valley bottom reaches are generally comprised of a greater proportion of fine material.

Bankfull flows occur every year in the spring and generally prevail throughout the period of spring snowmelt. As such, they are the dominant process that functions to maintain and shape channels in the watershed. Land use practices have introduced human-influenced channel-shaping processes. Humans have influenced and altered certain stream reaches with such changes as irrigation diversions and ditches in the valley and road segments that cross streams. There are eight known diversion structures in the valley that redirect stream flow to a system of approximately 11 miles of irrigation ditches. These features, as well as the absence of beavers, have altered the flow route of several of the primary tributaries in the watershed. Sinuous valley bottom E channels have been changed and more closely resemble G channels that eventually evolve back to C and then E channels.

Water Temperature

Table A-1: Water Temperature for Lake Creek

Stream	Site	Allotment	Unit	Elevation	7DADM (F)	TMDL 7DADM Standard (F)	INFISH	
							Spawning & Rearing (F)	Adult Holding (F)
Lake Creek	Lake 1	Lake Creek	McCoy	5520	59.3	53.6	48	59
	Lake 2	Logan Valley	W. Lake Creek	5520	58.2			
	Lake 3	Private	--	5060	75.6			
	Lake 4	Private	--	5060	73.2			
	Lake 5	McCoy Creek	Cow Camp	5020	75.0			

Table A-2: Water Temperatures for Big Creek

Stream	Site	Allotment	Unit	Elevation	7DADM (F)	TMDL 7DADM Standard (F)	INFISH	
							Spawning & Rearing (F)	Adult Holding (F)
Big Creek	Big 1	Lake Creek	McCoy	5280	56.8	53.6	48	59
	Big 2	Logan Valley	W. Bosenberg	5082	63.8			

Table A-3: Water Temperatures for Summit Creek

Stream	Site	Allotment	Unit	Elevation	7DADM (F)	TMDL 7DADM Standard (F)	INFISH	
							Spawning & Rearing (F)	Adult Holding (F)
Summit Creek	Summit 1	Summit Prairie	Summit Rock	5735	54.8	53.6	48	59
	Summit 2	Summit Prairie	Summit Rock	5283	66.9			
	Summit 3	Summit Prairie	Little Logan	5190	72.8			
	Summit 4	Summit Prairie	Little Logan	5160	72.8			
	Summit 5	Summit Prairie	Sagehen	5078	72.5			
	Summit 6	Summit Prairie	Sagehen	4950	76.8			
	Summit 7	Private	--	4820	78.7			

Wildfire History

Wildfires occurred on 497 acres of Lake Creek (410 acres) and Summit Prairie allotments (87 acres) in 1958 from the Bosenberg Fire. Of that, 62 acres reached Riparian Habitat Conservation Areas (RHCA) in the Lake Creek Allotment and 10 acres reached RHCAs in Summit Prairie allotment. Three wildfires occurred in 1990 with the Corral Basin, Sheep Mountain and Snowshoe Fires. The Corral Basin wildfire burnt 813 acres in the Lake Creek (753 acres) and Summit Prairie allotments (60.6 acres). The Corral Basin Fire burnt 45 acres of RHCAs in the

Bosenberg Unit of the Lake Creek allotment. The Sheep Mountain Fire ignited 2,067 acres in the Summit Prairie allotment and 11 acres of RHCAs in the Summit Rock unit. The Showshoe Fire ignited 7,011 acres in the Lake Creek (6410 acres), Logan Valley (122 acres), and the Summit Prairie allotment (480 acres). RHCAs burnt in the Snowshoe Fire include Bosenberg Unit (45 acres) and McCoy Creek unit (90 acres) of the Lake Creek allotment; East Lake Creek (48 acres), North Big Creek (20 acres) of the Summit Prairie allotment; Little Logan unit (27 acres) and Summit Rock (16 acres) of the Summit Prairie allotment.

Threatened, Endangered and Sensitive Aquatic Species (TES)

The following is a summary of effects determinations for alternatives documented from the Aquatic Biological Evaluation for the Summit Logan Valley Grazing Authorization project. See Environmental Consequences section for further discussion on Effects Determination for threatened, endangered and sensitive aquatic species.

Table A-4: Threatened, Endangered and Sensitive Aquatic Species

Aquatic Species	Status	Effects Determination			
		Alt 1	Alt 2	Alt 3	Alt 4
Columbia River Bull Trout *Salvelinus confluentus*	T (MIS)	NLAA/BE	LAA	NLAA/BE	NLAA/BE
Columbia River Bull Trout Designated Critical Habitat	D	NLAA/BE	LAA	NLAA/BE	NLAA/BE
Interior Redband Trout *O. mykiss gairdneri*	S (MIS)	MIIH/BI	MIIH	MIIH/BI	MIIH/BI
Columbia spotted frog *Rana luteiventris*	S	NI	MIIH	MIIH/BI	MIIH/BI
Western Ridged Mussel *Gonidea angulata*	S	MIIH	MIIH	MIIH/BI	MIIH/BI
Shortface Lanx *Fisherola nuttalli*	S	MIIH	MIIH	MIIH/BI	MIIH/BI

Status

T	Federally Threatened
S	Sensitive species for Regional Forester's list
D	Designated Critical Habitat
MIS	Management Indicator Species

Effects Determination

Threatened and Endangered Species

NLAA	May Effect, Not Likely to Adversely Affect
LAA	May Effect, Like to Adversely Affect
BE	Beneficial Effect

Sensitive Species

NI	No Impact
MIIH	May Impact Individuals or Habitat but Will Not Likely Contribute to a Trent Toward Federally Listing or Cause a Loss of Viability to the Population or Species
BI	Beneficial Impact

Columbia River Bull Trout

See discussion under Management Indicator Species.

Interior Redband Trout

See discussion under Management Indicator Species.

Columbia Spotted Frog

Columbia spotted frog habitat in the project area is highly associated with wet meadows and drainages of the three subwatersheds. The acres of the 4 primary wetland types are displayed below. Where wet meadows are associated with drainages or standing water they provide potential spotted frog habitat. Actions that effect riparian areas containing bull trout and redband trout would have similar effects to Columbia spotted frog.

Table A-5: Acres of Wetland Type within the Allotments for the Summit Logan Grazing Project.

Allotment	Wetland Type	Acres	Percentage
Lake Creek	Freshwater Emergent Wetland	3.49	6.5
	Freshwater Forested/Shrub Wetland	4.03	7.5
	Riverine*	45.95	*85.9*
	TOTAL	**53.46**	***3.6***
Logan Valley	Freshwater Emergent Wetland	545.50	*62.5*
	Freshwater Forested/Shrub Wetland	321.28	36.8
	Riverine	5.12	0.6
	TOTAL	**871.90**	**59.6**
McCoy Creek	Freshwater Emergent Wetland	180.81	*87.1*
	Freshwater Forested/Shrub Wetland	23.55	11.3
	Riverine	3.28	1.6
	TOTAL	**207.64**	**14.2**
Summit Prairie	Freshwater Emergent Wetland	214.99	*65.2*
	Freshwater Forested/Shrub Wetland	38.86	11.8
	Freshwater Pond	0.45	0.1
	Riverine	75.47	22.9
	TOTAL	**329.8**	**22.5**
	PROJECT AREA TOTAL	**1462.8**	

* Riverine habitats constitute wetlands along a flowing stream
Percentages that are italized represent the dominant wetland type within the specific allotment.

Management Indicator Species (MIS)

Aquatic Species within the project area include threatened bull trout (*Salvelinus confuentus*), Malheur National Forest MIS sensitive redband trout (*Oncorhynchus gairdi*), and Columbia spotted frog.

Bull Trout

Bull trout are a Malheur National Forest management indicator species. Bull trout within the Upper Malheur Watershed are part of the Malheur River metapopulation that includes populations in the upper Malheur River and the N.F. Malheur River.

For the Upper Malheur River populations, spawning and rearing is limited to headwater streams within the Upper Malheur River. Spawning and rearing habitat was identified to occur in all of McCoy, Lake, Big, Meadow Fork Big, Snowshoe, Corral Basin, Bosenberg, and Summit Creeks during the designation of Critical Habitat (USFW 2010). These streams include all the major drainages except for Crooked Creek and the Malheur River. Presently, spawning habitat is minimal in areas below the FS 16 road due to limited spawning gravel and high summer and fall stream temperatures. The populations in the Malheur River and N.F. Malheur River do not connect with each other or other Snake River populations due to impassable Warm Springs Dam on the Malheur River and the impassible Agency Dam on the North Fork of the Malheur River. Populations were historically thought to use the entire Malheur River where as present use is confined to the upper tributaries. Bull trout have not been documented within the Warm Springs Reservoir, which has the potential to provide overwintering habitat. Since the Upper Malheur River local population lack connectivity, this population is considered to be at risk of genetic drift and failed the distribution criterion in the bull trout recovery plan. In regards to abundance, the Malheur River metapopulation contains less than 1,000 adults and is isolated from other populations. The Meadow Fork of Big Creek was the apparent stronghold of this population and has yet to recover from the 2002 High Roberts fire and consequent flood event (2003).

A radio telemetry study began in 2000 conducted by the Burns Paiute Tribe of fluvial bull trout in the upper Malheur River and tributaries. Bull trout tagged near the confluence of Big Creek and Lake Creek spawned in the Meadow Fork of Big Creek in 2000. Bull trout redds have been counted within the Meadow Fork of Big Creek every year since 2000 with the exception of 2003 in which no redds were observed. Radio tagged bull trout overwintered downstream of Lake Creek subwatershed in the vicinity of Malheur Ford.

Population Status

In 1997, ODFW considered the upper Malheur River subpopulation at high risk of extinction. The number of age 1+ bull trout in the upper Malheur subpopulation was estimated as 3,554 $\pm$ 30% (Buchanan et al 1997). The majority of bull trout were found in the area of Big Creek, lower reaches of Snowshoe Creek, and Meadow Fork of Big Creek. The maximum length observed in 1993, 1994 and 2003 was 440mm suggesting few fluvial adults are present.

Primary spawning areas for the Upper Malheur subpopulation are located in the Meadow Fork, Big Creek, Snowshoe Creek, and Lake Creeks. Meadow Fork is the key spawning stream for the local population. The majority of bull trout spawning within the project area occurs prior to mid-September. Due to the presence of brook trout redds are only counted as bull trout redds observed prior to mid-September. The estimated number of bull trout redds peaked in 2000 (39) and has since declined to 5 redds in 2004. The decline in the estimated number of redds is most likely attributed to the effects of the 2002 High-Roberts Fire and the 2003 flash flooding that originated in the area. A passage barrier on the Meadow Fork at culvert FSR 1648021 developed following the 2003 flash flooding.

Limiting Factors

Stream temperatures and the quality of habitat are the major limiting factors to bull trout recovery within the Malheur River Watershed. Primary effects from grazing are related to vegetation removal and hoof action along the banks and areas of saturated soils. Though much of the area has improved from historical conditions, wide and shallow streambanks are still prevalent which increases solar radiation reducing the cooling effect of deep pools, undercut banks, and hardwood shade. Well shaded cover also provides productive terrestrial and aquatic macro-invertebrates for an abundant food base. This complexity of cover also reduces stress to individual trout allowing for productive growth and reproduction.

The Draft Recovery Plan (USFW 2002) indicated past and ongoing human-induced activities have increased stream temperatures, increase sediment delivery, and resulted in the loss of large pools. These activities include the creation and management of Warm Springs and Agency dams, forest management practices, irrigation withdrawals, livestock grazing, past bull trout harvest, and introduction of non-native species (brook trout).

The FWS published a proposed rule revising designation of critical habitat for bull trout on January 14, 2010 (75 FR 2270).

Columbia Bull trout Recovery Plan

The Columbia River Bull Trout Recovery plan identified the specific recovery criteria for the Malheur River population.

Recovery Criteria:

- Bull Trout are distributed among 2 or more local populations in the recovery unit within the Malheur River Core Area.
- Estimated abundance of adult bull trout in the Malheur River Recovery Unit is between 2,000 and 3,000 individuals between the two local populations.
- Adult bull trout exhibit a stable or increasing trend for at least two generations at or above the recovered abundance level within the Malheur River Core Area.
- Specific barriers inhibiting bull trout movement and recovery in the Malheur River Recovery Unit have been addressed, assuring opportunities for connectivity among local populations within the core area.

Livestock grazing has the potential of effecting strategies 1-3. The recovery plan lists over grazing and loss of shade as a reason for an increase in mid elevation stream temperatures and decline in bull trout populations. Livestock Grazing was considered a high significance of threat to recovery for the Malheur River Recovery Unit. The highest priority for the USFWS is that no direct effects occur to spawning bull trout or redds after August 15th.

The Recovery Plan Addresses sediment issues identified in the upper Malheur River watershed assessment, (*e.g.*, road related sediment in Lake Creek and Bosenberg Creek). Noted was a diversion ditch on Lake Creek that diverts flow into a draw where erosion and head-cutting have been occurring on the return flow ditch.

The Plan noted that there was a need to restore shade and canopy, riparian cover, and native vegetation in all bull trout spawning, rearing and migration areas. Specifically, Summit Creek,

the Malheur River downstream of Logan Valley, and Crooked Creek in the Upper Malheur River subbasin have suppressed woody vegetation in reaches that need this component to become stable. The Plan recommended reducing grazing impacts in all bull trout spawning areas such as implementing measures to reduce livestock impacts to streams, (*e.g.*, fencing, changes in timing and use of riparian pastures, off-site watering and salting), to accomplish this task. Lower Lake Creek lower Big Creek, Lower Bosenberg Creek, Summit Creek, and lower McCoy Creek are areas that would benefit from shade restoration.

Habitat in the Analysis Area – Rearing Habitat

Currently, occupied rearing habitat for juvenile bull trout is present in Lake Creek, Big Creek, Meadow Fork, and Snowshoe Creek. Potential rearing habitat for juveniles is currently present in McCoy, Bosenberg, and Summit Creeks. Stream reaches with daily maximum water temperatures < 20ºC were considered to be potential rearing habitat for juvenile bull trout (Dunham and Chandler 2001). Currently, juvenile bull trout occupy about 63% of potential habitat in the Upper Malheur subpopulation area (Table A-6).

Table A-6: Miles of Potential and Occupied Habitat for Juvenile Bull Trout in the Upper Malheur Subpopulation Area

Stream Name	Documented Use Prior to 1990	Miles of Potential Juvenile Rearing Habitat	Miles of Occupied Juvenile Rearing Habitat
Big Creek	Yes	5.8	5.8
Meadow Fork	Yes	4.8	4.8
Snowshoe Creek	Yes	1.6	1.6
Corral Basin Creek	Yes	2.7	0.0
Bosenberg Creek	Yes	2.6	0.0
Lake Creek	Yes	5.0	5.0
McCoy Creek	No	1.8	0.0
Summit Creek	Yes	3.0	0.0
Crooked Creek	Yes	0.0	0.0
	TOTAL	**27.3**	**17.2**

Spawning Habitat

There are about 14 miles of bull trout spawning habitat in the subpopulation area. Primary spawning areas for the upper Malheur subpopulation are located in Meadow Fork, Big, Snowshoe, and Lake Creeks. Highest numbers of suspected bull trout redds are found in Meadow Fork. A bull trout was observed on a redd in upper Summit Creek in 2000.

Table A-7: Miles of Suspected Bull Trout Spawning Habitat in the Upper Malheur Subpopulation Area

Stream Name	Bull Trout Spawning Habitat (Miles)
Big Creek	3.7
Lake Creek	4.5
Meadow Fork	3.4
Snowshoe Creek	1.8
Summit Creek	0.8
TOTAL	**14.2**

Subadult Rearing Habitat

There is little information currently available on areas used by subadults for rearing during summer months in the upper Malheur River and tributaries. However based upon general life history information, it is assumed that rearing habitat for fluvial subadult bull trout is present downstream of juvenile rearing areas and may extend down to at least the Forest boundary. Winter and spring use of Crooked and Summit creeks by subadults is possible. A bull trout 200mm in length, most likely a subadult, was captured in Crooked Creek in August of 1998 (L. Schwabe, BPT, pers. com.). In 2004, one radio-tagged subadult reared throughout the summer in the East Fork of Lake Creek and one in Big Creek below FSR 16.

Adult Winter Holding Habitat

Winter holding habitat for fluvial adults is present in the upper Malheur River downstream of the confluence of Lake and Big creeks to at least the Forest boundary. Spring use of Crooked Creek by adult bull trout has been documented. A bull trout 356mm in length was captured in Crooked Creek in May of 1995. Winter and spring use of Summit Creek by adults is also possible.

Migration Habitat

The Malheur River serves as a migration corridor for the subpopulation. Seasonal thermal barriers occur at the lower ends of tributaries and on the Malheur River (Bowers et al. 1993). An apparent thermal barrier exists in Lake Creek downstream of national forest lands in Logan Valley that restricts the movement of fluvial adults into spawning areas on Lake Creek. This thermal barrier has probably resulted in the isolation of the local population of Lake Creek from the rest of the subpopulation.

Redband Trout

Redband trout occur in the following streams within the project area Crooked Creek, Lake Creek, Big Creek, Bosenberg Creek and Summit Creek. Redband trout are sensitive to changes in water quality and habitat. Adult redband trout are generally associated with pool habitats, although various life stages require a wide array of habitats for rearing, hiding, feeding, and resting. Pool habitat functions as important refugia during low water periods. An increase in sediment lowers spawning success and reduces the quantity and quality of pool and interstitial habitat. Other important habitat features include healthy riparian vegetation, undercut banks and LWD.

Spawning occurs during the spring, generally from March to June. Redds tend to be located where velocity, depth and bottom configuration induce water flow through the stream substrate, generally in gravels at the tailout area of pools. Water temperatures influence emergence of fry, which is typically from June through July.

Redband trout are present in all fish bearing streams in the analysis area. Highest densities are found in Crooked Creek. Lower numbers are found in Lake Creek and McCoy Creek where brook trout are the dominant salmonid.

The project area has approximately 45.39 stream miles of occupied redband habitat. Comparatively, the Malheur National Forest contains approximately 840 miles of redband trout habitat (Malheur Forest GIS data). The miles of occupied redband trout habitat by allotment, unit and 6th field HUC are displayed below (Table A-8).

Table A-8: Miles of Occupied Redband Trout Habitat within the Allotment Boundaries in the Project Area for Summit Logan

Allotment	Unit	HUC	Miles	Percentage
Lake Creek	Bosenberg	Bosenberg Creek, Upper Big Creek	12.61	68.53
	McCoy Creek	Lake Creek Upper Big Creek	5.79	31.47
		TOTAL	**18.4**	**40.54**
Logan Valley	Big Field	Lake Creek	0.17	3.31
	Corral Holding	Bosenberg Creek	0.17	3.31
	East Lake Creek	Bosenberg Creek Upper Big Creek	0.32	6.23
	Lower Field	Bosenberg Creek	0.16	3.11
	North Big Creek	Bosenberg Creek Upper Big Creek	1.80	35.02
	South Big Creek	Bosenberg Creek Upper Big Creek	0.92	17.90
	West Bosenberg	Upper Big Creek	0.32	6.23
	West Lake Creek	Lake Creek	1.28	24.90
		TOTAL	**5.14**	**11.32**
McCoy Creek	Cow Camp	Lake Creek	0.58	31.87
	North Fork	Upper Big Creek	0.43	23.63
	Starvation	Lake Creek	0.81	44.51
		TOTAL	**1.82**	**4.01**
Summit Prairie	Crane Rock	Summit Creek	1.26	6.29
	Little Logan	Summit Creek	5.03	25.11
	North Summit	Summit Creek	0.97	4.84
	Sagehen	Summit Creek	6.43	32.10
	South Summit	Summit Creek	0.01	0.05
	Summit Rock	Summit Creek	5.93	29.61
	West Summit	Summit Creek	0.40	2.00
		TOTAL	**20.03**	**44.13**
		GRAND TOTAL	**45.39**	**--**

Redband trout require the same habitat characteristics as bull trout with the exception that bull trout are relatively limited by their requirement for cold stream temperatures. Therefore the analysis of bull trout critical habitat and water quality along with the actions proposed would have the same effects on redband trout habitat within the project area.

Summary by Allotment

Lake Creek Allotment

Streams within the Lake Creek allotment include Bosenberg Creek (4.4 miles of unoccupied bull trout critical habitat), Corral Basin Creek (3.6 miles), Meadow Fork Big Creek (0.5 miles), Big Creek (2.3 miles), Lake Creek (1.8 miles) and McCoy Creek (1.6 miles). 14.3 miles (41%) of bull trout critical habitat is within the Lake Creek allotment of the total 35 miles in the Project Area. The Bosenberg unit contains 8.6 miles of bull trout critical habitat (60%) while the McCoy Creek unit contains 5.7 miles (40%). 9.6 miles (67%) of the total 14.3 miles of bull trout critical habitat within the Lake Creek allotment are unoccupied and 4.7 miles (33%) are occupied.

Appendix A part 1 shows the departure from desired condition and existing condition for stream reaches within the Lake Creek allotment based on vegetative potential and stream channel potential. The recovery timeline for these departures is represented in Appendix A part 2 based on vegetation and channel characteristics documented to not be in balance by the PFC 2007 surveys, MIM and PIBO data, and Carex Working Group Report 2012. Specific indicators related to vegetation, channel characteristics and bull trout critical habitat were selected for determining recovery or improvement based on their repeatability and relationship to other specific indicators for bull trout critical habitat as well as existing monitoring that is currently ongoing in these areas and their demonstrated responses to changes in management such as livestock grazing. The following descriptions of vegetation, channel characteristics, water temperature and bull trout critical habitat describe the existing condition by unit for streams within the Lake Creek allotment and a more detailed description as well as the desired condition for stream reaches within the specific units can be found in Appendix A part 1.

Bosenberg Creek subwatershed risk ratings were developed during the Malheur National Forest Roads Analysis (MNF 2004b). Findings from the report include:

- The road density risk was high for road maintenance level (RML) 1-5 and 1-2
- The risk rating for total road density within the 200 foot of perennial and intermittent streams was extreme for both RML 1-5 and 1-2
- The overall watershed risk from the road network was rated high

Vegetation

The potential vegetation for the riparian plant community are dominated with a conifer overstory with alder, willow and mesic graminiods in open areas (IDT Review 2012). This vegetative community is dominated by the landform of the valley bottoms and by the soil texture.

Channel Characteristics

Rosgen B channel types are dominant in the Lake Creek allotment also due to the landforms. The gradient of these streams is between 2 and 4 percent slope and there is little floodplains developed in these type of streams. Rosgen C channel types develop on the downstream extent of the allotment. Gravel substrate dominates the bed of these channels. Recent wildfires in the headwaters have introduced large sediment sources that the channel is transporting downstream in pulses. Organic ash and debris from the post fire have been deposited on the streambanks and floodplain downstream of the burnt areas. These stream banks are extremely sensitive to disturbance and are vulnerable to over widening through streambank trampling.

Water temperatures across Lake Creek allotment likely are compliant with the INFISH criteria for adult holding temperatures (59 F), but not INFISH spawning and rearing (48 F) or the TMDL standard (53.6 F). Water temperatures for streams within the Lake Creek allotment are displayed in Streams within the Lake Creek allotment include Bosenberg Creek (4.4 miles of unoccupied bull trout critical habitat), Corral Basin Creek (3.6 miles), Meadow Fork Big Creek (0.5 miles), Big Creek (2.3 miles), Lake Creek (1.8 miles) and McCoy Creek (1.6 miles). 14.3 miles (41%) of bull trout critical habitat is within the Lake Creek allotment of the total 35 miles in the Project Area. The Bosenberg unit contains 8.6 miles of bull trout critical habitat (60%) while the McCoy Creek unit contains 5.7 miles (40%). 9.6 miles (67%) of the total 14.3 miles of bull trout critical habitat within the Lake Creek allotment are unoccupied and 4.7 miles (33%) are occupied.

Appendix A part 1 shows the departure from desired condition and existing condition for stream reaches within the Lake Creek allotment based on vegetative potential and stream channel potential. The recovery timeline for these departures is represented in Appendix A part 2 based on vegetation and channel characteristics documented to not be in balance by the PFC 2007 surveys, MIM and PIBO data, and Carex Working Group Report 2012. Specific indicators related to vegetation, channel characteristics and bull trout critical habitat were selected for determining recovery or improvement based on their repeatability and relationship to other specific indicators for bull trout critical habitat as well as existing monitoring that is currently ongoing in these areas and their demonstrated responses to changes in management such as livestock grazing. The following descriptions of vegetation, channel characteristics, water temperature and bull trout critical habitat describe the existing condition by unit for streams within the Lake Creek allotment and a more detailed description as well as the desired condition for stream reaches within the specific units can be found in Appendix A part 1.

Bosenberg Creek subwatershed risk ratings were developed during the Malheur National Forest Roads Analysis (MNF 2004b). Findings from the report include:

- The road density risk was high for road maintenance level (RML) 1-5 and 1-2
- The risk rating for total road density within the 200 foot of perennial and intermittent streams was extreme for both RML 1-5 and 1-2
- The overall watershed risk from the road network was rated high

Bull trout Critical Habitat

Lake Creek allotment is a stronghold for Bull Trout survival in the Upper Malheur Drainage. Much of the spawning and rearing takes place in the allotment. Meadow Fork of Big Creek had the highest density of redds until the wildfires introduced large amounts of sediment and have reworked the system.

A fish barrier is present on Bosenberg Creek, inhibiting fish connectivity to cooler water upstream. R6 stream survey data suggests bankfull width/depth and LWD are meeting standards, whereas pool quantity did not.

Logan Valley Allotment

Streams within the Logan Valley Allotment include of Big Creek, Bosenberg Creek and Lake Creek. 3 miles (9%) of bull trout critical habitat is within the Logan Valley allotment of the total 35 miles in the project area. Big Field, East Bosenberg, Flat Field and Front Field do not have aquatic habitat or riparian resources identified. A large fen occurs in the Big Field unit. Please see the Botany Section for a discussion on these resources.

Appendix A part 1 shows the departure from desired condition and existing condition for stream reaches within the Logan Valley allotment based on vegetative potential and stream channel potential. The recovery timeline for these departures is represented in Appendix A part 2 based on vegetation and channel characteristics documented to not be in balance by the PFC 2007 surveys, MIM and PIBO data, and Carex Working Group Report 2012. Specific indicators related to vegetation, channel characteristics and bull trout critical habitat were selected for determining recovery or improvement based on their repeatability and relationship to other specific indicators for bull trout critical habitat as well as existing monitoring that is currently ongoing in these areas and their demonstrated responses to changes in management such as

livestock grazing. The following descriptions of vegetation, channel characteristics, water temperature and bull trout critical habitat describe the existing condition by unit for streams within the Logan Valley allotment and a more detailed description as well as the desired condition for stream reaches within the specific units can be found in Appendix A part 1.

Big Creek subwatershed risk ratings were developed during the Malheur National Forest Roads Analysis (MNF 2004b). Findings from the report include:

- The road density risk was moderate for road maintenance level (RML) 1-5 and 1-2
- The risk rating for total road density within the 200 foot of perennial and intermittent streams was moderate for both RML 1-5 and 1-2
- The overall watershed risk from the road network was rated moderate

Lake Creek subwatershed risk ratings were developed during the Malheur National Forest Roads Analysis (MNF 2004b). Findings from the report include:

- The road density risk was high for road maintenance level (RML) 1-5 and moderate for RML 1-2
- The risk rating for total road density within the 200 foot of perennial and intermittent streams was high for both RML 1-5 and 1-2
- The overall watershed risk from the road network was rated moderate

<u>Big Creek</u>

Vegetation

Three reaches along Big Creek (1.8 miles) was rated PFC in 2007. It transitions from a conifer with alder and mesic graminiods upstream to a willow/sedge-rush controlled system near the 16 road. The ecological status of the designated monitoring area (DMA) on Big Creek Reach 3 was mid seral. The distribution of stabilizing plant communities along Big Creek Reaches 1 and 2 were near desired condition (Appendix A, part 1).

Channel Characteristics

Big Creek has a Rosgen Da5/6 channel type and is a glacial outwash, multiple threaded and highly sinuous stream. The stream became braided because of the excessive sediment loads due to historic glacial activities. At the DMA in Reach 3, bank stability is at the long-term desired condition and meets the Amendment #29 numeric standard. The channel stability throughout Big Creek is largely controlled by the large woody debris that falls into the stream.

Big 2 in the West Bosenberg unit is the only water temperature monitoring site that occurs in the Big Creek portion of the Logan Valley Allotment. Big 1 is in the McCoy Creek unit of Lake Creek allotment. They are approximately 2.3 miles away from each other. The 7DADM was 56.8°F at Big 1 and 63.8°F at Big 2. Big Creek heats up approximately 7°F between sites Big 1 and 2. Without a monitoring site in the unit it is difficult to determine if the water temperatures met standards. It is likely that water temperatures in the South Big Creek unit met INFISH standards for adult holding (59 F), but may exceed INFISH standards for spawning and rearing (48 F) or the TMDL standard (53.6 F).

Bull trout Critical Habitat

Bull trout likely use Big Creek for rearing and spawning habitat. 1.8 miles are occupied bull trout critical habitat listed for spawning and rearing.

Bosenberg Creek

Vegetation

Bosenberg Creek flows through Corral Holding and Lower Field units that are separated by private land ownership. Corral Holding has approximately 0.1 miles of the North end of the unit contained in a riparian pasture on the back side of the corral. This section of stream is a sedge/rush with some willow plant community in very good condition and likely at a PFC rating. Willows appeared in multiple age class heights and at an appropriate density of individuals. Approximately 0.02 miles at the bottom of the reach are outside of the corral area and appear to be grazed annually with private lands. This area would likely be rated FAR with an unknown trend. The area lacks adequate vegetative cover and the channel looks over widened with the bankfull width/depth not in balance with its landform setting. Lower Field unit is a sedge/rush plant community that is developing into developed community types.

Channel Characteristics

Bosenberg Creek has a Rosgen E channel type with channel stability controlled by herbaceous plants with a very narrow channel width and is highly sinuous. Abundant undercut banks and quality pools were observed throughout these two units. However, there are indicators of isolated spots that were historically over widened and slow to recover.

No water quality monitoring sites were available on Bosenberg Creek.

Bull trout Critical Habitat

0.24 miles are unoccupied bull trout critical habitat listed for spawning and rearing.

Lake Creek

Vegetation

Lake Creek is a conifer overstory with alder, willow and mesic graminiods in the open areas while the lower end of the reach has little or no conifer overstory (PFC 2007). The ecological status was monitored at the MIM DMA as early seral with alder (19%) / Kentucky bluegrass (8%) plant community (MIM 2008). The young age class of willow and alder hardwoods is low. The effective shade averaged at 39% and did not meet the desired condition of 60-80% in mixed shrub and conifer plant communities (CWG 2012). Two PIBO DMAs occur in the Lake Creek portion of the Logan Valley allotment. A decrease in woody cover along the stream bank was the only statistical change observed associated with vegetative attributes. The wetland rating across the floodplain slightly improved at PIBO site 1884.

Channel Characteristics

Lake Creek has a Rosgen F4/C4 complex of channel types. The potential channel type that could exist is an E4/C4. This reach has legacy disturbances that over widened the channel form. The poor channel shape has resulted in issues in sediment transport through the reach and has decreased the likelihood of a typical flood from reaching its floodplain. This yields excessive energy that may make the channel more unstable. Stream bank stability (55%, MIM 2008) was

not meeting the 90% desired condition using the MIM protocol, but did meet the desired conditions with 95% using PIBO in 2006 and 2011. The MIM value is suggested to being more representative since the sampling interval is closer.

PIBO channel characteristics data from site 1884 indicate numbers of pools per mile have increased by two fold, bank angle and percent undercut banks have improved. Residual pool depth has significantly decreased and bankfull width/depth has decreased.

PIBO site 2037 has less data collected in 2006 to compare 2011 data for trend interpretation. Percent stable banks has remained static and is meeting Forest Standards. Bank angle has significantly improved and percent undercut banks have improved.

One water temperature monitoring site (Lake 2) occurs in the West Lake Creek unit and two approximately one mile downstream below the 16 road on two channels of Lake Creek (Lake 3 and 4). Lake 3 is the east channel and Lake 4 is the west channel. Lake 2 is near the most upstream extent of the unit. The 7DADM was 58.2°F at Lake 2, 75.6°F at Lake 3 and 73.2°F at Lake 4. Lake Creek heats up approximately 17.4°F between sites Lake 2 and 3 and heats up by 15°F from sites Lake 2 and 4. Site 1 met the 59°F INFISH standard for adult holding, but exceeded the 53.6°F TMDL standards and 48˚F INFISH standard for spawning and rearing. The temperature difference from sites Lake 2 to 3 and 4 is because of the irrigation withdrawals that occur on private land.

Bull Trout Critical Habitat

Currently 0.95 miles of Lake Creek are occupied, spawning and rearing Bull Trout Critical Habitat within the West Lake Creek.

McCoy Allotment

Streams within the McCoy Creek Allotment include of Big Creek, Crooked Creek and Lake Creek. 1 mile (3%) of bull trout critical habitat is within the McCoy Creek allotment of the total 35 miles in the project area. Lake Creek, Ridge, Dry, and Gov't Flat do not have aquatic habitat or riparian resources identified. 0.02 miles of Big Creek flow through the North Fork unit and have been excluded to livestock by an electric fence. This reach is likely at PFC, but was not assessed.

Appendix A, part 1 shows the departure from desired condition and existing condition for stream reaches within the McCoy Creek allotment based on vegetative potential and stream channel potential. The recovery timeline for these departures is represented in Appendix A, part 2 based on vegetation and channel characteristics documented to not be in balance by the PFC 2007 surveys, MIM and PIBO data, and Carex Working Group Report 2012. Specific indicators related to vegetation, channel characteristics and bull trout critical habitat were selected for determining recovery or improvement based on their repeatability and relationship to other specific indicators for bull trout critical habitat as well as existing monitoring that is currently ongoing in these areas and their demonstrated responses to changes in management such as livestock grazing. The following descriptions of vegetation, channel characteristics, water temperature and bull trout critical habitat describe the existing condition by unit for streams within the McCoy Creek allotment and a more detailed description as well as the desired condition for stream reaches within the specific units can be found in Appendix A part 1.

See the Logan Valley allotment description for information on roads.

Big Creek

Vegetation

Big Creek reach 2 has a vegetative potential of sedge, rush, grass, and willows (PFC 2007). PFC identified an abundant cover of stabilizing plants along the streambanks of this reach. A recent change in livestock management has resulted in numerous increases in number and vigor of willow species present.

Channel Characteristics

Lake Creek reach 2 was a Rosgen E5 channel type that has channel stability controlled by vegetative attributes and is sensitive to livestock grazing. The beaver activity in this reach has created channel complexity that helps retain water and sediment and provide fish habitat faster than any other manner. The reach is a series of dams with a low gradient, meandering channel between the dams.

One water temperature monitoring site (Lake 5) occurs in the Cow Camp unit and one just upstream of the unit on the east channel (Lake 3). The 7DADM was 75.6°F at Lake 3 and 75.0°F at Lake 5. Lake Creek stays relatively constant as it flows through Lake Creek reach 2. Site 5 exceeds INFISH standards and TMDL standards.

Bull Trout Critical Habitat

Currently 0.51 miles of Lake Creek are occupied, spawning and rearing Bull Trout Critical Habitat within the Cow Camp unit.

Lake Creek

Lake Creek has two reaches that flow through two pastures that are not adjacent.

Vegetation

Lake Creek has a vegetative potential of sedge, rush, grass, and willows (PFC 2007). PFC identified an abundant cover of stabilizing plants along the streambanks of this reach. A recent change in livestock management has resulted in numerous increases in number and vigor of willow species present on reach 1.

Channel Characteristics

Lake Creek reach 2 has a Rosgen E channel type and reach 1 a Rosgen C channel type that has channel stability controlled by vegetative attributes and is sensitive to livestock grazing. The beaver activity in reach 2 has created channel complexity that helps retain water and sediment and provide fish habitat faster than any other manner. The reach is a series of dams with a low gradient, meandering channel between the dams. Reach 1 has narrowed dramatically and is meeting Forest Plan standards for undercut banks.

One water temperature monitoring site (Lake 5) occurs in the Cow Camp unit and one just upstream of the unit on the east channel (Lake 3). The 7DADM was 75.6°F at Lake 3 and 75.0°F at Lake 5. Lake Creek stays relatively constant as it flows through Lake Creek reach 2. Site 5 exceeds INFISH standard and TMDL standards.

Bull Trout Critical Habitat

An R6 stream survey was conducted on reach 1 of Lake Creek within the Starvation unit in 1999. Lake Creek reach 1 did not meet the INFISH and Forest Plan Amendment 29 criteria for average Bankfull Width/depth of 19.23. It met INFISH and Forest Plan Amendment 29 standards for stream bank stability with 91%. Lake Creek reach 1 measured 85% undercut banks and is meeting Forest Plan Standards

Currently 0.72 miles of Lake Creek are occupied, spawning and rearing Bull Trout Critical Habitat within the Cow Camp and Starvation units.

Crooked Creek

Vegetation

Crooked Creek has a sedge/rush with some willows (PFC 2007).

Channel Characteristics

Crooked Creek was rated functioning at risk with a downward trend (PFC 2007). This reach was an intermittent Rosgen E4/5 channel type. The potential is a perennial E5 channel type. The bankfull width/depth was not in balance and the riparian area is shrinking from eroding stream banks. The stream energy is excessive and has downcut below the rooting depths of vegetation present. This is considered high risk for additional downcutting and system unraveling (PFC 2007).

Bull Trout Critical Habitat

R6 stream survey was conducted on reach 1 of Crooked Creek within the McCoy Creek allotment in 1999. Reach 1 did not meet INFISH and Amendment 29 standards for average bankfull width:depth, pool quantity, and large woody debris. Crooked Creek reach 1 did meet INFISH and Amendment 29 standards for stream bank stability.

Currently 0.21 miles of Crooked Creek are unoccupied foraging and migratory bull trout critical habitat.

Summit Prairie Allotment

Summit Creek is the only stream within the Summit Prairie Allotment that has bull trout critical habitat. All bull trout critical habitat within the Summit Prairie allotment is considered unoccupied. 14.5 miles (49%) of bull trout critical habitat is within the Summit Prairie allotment of the total 35 miles in the project area. Crane Rock unit is the only unit that does not have bull trout critical habitat resources. South Summit contains a water gap on Summit Creek that is approximately 20 feet wide and this unit will not be discussed. Summit Creek is also the only allotment in the Project Area that is approximately entirely contained in a watershed.

Appendix A part 1 shows the departure from desired condition and existing condition for stream reaches within the Summit Prairie allotment based on vegetative potential and stream channel potential. The recovery timeline for these departures is represented in Appendix A part 2 based on vegetation and channel characteristics documented to not be in balance by the PFC 2007 surveys, MIM and PIBO data, and Carex Working Group Report 2012. Specific indicators related to vegetation, channel characteristics and bull trout critical habitat were selected for determining recovery or improvement based on their repeatability and relationship to other specific indicators for bull trout critical habitat as well as existing monitoring that is currently ongoing in these areas and their demonstrated responses to changes in management such as

livestock grazing. The following descriptions of vegetation, channel characteristics, water temperature and bull trout critical habitat describe the existing condition by unit for streams within the Summit Prairie allotment and a more detailed description as well as the desired condition for stream reaches within the specific units can be found in Appendix A part 1.

Summit Creek subwatershed risk ratings were developed during the Malheur National Forest Roads Analysis (MNF 2004b). Findings from the report include:

- The road density risk was high for road maintenance level (RML) 1-5 and 1-2.
- The risk rating for total road density within the 200 foot of perennial and intermittent streams was extreme for both RML 1-5 and 1-2.
- The overall watershed risk from the road network was rated high.

Note: A ¼ mile long buck and pole riparian exclosure will be built in the Little Logan Unit and will serve as a reference in which to compare the vegetative, channel characteristics and complexity indicators to.

Riparian exclosures would serve as a reference for determining rates of recovery and movement towards desired conditions within Appendix A part 1 and Appendix A part 2. When livestock are managed appropriately recovery rates should approximate those within areas where no livestock use is occurring. If not adaptive management strategies would be implemented.

Table A-9: PFC Stream Reaches on Summit Creek with Unit, Rating and Miles

Reach	Unit	Rating	Miles
Summit Creek 1	Sagehen	FAR NA	0.3
Summit Creek 2		FAR DN	2.43
Summit Creek 2 (exclosure)		PFC	0.24
Summit Creek 3		PFC	0.65
Summit Creek 4		FAR UP	1.1
Summit Creek 5	Little Logan	FAR UP	5.03
Summit Creek 6	Summit Rock	PFC	1.97
Summit Creek 7	North Summit	PFC	0.97
Summit Creek 8	Summit Rock	PFC	1.74
West Fork Summit Reach 1	West Summit	FAR DN	0.4
West Fork Summit Reach 2	Summit Rock	FAR DN	0.81

Table A-10: Vegetative Type on Summit Creek with Habitat Type and Reach

Habitat Type	Probable Historic Vegetation	Reaches
Constrained rocky reaches	Alder-dominated thickets along stream	Reaches 1, 3
Broad Valleys with Mesic Terraces	Extensive willow-dominated thickets along stream in mosaics with grasslands, aspen groves and cottonwood groves	Reaches 2,4,5,7
Wetlands with Lateral or Hypothetic Flows	Sedge meadows (often with willows or alders along creek banks)	Reach 6
Headwater Reaches	Conifer-dominated with scattered alders and shrubs along stream	Reach 8

Vegetation

Four major habitat types indicate four likely riparian vegetative communities along Summit Creek as you transition from the top of the watershed downward.

Reaches 1 and 3 are constrained, rocky reaches where alder species are dense. The existing conditions for shrub density and stabilizing plant species are very similar to desired conditions (Appendix A, part 1).

Reaches 2, 4, 5 and 7 are broad valleys where willow cover would be extensive. Currently, these reaches have plant cover that is dominated by sedges, rushes, mesic grasses and forbs. The herbaceous plant community has been narrowing the channel's form and developing into sedge/rush plant communities. Reaches 4 and 7 are closer to their desired stabilizing plant cover than Reaches 2 and 5. Sites for new willow establishment may become limited as the sedge/rush plant community continues to improve. Localized areas where scour and aggradation occurs will be likely areas for willow germination. However, the willow density levels in these reaches compared to the reference levels suggest there is a large departure. The willow species are present, but are being maintained in a 0-3 foot height category and are not able to be expressed into a height class that is above ungulate browse lines (approximately 4.5 feet for deer, 5 feet for cattle and 7 feet for elk). The lack of shrubs decreases the effective shade that can help keep the water temperatures cool. The MIM site on Reach 2 has observed a decrease in woody browse use leading to an increase in the number of seedlings and young woody plants from 2004 to 2010. An exclosure occurs on Reach 2 that has abundant age and height classes of different willow species and has beaver activity.

Reach 6 occurs where a groundwater upwelling or spring emerge into the bottom of the floodplain. This reach is dominated by sedge meadows because of the abundance of soil moisture. The existing stabilizing plant species and effective shade are very similar to the desired levels (Appendix A Part 1). The effective shade is largely provided by the channel form and the herbaceous floodplain vegetation.

Reach 8 occurs in the most upstream extent of Summit Creek and is a headwaters reach. The overstory is dominated by conifer species with alders scattered throughout the reach. The existing stabilizing plant species and effective shade are very similar to the desired levels (Appendix A Part 1).

West Fork of Summit Creek Reaches 1 and 2 have potential vegetative communities of sedge/rush/grass with some alder. The existing vegetative community is a Kentucky bluegrass community with isolated sedges and rushes. Reach 2 has an conifer overstory near the upstream most extent of the reach.

Channel Characteristics

Reaches 1 and 3 are Rosgen B channel types largely because the landforms produce constrained, rocky reaches. Reach 3 has pockets of Rosgen C channel types scattered amongst the B because of localized areas where the valley bottom is wider. Rosgen B channel types are commonly inherently stable to livestock effects because the streambed is armored with cobbles and gravels.

Summit Creek Reaches 2, 4, 5, 6, 7 and West Fork Summit Creek Reaches 1 and 2 are broad valleys that are low gradient and commonly have highly meandering channels across the valley bottom. All the reaches are currently in a Rosgen C channel type with a potential of a Rosgen E channel type in all but Reach 4. Being departed to a Rosgen C channel type is typical in livestock grazing areas because of hoof action and the loss of vegetative cover to dissipate the

stream energy and the channel is over widened as a result. Rosgen E channel types have increased bank storage of water and a tighter channel form to maintain water temperatures and not accelerate heating losses. Vertical stability issues in the form of headcuts were observed in West Fork Summit Creek Reaches 1 and 2. The MIM DMA on Reach 2 has statistically improved for bank stability from 2004 to 2010. Reach 5 has two PIBO DMAs that have measured a statistically significant change in the bankfull width/depth or channel form between 2001, 2006 and 2011, suggesting sufficient vegetation is catching sediment and the banks are building.

Reach 8 has a Rosgen B channel type similar to Reaches 1 and 3. However, it is a first order stream and does not receive the streamflows or sediment supply Reaches 1 and 3 does. Energy is largely dissipated in Reach 8 through large rock, down wood and step pool sequences.

Water temperatures are coldest in Reach 8 where they emerge from groundwater and heat up as your progress towards the Malheur River. Site 1 is towards the top of Reach 8 with an average 7DADM of 54.8°F at Summit 1 heating up to 78.1°F at Summit 2 and cooling down to 66.9°F at Summit 3. Summit Creek heats up approximately 23°F between sites Summit 1 and 2 and cools down by 11°F from sites Summit 2 and 3. Reach 6 has numerous springs that drain into the floodplain that cool the water considerably before flowing through Summit 3. Summit Creek heats up approximately 6°F between sites Summit 3 and 4 and stays relatively continuous through sites Summit 4 and 5 in the Little Logan unit. The average seven day average daily max was 72.5°F at Summit 5 and 78.7°F at Summit 7, heating up approximately 6°F. Site 1 is the only site to meet the INFISH standard for adult holding. All sites did not meet the INFISH spawning and rearing or TMDL standard.

Bull Trout Critical Habitat

Currently 14.5 miles of Summit Creek are unoccupied, spawning and rearing Bull Trout Critical Habitat within the Summit Prairie allotment.

Currently suitable water temperatures for spawning and rearing within Summit Creek are located within the headwaters Reaches 8 and above. Within reach 5 there are some spring and groundwater upwelling.

Reaches 1 and 2 are located within a ponderosa pine/lodgepole pine/alder system. They are considered constrained rocky reaches where large wood plays an important role in forming pools and maintaining bull trout habitat. These reaches are the lowest in the Summit Creek system and are the closest in proximity to the Malheur River. Primary utilization of these reaches by bull trout would be as migratory corridors, and possibly over wintering habitat.

Reaches 3, 4 and 5 are primarily in a meadow system that lacks adequate vegetation for shade (riparian hardwoods) and undercut bank formations which would be the primary cover for bull trout within these reaches with limited input of lodge pole pine. Additionally, channel incision and widening within these reaches and some straightening has occurred which also has reduced the streams capability for forming pools, undercut banks, and deposition (bank building). The potential channel characteristics for the reaches suggest sinuosity and the ability of the stream to access its floodplain are critical elements for recovery of this system. These factors have reduced the potential for Summit Creek in these reaches to provide juvenile rearing, spawning, and migratory habitat.

Reaches 5 and 6 would primarily be used for migratory behavior by transitory bull trout currently because of the existing warm stream temperatures. However with improvement in existing condtion cold influxes within reaches 5 and 6 may provide adequate rearing habitat. The components of quality migratory habitat include quality pools that are refugia for migrating fish and the absence of thermal barriers related to water temperature. A potential culvert barrier for adults and juvenile bull trout exists within reach 8 of Summit Creek which may limit access to cold water thermal refugia for juvenile bull trout.

Environmental Consequences

Alternative 1 - No Grazing

Direct and Indirect Effects

Under the no action alternative, grazing would not be authorized within the Summit Prairie, Logan Valley, and McCoy allotments and the permit cancelled. Direct effects related to livestock grazing would not occur under this alternative resulting in improvements in riparian vegetation, channel characteristics, bull trout CH, and water temperatures within the three allotments following removal of livestock 2 years after the permit cancellation. Recovery objectives (Appendix A, part 2) and desired condition (Appendix A, part 1) would likely be achieved within the time frames prescribed for many of the reaches (Appendix A, part 2) if the existing condition is related to livestock grazing. The rate of recovery within this alternative would have the greatest extent of all alternatives for recovery. Riparian areas that have concentrated wildlife use would have limited riparian hardwood recovery and thus would have a slower recovery than areas where wildlife exclosures are proposed. Improvement in riparian hardwood condition may be slower than that of areas where exclosures are proposed because of the effects related to fencing limiting wildlife use.

Grazing would continue as permitted under the current permit for 2 years following notification of cancellation of the permit. The effects from another 2 years of grazing under the current permitted use are summarized in chapter 2 alternatives considered but eliminated from detail study (Current Management). Reaches of Summit Creek are not expected to improve at a rate sufficient for the desired conditions in Appendix A, part 1 under the existing management and therefore the existing condition within this area is expected to remain the same for those two years.

Table A-11: Summary of Expected Recovery for PFC Ratings by Unit Based on the Actions Proposed

Allotment	Unit	Miles	PFC in 5 years	PFC in 10 years	Desired Condition in 10 years
Lake Creek	Bosenberg	8.64	>[12]PFC	>>[13]PFC	Y
	McCoy Creek	5.66	>PFC	>>PFC	Y
Logan Valley	Corral Holding	0.12	PFC	>>PFC	Y

[12] > : Shows improvements in bull trout critical habitat indicators moving toward PFC
[13] >> : Shows continued improvements in bull trout critical habitat indicators near or beyond PFC

Allotment	Unit	Miles	PFC in 5 years	PFC in 10 years	Desired Condition in 10 years
	East Lake Creek	0.33	>PFC	>>PFC	Y
	Lower Field	0.12	PFC	>PFC	Y
	North Big Creek	0.73	>PFC	>>PFC	Y
	South Big Creek	0.62	>PFC	>>PFC	Y
	West Bosenberg	0.13	PFC	>>PFC	Y
	West Lake Creek	0.95	PFC	>PFC	Y
McCoy Creek	Cow Camp	0.51	>PFC	>>PFC	Y
	North Fork	0.02	PFC	>>PFC	Y
	Starvation	0.29	>PFC	>>PFC	Y
	Starvation	0.21	PFC	>PFC	Y
Summit Prairie	Little Logan	5.03	PFC	>PFC	Y
	North Summit	0.97	>PFC	>>PFC	Y
	Sagehen	2.75	N[14]	PFC	N
		1.10	PFC	>PFC	Y
		0.89	>PFC	>>PFC	Y
	South Summit	0.04	PFC	PFC	N
	Summit Rock	0.81	N	PFC	N
		3.71	>PFC	>>PFC	Y
		1.00	>PFC	>>PFC	Y
	West Summit	0.39	N	PFC	N

Cumulative Effects

The area considered for cumulative effects includes all of the Big Creek, Lake Creek, Summit Creek, Bosenberg Creek – Malheur River Subwatersheds (to the confluence of Bosenberg and the Malheur River) in the Headwaters Malheur River Watershed. All activities in Appendix C of the DEIS have been considered for their cumulative impacts on riparian habitat and aquatic dependent species. These cumulative effects geographical area upstream extent was selected because activities that occur upstream of the project area up to the drainage divide may be transported by runoff into the project area. The downstream extent was selected because most materials flowing out of the project area should deposit before leaving the subwatershed. The cumulative effect for past actions has been described in the existing condition for this analysis area. The following discussion focuses on those past, ongoing and foreseeable activities that may contribute impacts to riparian condition and aquatic species.

[14] N: Indicates not at PFC or Desired Condition within defined time period

The subwatersheds that contain the Logan Valley, Lake Creek, McCoy Creek and Summit Creek allotments vary in condition depending on the land management designation and the primary activities that have occurred within those spaces. The upper portions of Lake Creek and Big Creek are in wilderness areas with little human caused effects. Riparian vegetation and aquatic habitat conditions are properly functioning in these areas to the extent of natural variability (w/o anthropogenic influence). The mid to lower portions of these subwatersheds have been affected by a variety of human-caused impacts, but mostly grazing, timber harvest, and road development. Private land occurs in about the mid portion of all the subwatersheds. Livestock grazing and agriculture are the primary uses of those private lands.

The No Action alternative would not add any cumulative effects to the existing riparian vegetation, channel characteristics and complexity, water temperature and Bull Trout Critical Habitat in the project area. The current livestock grazing activities on the Logan Valley, Lake Creek, McCoy Creek and Summit Prairie allotments would not occur and areas where current grazing management impact fish and their habitat would stop. Grazing access points that result in bank trampling and streamside vegetation removal would no longer occur and these areas would improve, leading to improved aquatic and riparian habitat conditions. Because no direct or indirect effects would occur, there would be no cumulative effects. The No action alternative would result in the greatest extent of recovery of all alternatives when considered cumulatively for riparian areas whose existing condition is primarily attributable to livestock grazing. The rate of recovery for no livestock grazing including exclosures would be similar to those areas with the appropriate livestock management.

The following tables depict the expected PFC rating by miles for each stream reach within each allotment and unit based on the existing condition, the potential for recovery towards or achievement of desired conditions (Appendix A, part 1) and the relevant actions proposed in Alternative 1.

Direct and Indirect Effects Common to Action Alternatives

Livestock Grazing – All Allotments

There are three primary ways in which livestock grazing may affect riparian vegetation, channel characteristics, bull trout critical habitat, and water quality. The three ways include browse utilization, hoof shearing/compaction, and riparian herbaceous plant utilization. An increase in any of these 3 factors and its effect on riparian vegetation and channel characteristics are synthesized below. Likewise a decrease in any of these factors would have the opposite effect. The intensity, duration, season of use, and periods of rest associated with these effects vary by alternative as well as the standards (endpoint indicators) for specific units in each of the alternatives (Appendix E). Additionally, the effects of increasing any of the three values is also dependent on the existing condition (PFC rating, CWG 2012, USFS stream surveys) of the riparian area and its resiliency to these effects and other disturbances. For example, these general effects would be lessened annually or not measureable if a site is at greater than PFC and the existing condition is very close to the desired condition. If a reach is below PFC and there is large departure from desired condition, then the annual effects will be exacerbated. This is because the vegetative and channel attributes are not resilient enough to provide channel stability. The general effects of the primary actions related to livestock grazing and their effects on riparian hardwoods, channel characteristics, and herbaceous plants in riparian areas are listed below.

- Stubble Height: 6 inches (typically 4-8 inches based on season of use and similarity to desired conditions); stubble height has been widely used as an annual monitoring indicator for adaptive management to evaluate livestock vegetation use in riparian areas and provides information useful in determining the degree to which livestock grazing is influencing the achievement of desired conditions (streams dominated by herbaceous hydrophytic vegetation). Stubble height has been identified as being related to the physiological health and vigor of individual plants/communities as well as the ability of vegetation to protect streambanks and filter sediment during overbank flows, although by itself it is generally not sufficient to establish a relationship between grazing and riparian vegetative conditions. Research is limited, but the literature generally suggests 4-6 inches of residual stubble height allows for improved riparian grazing management and provides for adequate riparian protection. Clary and Leininger (2000) conducted studies on stubble height and its ability to improve riparian habitats and to capture and stabilize sediment. They concluded that stubble heights of 4-6 inches appear to stabilize the greatest amount of sediment. Boyd and Svejcar (2004) found similar results, reporting adequate regrowth occurred on most sites tested in Oregon when 4-6 inch stubble height remained. Clary (1999) states that by maintaining stubble heights of 4-5.5 inches allowed for streambank recovery. It is acknowledged; however, that in some instances 3 inches may provide adequate riparian protection while in other instances 6 to 8 inches may be required to limit streambank trampling or to reduce willow browsing. Grazing use indicator values are intended to vary by site depending on similarity to desired conditions, resiliency of the site being monitored, and the timing, duration and intensity of livestock use (UI Stubble Height Review Team Report 2004, Clary and Leininger 2000, Clary et al. 1996, Hall and Bryant 1995, PACFISH Enclosure B – Recommended Livestock Grazing Guidelines 1995, Clary and Webster 1989). This annual use indicator should be used in combination with long-term monitoring of vegetation and stream channel attributes
- Bank Alteration: 20% (10-30% depending on measurement method used and on resiliency of site); like stubble height, streambank alteration is another annual or short-term indicator used to evaluate the potential effects of livestock grazing in riparian areas, primarily any potential effects to long-term streambank stability and channel shape. It is used as a tool to assess the intensity of grazing along streambanks and to determine when such intensity may be appropriate or deemed too excessive. It can also prove useful in determining the cause-and-effect relationships between livestock grazing and stream channel conditions and whether management changes are needed for the following year. Streams are naturally dynamic and have the ability to repair a certain amount of annual disturbance each year (the amount is variable based upon stream gradient, substrate composition, streambank materials, vegetation type and abundance, channel geometry, flow regime, etc.). The literature is not extensive but generally suggests 10-30% streambank alteration is consistent with providing adequate riparian protection, and is intended to vary by site depending on similarity to desired conditions, resiliency of the site being monitored, and the timing, duration and intensity of livestock use (Burton et al. 2011, Heitke et al. 2008, Bengeyfield 2006, Cowley 2002, Bengeyfield and Svoboda 1998). Bengeyfield (2006) found that when streambank alteration measured 15-20%, width to depth ratios showed an improving trend. He also noted that the vegetation improvements kept pace with the physical changes. This annual use indicator should be

used in combination with long-term monitoring of streambank stability and channel geometry. In addition, it is worth noting that research is continuing to be conducted on the various ways that can be used to monitor for and measure actual streambank alteration (including MIM, which the District is presently using) to account for accuracy of results, reduction of variability among observers, and the resources necessary to carry out such measures.

- Mean incidence of use on woody species: 40% (30-50% based on season of use and similarity to desired conditions); Woody vegetation is an important component of many stream/riparian ecosystems as they provide a strong root system, filter sediments, and provide stream shade and habitat diversity. Woody species browse is a short-term indicator of grazing utilization of woody species. Studies have shown that it is quite difficult to accurately measure utilization of many riparian woody species, but that a general estimate of overall browsing of woody plants is important for determining the success of various grazing management prescriptions (detailed rule sets for describing classes of woody species use help with consistency). Overall, there is generally a reduction in seed production of woody plants that receive more than 55 percent utilization, and when heavy and severe utilization levels are sustained over time overall plant health, including size and root strength, is reduced. Although the literature is not extensive, it generally suggests light to moderate allowable use on woody species (~30-50%) in order to maintain or improve woody plant communities; and is intended to vary by site depending on similarity to desired conditions, resiliency of the site being monitored, and the timing, duration and intensity of livestock use (Winward 2000, Utilization Studies and Residual Measurements – USDI BLM 1996b, PACFISH Enclosure B – Recommended Livestock Grazing Guidelines 1995). It has also been suggested that a preference change, from grasses and sedges to shrubs, be used as a trigger to manage livestock in order to protect sprouts and young woody species (Hall and Bryant 1995). This annual use indicator should be used in combination with long-term monitoring indicators of woody species age class and greenline composition to help determine the health of woody plant communities. The overall health of these plants can be a substantial factor influencing streambank stability, aquatic habitat, as well as water quality. Furthermore, this information can assist managers in determining whether management actions are making progress towards desired objectives or if adjustments are needed.

The following numbered items depict the effects of livestock grazing on vegetation and channel characteristics when not managed appropriately or the existing condition is FAR with a large departure from desired conditions and lack resiliency to grazing impacts. Riparian areas that are closer to desired condition may not demonstrate these responses when managed appropriately and sufficient resiliency is present (minimum of PFC) therefore effects may not be measurable annually.

General effects from an increase in browse utilization

- decrease in riparian hardwood height and density
- decrease in percent effective shade
- increase of existing water temperature
- decrease in terrestrial insect input

- decrease of wetted floodplain

General effects from an increase in stream bank hoof shearing/compaction

- decrease in undercut banks
- increase in bankfull width to depth ratio
- decrease in residual pool depth and quality pools
- decrease in channel complexity/decrease in greenline to greenline width
- increase in sediment and unstable banks
- contraction of wetted floodplain

General effects from an increase in riparian plant utilization (stubble height)

- decrease in terrestrial insect input
- decrease in hydric plant vigor
- contraction of wetted floodplain
- decrease in stable banks

Relationship of the Effects of Livestock Grazing on the Indicators and Bull Trout Critical Habitat

Effects to Bull trout from livestock grazing can be in the form of direct impacts to individual fish or indirectly through habitat disturbance. Direct disturbance includes trampling on bull trout redds, resulting in injury or death to incubating embryos or alevin; disturbing holding or spawning adults, forcing them to alter their behavior and seek cover; or disturbing rearing juveniles, forcing them to alter their behavior and seek cover. Bull trout critical habitat designated as occupied within the project area would have livestock removed prior to August 15th to prevent direct impacts to spawning adult bull trout and bull trout redds.

Grazing can have a number of detrimental effects on riparian and aquatic habitat which includes reduction of herbaceous plant cover and litter, disturbing and compacting soils, reducing water infiltration rates, and increasing soil erosion (Belsky et al. 1999). When riparian habitat is negatively affected, the survival and growth of listed fish species, sensitive species, and water quality may also be negatively affected.

Riparian Vegetation

Shrub Development

Livestock grazing can result in reduced recruitment of riparian shrubs (density), and a reduction in height classes as well as age classes. Willows require at least 2 years of leader growth before being able to set seed. When leaders are hedged each year, recruitment does not occur. A large portion of riparian woody browse occurs on riparian shrubs less than 5 feet tall that are accessible to livestock and wildlife. Livestock grazing of riparian shrubs in the fall often extenuates the use of woody riparian plants. Shrub height can directly affect shade which impacts water temperature. Also shrubs are an important source for terrestrial insects which are a source of food for bull trout and other fish species (Saunders and Fausch 2007). Terrestrial invertebrate prey that come directly from riparian vegetation have been shown to account for 50-85% of trout diets during summer months (Utz et al 2007) and provide about 50% of their annual budget (Kawaguchi and Nakano 2001; Baxter et al 2005; Sweka and Hartman 2008). Browse and herbaceous utilization levels that limit the amount of detrital matter into streams may also

impact aquatic invertebrates that are dependent on detrital matter (Saunders 2006, Saunders and Fausch 2007b). Riparian shrub stems provide roughness and resistance to high flows. Their root system creates a matrix with herbaceous plants and increases bank stability and holding the channel's shape in a stable form.

Stabilizing plant cover

Livestock grazing can alter ecological status rating or maintain an early seral state. Hydric species such as sedges and rushes are often preferred by livestock. These hydric species contribute to a higher green line stability rating and wetland indicator rating. They also often are the first green vegetation immediately adjacent to the stream or the greenline. Hydric species also include the first colonizers of eroded banks and depositional areas facilitating a reduction in greenline to greenline width followed by channel narrowing. Early, mid, and late seral stages differ in their resilience to impacts from grazing and their ability to repair damage from one year to the next. Riparian areas that are in an early seral or mid seral state are susceptible to yearly high flow events and 5 year flow events which may result in a reset of improving riparian condition. These types of riparian areas are usually rated below PFC. Streams with adequate stabilizing plant cover build banks through deposition of sediment during high flows.

Shade

Livestock grazing can impact shade through a reduction in height of herbaceous cover, decrease in bankfull width/depth and decreases in height and density of riparian shrubs. They can also reduce hydric vegetation heights by reducing plant vigor. Reduced plant vigor can affect the channel's shape and stability. Riparian shrubs adjacent to the channel can provide microclimate effects that can provide cooler day time temperatures (Anderson et al 2007; Chen et al. 1999). Overhanging sedges and rushes provide shade to the stream and hiding cover for fish. In meadow systems with meandering, low gradient stream channels, herbaceous vegetation may be the only shade-providing plants.

Channel Characteristics

The streams that are discussed are largely alluvial and develop and function through continual adjustments from high flows and sediment loads coming in. Livestock grazing can result in changes in hydrology and channel complexity by direct bank alteration and a reduction in stabilizing bank cover and riparian hardwood shrub density. Bank stability decreases with a reduction stabilizing bank cover and a reduction in riparian plant vigor. Reductions in riparian hardwood density can also decrease bank stability. Channel can become overwidened and susceptible to erosional process resulting in channel incision when these vegetative components are reduced. Depositional processes can be accelerated facilitating pool filling reducing residual pool depth and the number of quality pools. Floodplain connectivity is reduced when channel incision or over widening occurs. The effects are manifested in the indicators of bankfull width to depth, average bankfull width, and Rosgen channel type.

Water temperature and Aquatic Species

Water temperature is related to several of the indicators discussed above. Livestock grazing can impact shade by reducing overhead cover in the form of riparian hardwood shrub height and densities thus increasing solar heating. Floodplain connectivity is related to channel type, geomorphology, and riparian vegetation. Hyphoreic exchange (cold ground water) is related to floodplain connectivity therefore a reduction in riparian vegetation function and maintenance of

an over-widened stream channel from livestock bank alteration and reduction in bank stability also affects cold groundwater influence within a reach. Pool depth and the number of quality pools also interact with stream temperature acting to mediate stream temperatures during the summer and winter months (Ebersole et al 2001). Mediation of winter temperatures by deep pools was found to be important for bull trout over wintering (Jakober 1995). Winter movement by bull trout was found to be more extensive in mid elevation streams where frequent freezing and thawing led to variable surface ice cover and frequent super cooling (Jakober et al 1998). Excessive fine sediment can result in filling of pools within a reach. Current climate model predictions for the Pacific Northwest suggest less snowpack followed by more rain on snow events. This suggests more freezing/thawing events in mid elevation streams similar to streams in the project area.

Bull trout critical habitat relates to the indicators discussed above in several ways. The primary elements are stream temperature, shade, pool quality, and suitable spawning substrate. All of which vary in importance based on life history and stage-migratory, spawning, rearing. These elements are often not found within the same locale therefore migratory behavior or the ability to move between the distinct habitats based on life stage is critical for continuation of the population and its ability to endure natural or anthropogenic disturbances. Temperature may act as a thermal barrier to this type of behavior for bull trout.

Logan Valley Allotment

Corral Holding Unit

Direct effects related to hoof shearing, browse utilization, and stubble height would be maintained on Bosenberg Creek within the Corral Holding unit. The indirect effects of livestock grazing on the riparian vegetation, channel characteristics, water temperature and Bull Trout Critical habitat would be maintenance of condition for the small section downstream of the fenced out riparian area. Inside the fenced area, minimal grazing would occur and there would be an improvement in condition. This exclosed section is approximately 0.1 miles. The woody browse would further increase the density and height classes of riparian shrubs across the entire reach. The bank alteration reduction would facilitate movement towards of improvements in the bankfull width/depth, undercut banks and shade values. Thus, it benefits Bull Trout critical habitat. Bull trout critical habitat within the riparian pastures would be moving towards desired condition within 10 years. This reach would likely maintain PFC and potentially move towards desired condition in 5 years.

Flat Field Unit

The direct effects of the unit boundary changes and fence removal and conversion would be no livestock use on Big Creek in the Flat Field unit. The indirect effect of no livestock grazing would benefit riparian resources, channel characteristics, water temperature and critical habitat. The ground disturbing impacts removal of 0.3 miles would be not measurable. Any effects from conversion of 0.3 miles electric fence to permanent let down would be minimized through following design criteria. Excluding livestock grazing from 0.13 miles of critical habitat on Big Creek in the Flat Field unit would move it towards a rating of PFC or beyond.

Lower Field Unit

Direct effects related to hoof shearing, browse utilization, and stubble height would be maintained on Bosenberg Creek within the Lower Field unit. The indirect effects of livestock

grazing on the riparian vegetation, channel characteristics, water temperature and Bull Trout Critical habitat would have a continued improvement. Bosenberg Creek is on the far east corner of the unit and an irrigated meadow produces abundant vegetation and provides livestock water through the grazing season. The permittee actively salts in the northwest corner and these management strategies likely are successful for providing recovery for Bosenberg Creek. Sedge and rush plant communities would continue to develop dense root masses and narrow the channel. Improvements in vegetative attributes would improve the bankfull width/depth, undercut banks and shade values in the reach. Thus, it benefits bull trout critical habitat. Bull trout critical habitat within the riparian pastures would be moving towards desired condition within 10 years. This reach would likely attain PFC in 5 years.

West Bosenberg Riparian Pasture

Direct effects related to authorizing the grazing system would result in a reduction in hoof shearing of streambanks, reduction in woody browse use, and an increase in hydric plant vigor within Big Creek. This site did not have any data collected on it other than field observations, but was in good condition likely rated at PFC. A photopoint would be monitored in this 14 acre unit to ensure there's an increase in shrubs and wetland obligate plant communities. The adaptive management strategy is additional rest if sufficient movement towards or achievement of desired conditions (Appendix A, part 1) has not occurred following the 3-5 years of rest.

The indirect effects of reducing livestock effects would likely result in an increase in shrub density, height and vigor, and an increase in shade. It would also maintain potential channel type (Da5/6) by reducing bankfull width to depth. Bull trout critical habitat within the riparian pastures would likely move towards desired condition (Appendix A, part 1 and Appendix A, part 2 within 10 years) by increasing residual pool depth, undercut banks, and the number of quality pools. As a result of the increase in residual pool depth, number of quality pools, decrease in bankfull width to depth, increase in riparian hardwood density and height, and increase in shade, cooler water temperatures are expected. Effects related to changes in water temperature as a result of vegetative changes would be expected within 5 years and effects related to channel characteristics and water temperature are expected within 10 years. Resting for 3-5 years would facilitate movements towards or achievement of recovery objectives Appendix A part 1. The use levels identified in Appendix E for the West Bosenberg unit, resting 3 years out of 10, monitoring (review of riparian condition 5 years out of recovery trajectory) as well as the adaptive management strategy (additional rest) would ensure movement towards desired conditions following re-initiation of livestock grazing.

The 0.13 miles reach is identified at PFC in 2012 and is expected to improve beyond a rating of PFC within the next 10 years based on the management actions within the West Bosenberg Riparian pasture. Any improvement beyond a rating of PFC is directly related to improvements in bull trout critical habitat. Annual use levels would facilitate maintenance of or improvement beyond a rating of PFC within the West Bosenberg Riparian pasture. The application of the adaptive management strategy (additional rest) for the West Bosenberg riparian if sufficient progress towards or achievement of desired conditions (Appendix A, part 1) has not been made following 3-5 years of rest would benefit this reach. This would ensure that movement towards desired vegetative and channel characteristics are continued.

McCoy Allotment

Cow Camp Riparian Exclosure

Livestock grazing would be excluded from Lake Creek Reach 2 because of the Lake Creek Fence and Water-Gap and the Lake Creek Willow Gallery Fence. These two fence projects are discussed in Chapter 1. Direct effects of herbivory, browsing and bank trampling would be reduced. Indirect effects of riparian and channel condition would be improved through the reduction of livestock use. Shade would be improved as the herbaceous vegetation becomes established into and decreasing the channel's width. Water temperatures would likely experience less solar radiation. As the vegetation, channel and water temperatures improve, fish habitat would also be improved. The active beaver colony would likely expand and provide increased groundwater recharge. The beaver activity would also improve channel complexity for further improved fish habitat. Bull trout critical habitat within the riparian exclosure would be moving towards desired condition within 10 years. This reach would likely remain at PFC.

Starvation Unit

The Starvation unit (Lake Creek Reach 1 and Crooked Creek Reach 1) would be removed from the McCoy Creek allotment. This area may be added to the Dollar Basin allotment in the future. A separate environmental analysis would be required to add this area to the Dollar Basin allotment.

Cumulative Effects Common to Action Alternatives

The area considered for cumulative effects includes all of the Big Creek, Lake Creek, Summit Creek, Bosenberg Creek – Malheur River Subwatersheds (to the confluence of Bosenberg and the Malheur River) in the Headwaters Malheur River Watershed. All activities in Appendix C of the EIS have been considered for their cumulative impacts on riparian habitat and aquatic dependent species. These cumulative effects geographical area upstream extent was selected because activities that occur upstream of the project area up to the drainage divide may be transported by runoff into the project area. The downstream extent was selected because most materials flowing out of the project area should deposit before leaving the subwatershed. The cumulative effect for past actions has been described in detail in the existing condition for this analysis area. The following discussion focuses on those past, ongoing and foreseeable activities that may contribute impacts to riparian condition and aquatic species.

The subwatersheds that contain the Logan Valley, Lake Creek, McCoy Creek and Summit Creek allotments vary in condition depending on the land management designation. The upper portions of Lake Creek and Big Creek are in wilderness areas with little human caused effects. Riparian vegetation and aquatic habitat conditions are properly functioning in these areas. The mid to lower portions of these subwatersheds have been affected by a variety of human-caused impacts, but mostly grazing, timber harvest, and road development. Private land occurs in about the mid portion of all the subwatersheds. Livestock grazing and agriculture are the primary uses of those private lands.

Past Activities

Past activities such as legacy livestock grazing and dispersed camping in riparian areas have influenced riparian plant communities. Past activities such as timber harvest, road construction, wildland fire, and dispersed camping in riparian areas have influenced channel characteristics and complexity. Past actions relevant to water temperature and aquatic habitat resources are water withdrawals for irrigation, timber harvest, road construction, wildland fire livestock grazing and stocking of nonnative fish.

Livestock grazing (prior to adoption of the Forest Plan in 1990) likely influenced riparian vegetation in the greatest extent and magnitude of all past actions. Legacy livestock grazing has affected plant vigor, potential area of wetland obligate communities, density and height classes of riparian shrubs that have strongly influenced effective shade and thus water temperatures. These changes have affected the recruitment and maintenance of the riparian vegetative attributes. Dispersed camping from recreation uses in the project area had minor effects on aquatic and riparian function. There are a few trails that cross streams resulting in localized sediment delivery and a few dispersed recreation sites that have disturbed riparian vegetation. Legacy livestock grazing has resulted in direct effects to fish species when they accessed occupied streams and may have trampled redds, resulting in altering normal behaviors and mortalities. It has also resulted in channels with wider bankfull widths that increase solar radiation. Legacy effects from browsing on stunted riparian shrubs have decreased the amount of effective shade available.

40 timber sales have occurred within the project area since 1972 (40 years). These included multiple harvest prescriptions see Appendix C. Past timber harvest likely resulted in compacted upland soils, leading to increased runoff and sediment yield. This can change the patterns of runoff from large areas in watersheds by changing vegetation characteristics. INFISH standards and RHCA buffers have been applied for timber management since 1995. INFISH limited silvicultural practices to those that are needed to acquire desired vegetation characteristics where needed to attain Riparian Management Objectives, and that avoid adverse effects on inland native fish. Ongoing and foreseeable timber harvests are required to meet the Forest Plan as amendment by Amendment 29 and INFISH.

Past timber harvesting required an extensive road network throughout most of the project areas. Roads are impervious and have changed runoff flow paths and processes. Roads adjacent to the stream likely constrain floodplain processes. Constrained roads may have additional stream energy that may erode streambanks and reduce bank stability and over widen the bankfull width/depth ratio. Ditch relief culverts in moderately steep roads adjacent to the stream are likely connected to the stream, yielding sediment into the water course directly. Roads tend to concentrate runoff, resulting in higher peak flows than would occur without roads. Fine sediments from road surfaces also enter stream channels at road crossings, increasing turbidity, substrate embeddedness and substrate composition. The vast majority of road crossings at streams are culverts. Poorly designed culverts can be barriers to juvenile or adult fish passage. Since the 1990's, road impacts have been reduced due to past project activities which have included road closure and decommissioning. Approximately 8.0 miles of road in RHCAs were closed or decommissioned in the last decade allowing some roads to re-vegetate and stabilize.

Past fires have occurred within the last 30 years in the wilderness and headwater portions of Big Creek, Summit Creek, and Bosenberg subwatersheds (Upper Malheur watershed) as well as stand replacement fires in Upper Big Creek and Lake Creek subwatersheds (Appendix C Cumulative activities considered). These fires resulted in large sediment plumes into lower downstream sections of stream, reduction in overstory and shade and likely warmer stream temperatures than prior to the fires. Recovery of the riparian hardwoods and herbaceous component has occurred in these area and the systems are primarily controlled by downed LWD as a result of the fires. However, recruitment of LWD would be delayed due to past fires, conifers have yet to reach a height where they provide the shade once present, and streambanks have formed, but are composed of erodible organic matter which is highly susceptible to impacts

from livestock hoof action. The effects of removal of the conifer overstory from fire can be expected to recover within 90 years post fire. Recruitment of new LWD may take even longer depending on natural disturbances such as windfalls or bug kills. Thus these streams would be limited in LWD for the foreseeable future.

Water withdrawals for irrigation occur on private lands in the Lake Creek subwatershed. Past, ongoing and foreseeable water withdrawals would continue and is managed by the State of Oregon. Water temperatures heat up on Lake Creek from site 2 to 3 and 4 increase by 17 and 15 degrees, respectively. This water flows through a series of irrigation ditches that warms the water before releasing it back into the creek. Two head gates with fish screens have been installed within the last 15 years.

High Lake above the project area has been stocked with non-native brook trout that now occur in some streams. Brook trout are known to compete with native trout for habitat and can interbreed resulting in less fit offspring. Brook trout (*Salvelinus fontinalis*) were introduced to the Malheur Basin in the early 1900's. The distribution of brook trout overlaps all areas occupied by bull trout in Lake Creek and most areas in Big Creek and its tributaries (Buckman et al. 1992). Hybridization and competitive displacement is possible due to the presence of brook trout. Hybridization between bull trout and brook trout in the subbasin has been documented (Buckman et al. 1992; L. Schwabe, BPT, personal communication). Brook trout are also a threat to bull trout because of their highly aggressive nature. Improvements in riparian vegetation, channel characteristics, water temperatures may improve the competitiveness of bull trout within the Malheur basin especially for those populations that exhibit migratory behavior and may grow to a larger size than local brook trout.

Ongoing Activities

Ongoing actions related to improvements in livestock management and riparian conditions are listed in Appendix C. Ongoing actions in the Project Area that are expected to improve the condition of riparian and aquatic resources include the following. The 0.3 mile West Fork Summit Creek fence and water gap would temporarily exclude livestock in the West Summit Recovery Unit on West Fork Summit Reach 1 until the condition improves. A 0.25 mile buck and pole exclosure and enlargement of willow cages to 20 foot diameter would improve willow height classes and densities in Summit Creek Reach 5 in the Little Logan unit. A 1 mile reconstruction of the Lake Creek unit division fence would improve management of livestock. A 0.2 mile fence and water gap that would provide better livestock management on Big Creek in the West Bosenberg Riparian pasture. A 0.2 mile fence that would exclude livestock from Lake Creek Reach 2, but would provide a 20 foot water gap in the Cow Camp unit. A 2.1 mile fence would fence off Lake Creek Reach 3 into the West Lake Creek Riparian pasture. Development of water sources in the Sagehen unit should improve the distribution of livestock amongst the unit and would decrease riparian vegetation disturbances except in localized areas. West Fork Summit Creek reach 2 would have parallel tree felling that should likely allow expression of vegetation and streambanks to heal where livestock do not have access to because of a tree acting as a physical barrier. All of these management actions should allow better management control of livestock grazing to improve the trend towards the management objectives and desired conditions.

These actions were considered cumulatively in each alternative based on the existing condition (PFC rating), identified issues and the proposed grazing management for each alternative.

Determinations were made as the whether the actions facilitated movement towards or achievement of recovery objectives and desired condition. These ongoing actions are expected to expedite recovery to desired conditions in coordination with the proposed actions in each alternative and benefit bull trout critical habitat thru improved livestock management and distribution within these units.

These ongoing actions are common to all alternatives and the effects from these actions have been analyzed previously in other NEPA documents. This document considered the effects of these actions cumulatively in conjunctions with proposed actions in each of the alternatives within the Summit Logan Valley Grazing Authorization DEIS. Cumulatively these actions would have a net benefit to livestock management, riparian condition, bull trout critical habitat, and water quality within the project area.

Foreseeable Activities

Riparian vegetation utilization from proposed activities would not likely add measurably to a downward trend in the existing condition of the streams in the project area because of the development of site specific use table standards, minimum rest requirements, adaptive management strategy, and changes in infrastructure to more effectively manage livestock and development of water sources. PFC Reaches that were identified as functioning at risk with a downward trend in 2007 had their use standards adjusted going into the 2008 grazing season. Changes in grazing management in response to present or ongoing activities would allow riparian vegetation to improve vigor in reaches that have issues.

Since past livestock grazing has had an effect on the existing condition of riparian vegetation, it also has an effect on the channel characteristics and complexity, water quality and aquatic dependent species. Of primary interest is the bankfull width/depth ratio is typically higher for streams where there is a departure in the existing condition from the desired. As a result, sediment transport is negatively influenced and residual pool depths and quality pools typically are not in their desired ranges.

Ongoing and foreseeable timber, road densities, fuels and recreational activities within these subwatersheds are expected to meet INFISH Riparian Management Objectives and Forest Plan Standards and Guidelines regarding RHCAs and aquatic dependent species. These objectives and standards are designed to allow recovery of aquatic habitat and riparian vegetation towards desired conditions. Since impacts to aquatic habitat from the proposed actions are limited to negligible or not measureable decreases in overall riparian condition, wetland obligate plant communities, channel characteristics, water quality and aquatic habitat. It is unlikely that retarding of riparian condition and its relationships to aquatic dependent habitat would result in cumulative effects from timber, fuels and recreational management activities.

The Malheur National Forest is currently in the process of analyzing changes in travel management. It is foreseeable that cross country travel would be prohibited across 1,337,770 acres on the Malheur National Forest where it is not already prohibited with the exception of cross country travel from designated open routes for the sole purpose of dispersed camping when resource damage caused by motor vehicle use can be avoided. The distance that cross country travel would be allowed from open routes to existing dispersed camp sites would vary by alternative considered in the travel management analysis. Existing dispersed sites in a riparian area would also have a setback distance from the stream where motorized access would be restricted. Foreseeable changes in travel management would have a beneficial cumulative

impact to riparian areas in the long term. It is expected that there would be a long-term reduction in fine sediment production in the project area as roads are decommissioned and re-vegetated; and cross country travel and dispersed camping that are causing resource damage is prohibited. Closing roads would result in a decrease in erosion of road surfaces.

Foreseeable activities of riparian hardwood planting restoration along 1.2 miles of Lake Creek and 2.5 miles of Big Creek. These actions should improve the density of riparian shrubs towards desired conditions in these areas.

Continual livestock utilization of riparian shrubs and herbaceous plants and bank alteration would have some level of cumulative effects with present dispersed recreation activities, water withdrawals and livestock grazing both on private and public lands. The level of these cumulative effects with present dispersed recreation activities are not likely to reach a point where measureable affects would occur. However, water withdrawals and livestock grazing on private lands within the middle of public lands may be influencing water temperatures flowing onto the public lands. It is likely that the Cow Camp unit may not achieve water quality standards despite Lake Creek being excluded from livestock use because of the water withdrawals on private land. Reach 6 of Summit Creek in the Summit Rock unit and Reach 5 in the Little Logan show signs of water temperature increases because of water that flows through the private lands sections. Utilization standards and adaptive management identified in the Cow Camp, Summit Rock and Little Logan units would ensure riparian and channel characteristics are on an upward trend towards desired condition on National Forest Lands.

The use of utilization standards, off-site water sources, placement of salt, active range riding, riparian exclusion fences, minimum rest requirements, and the adaptive management strategy would restrict the time cattle spend in stream and riparian areas and allow recovery towards riparian objectives. These components of the Allotment Management Plans would prevent measurable cumulative effects at the stream reach or larger spatial scales.

No detrimental change in aquatic habitat conditions from the proposed grazing regime intensity and duration is expected on the Lake Creek, Logan Valley, McCoy Creek and Summit Prairie Allotments. The cumulative effects are within the scope of anticipated effects to aquatic resources determined in the Malheur National Forest Land and Resource Management Plan EIS.

When past, present and foreseeable activities are considered together, rates of riparian recovery within the project area would differ because of the existing condition and rates of recovery for riparian areas within the project area. While aquatic habitat is expected to improve simply based on livestock management the presence of invasive brook trout may limit the recovery of bull trout within the project area due to competition. Riparian vegetation is expected to improve to some extent in all alternatives however channel characteristics from legacy impacts related to timber harvest or road construction may impede recovery to some degree unrelated to livestock management.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Lake Creek Allotment

McCoy Creek and Corral Basin Units

The direct and indirect effects of authorizing the McCoy Creek and Corral Basin units as a vacant allotment would be no grazing on 6.4 miles of Critical Habitat streams. This would facilitate continual improvement and likely improve beyond a minimum rating of PFC and achieve desired conditions for vegetative and channel characteristics within the next 10 years. Riparian hardwood densities and heights would continue to increase production of shade. Stabilizing hydric plant species would continue to increase in vigor and expand. Bankfull width/depth would continue to narrow creating undercut banks and deeper pools. Stream temperatures would likely cool as a result of the improvements listed above. These areas are a current stronghold for Bull Trout in the Upper Malheur River. These areas would continue to provide productive habitat.

McCoy Creek Unit

The direct and indirect effects of removing 407 acres from McCoy Creek unit and creating 2.5 miles of new fence would not affect riparian and aquatic resources. The portions of these units with riparian resources and critical habitat were vacant and the authorization from this analysis would keep it pending future analysis. The design criteria would minimize ground disturbing effects of compaction and trampling or removal of vegetation to water quality and critical habitat and would only apply to the 2.5 miles of fence.

Logan Valley Allotment

Big Creek Riparian Pasture

Direct effects related to hoof shearing, browse utilization, and stubble height would be maintained at current levels to Big Creek reaches 1, 2 and 3 within the Big Creek Riparian pasture with the exception that 3 years out of 10 would not have the current levels.

Indirect effects from authorizing livestock grazing in conjunction with the use levels and improvement projects in the unit would slightly improve the shrubs and the channel characteristics, maintain the effective shade values and improve the herbaceous plant vigor within the Big Creek Riparian pasture.

Riparian shrub densities and height may be slightly increased with proposed management. Annual browse utilization standards of 30-50% with season long rest 3 years out of 10 should allow shrubs currently less than three feet to be expressed to a height above the reach of livestock in 10 years. Shrubs that have not been grazed for 2 years are more likely to develop seed and establish the increased density of shrubs. These newly established shrubs are more likely to be browsed by wildlife and livestock than the shrubs that have been expressed above browse line or are mature.

Plant vigor and the greenline stability rating would likely be improved under this management. The condition of the herbaceous plant communities is currently in an adequate condition for PFC and would likely improve from the required 3 years out of 10 years rest. This condition was assessed with a 4 inch stubble height and since the herbaceous plant community is not the largest portion, it is not the driver for stream bank stability. The shrub development/recruitment in conjunction with large woody debris provides long term channel stability.

The presence of hoof shearing from livestock use would be maintained at current levels for 7 of 10 grazing seasons within the Big Creek Riparian pasture. The upstream extent of this unit has an abundant amount of large wood that has fallen across the channel and provides protection to

the streambanks and channel stability. Conifers have also encroached up to the streambanks in other places making it difficult for livestock to access the creek. The lower extent is more open from a conifer overstory and has more of a developed riparian hardwood plant community. Braided channels exist across the floodplain that inherently increase the streambank trampling that occurs as livestock cross Big Creek. Maintaining current use levels on shrubs may maintain to slightly improve increases in shrubs and height classes and may slightly improve stability on the channel and the bankfull width/depth ratio. The channel may narrow as a result of increases in new shrub root masses. It would not likely cause a change in residual pool depth and improved pool quality in the 10 years (Appendix A, part 2).

Maintaining or slightly improving the riparian shrubs and channel characteristics would not measurably increase effective shade values in the Big Creek Riparian pasture within 10 years (Appendix A, part 2). These reaches represent all 1.7 miles of all life stages for Bull Trout Critical Habitat. Since the condition of the residual pool depth, pool quality and bankfull width/depth would not likely improve; spawning and rearing habitat would likely be maintained in their current condition.

The creation of the Big Creek Riparian pasture may result 1.7 miles of critical habitat moving towards desired vegetation conditions, but not towards the desired channel characteristics within 10 years for reaches 1, 2 and 3 of Big Creek. Development of seed sources in the 0-3 foot height classes of shrubs may not likely occur due to the need of having consecutive years of no browse. The adaptive management strategy of additional rest or scheduled rest may allow continual movement towards or achievement of desired vegetative conditions identified in Appendix A, part 1. The ground disturbing impacts from removal of 1.2 miles of fencing would not be measurable.

Deardorff Unit

The direct effects of removing 395 acres from a portion of the Horse Unit and a portion of the McCoy Creek unit of the Lake allotment would not affect riparian and aquatic dependent species because there is no critical habitat within the proposed Deardorff unit. The indirect effect of adding this unit would benefit livestock management strategies by developing deferment and rest options that provide more frequent rest periods in other units in the allotment with riparian resources. The ground disturbing impacts of removal of 0.5 miles would not be measurable. Any effects from fence construction of 2.5 miles would be minimized through following design criteria.

West Lake Creek Riparian Pasture

The direct effects from authorizing livestock grazing in the West Lake Creek Riparian pastures in the Logan Valley allotment would result in a reduction in hoof shearing of streambanks, reduction in woody browse use, and an increase in hydric plant vigor within a functioning at risk stream reach.

The indirect effects of reducing hoof shearing, riparian hardwood browse utilization and increasing hydric plant vigor include an increase in shrub density, height and vigor, and an increase in shade. It would also facilitate movement towards or achievement of the potential channel type (F4/C4 towards E4) by reducing bankfull width to depth. Bull trout critical habitat within the riparian pasture would likely move towards desired condition (appendix A part 2 within 10 years) by increasing residual pool depth, undercut banks, and the number of quality

pools within Lake Creek reach 3. A result of the increase in residual pool depth, number of quality pools, decrease in bankfull width to depth, increase in riparian hardwood density and height, and increase in shade is cooler water temperatures. Effects related to changes in improvement of vegetative changes would be expected within 5 years and effects related to channel characteristics and water temperature are expected within 10 years. Resting for 3-5 years would facilitate movements towards or achievement of recovery objectives and desired condition. The adaptive management strategy of additional rest if it is determined that sufficient recovery has not been achieved following rest of 3-5 years would also facilitate recovery of reach 3 within Lake Creek. Reach 3 of Lake Creek was rated as FAR DN and in an early seral state. Riparian areas in a mid to late seral state are more resilient to the impacts of livestock grazing. Existing annual use levels are not sufficient to improve riparian condition within this reach however recovery of the riparian area to a mid/late seral stage (with 3-5 or more years of rest) prior to the resumption of grazing may be adequate to not retard the attainment of desired conditions. The adaptive management strategy of additional rest if movement towards desired condition is not sufficient would facilitate recovery within the West Lake Creek Riparian pasture.

These levels would not retard movement towards PFC and desired conditions for vegetation. The channel characteristics would likely move towards desired condition, but at a slower rate because of the current condition. The adaptive management strategy of additional rest within the West Lake Creek Riparian pasture would ensure that sufficient resiliency has been achieved within the riparian area to maintain an upward trend in recovery towards desired condition.

Summit Prairie Allotment

Bosenberg Unit

The direct effects from authorizing livestock grazing in the Bosenberg Unit in the Summit Prairie Allotment would result in an increase in hoof shearing (bank alteration) of streambanks related to livestock grazing, increase in woody browse use (browse utilization), and maintenance of herbaceous plant vigor (stubble height). There are approximately 4.4 miles of Bull Trout Critical Habitat within the Bosenberg Unit that are not currently being grazed and would have grazing reinitiated.

The indirect effects from incorporation of the Bosenberg Unit and rest for 3 out of 10 years would alleviate the effects of hoof shearing of streambanks, woody browse use, and increase hydric plant vigor within reaches 1,2,3,4 and 5 of Summit Creek (Little Logan and Sagehen Units). The Bosenberg Unit is currently vacant and contains Bull Trout CH. The addition of the Bosenberg Unit and resumption of grazing would introduce impacts from livestock grazing into areas that have not been grazed for twenty- two years and are recovering from the effects of fire. Required riding would maintain control of the livestock in the Unit and may minimize the time livestock spend near riparian areas. The establishment of a representative DMA and critical DMA within sensitive riparian areas in Bosenberg Creek may ensure excess bank trampling and shearing does not occur that is beyond the natural rate of recovery and facilitates a continual upward improvement in riparian condition within Bosenberg Creek.

Indirect effects from an increase in browse utilization (riparian hardwood) within Bosenberg Unit and implementation of 3 years out of 10 rest for the Sagehen and Little Logan Units.

Additional browse utilization would increase within the Bosenberg Unit to levels beyond that of wildlife use. Annual use levels for browse would be sufficient to facilitate movement towards or maintenance of desired riparian management objectives within Bosenberg Creek. Scheduled rest of 3 years out of 10 would facilitate continual movement towards or maintenance of riparian management objectives within Bosenberg Creek and the Sagehen and Little Logan Units.

Riparian hardwood densities and height would increase slightly. The percent shade would slightly increase as hardwood heights and densities increase. The increase in shade may result in cooler water temperatures, increase in terrestrial insect input and an increase in the wetted floodplain.

Indirect effects from an increase in riparian plant utilization (stubble height) within the Bosenberg Unit and scheduled rest of 3 years out of 10 may affect riparian plant vigor and but is expected to continue to increase at a rate slower than that of Alternative 1 where the Bosenberg Unit remains vacant. Riparian plant vigor is expected to increase within the Sagehen and Little Logan Units in the Summit Prairie Allotment as a result of the rest for 3 years out of 10 but not to the extent as that of Alternative 1 where Sagehen and Little Logan Units become vacant. Annual use level would alleviate some of the effects of livestock use of forage within the riparian areas but not to the extent as that of No livestock grazing in Alternative 1.

Indirect effects from an increase in streambank hoof shearing (bank alteration) within the Bosenberg Unit and decrease in hoof shearing within the Sagehen and Little Logan Units in the Summit Prairie Allotment. The presence of hoof shearing from livestock use would increase within the Bosenberg Unit but decrease within the Sagehen and Little Logan Units in the Summit Prairie Allotment due to initiation of rest for 3 years out of 10. Because of the establishment of a reference DMA and critical DMA as well as initial bank alteration levels of 10% and 15% within the Bosenberg Unit the formation of undercut banks, decrease in bankfull width, increase in residual pool depth, and decrease in greenline to greenline width, decrease in sediment that has occurred under vacancy is expected to continue to improve and move towards riparian management objects and desired conditions identified in Appendix A part 1.

Five off site water sources and two water gaps are proposed in alternative 2. Of the five off site water source developments, three would be stock ponds in the northeast portion of the unit, a headwater spring would be developed to a trough 300 feet away from Bosenberg Creek and a water withdrawal site would pump water from the creek to a trough approximately 100 feet away from the stream. The water gaps would be developed near the 1648 road and Bosenberg Creek. The effects related to the livestock developments proposed above for incorporation of the Bosenberg unit are analyzed below.

Three stock ponds would be constructed in the far northeastern portion of the unit. These stock ponds are in the uplands, a considerable distance from critical habitat streams. The direct and indirect effects of constructing 3 stock ponds include ground disturbance from heavy machinery and impacts to upland vegetation and soil compaction. Water would be stored in the ponds later into the grazing season and may improve the distribution of livestock in the unit. This may result in less time livestock spend in riparian areas.

FS 1648 road parallels Bosenberg Creek in several areas. The hill side slope from Forest Road 1648 in relatively steep into Bosenberg Creek. The direct and indirect effects from construction of water gaps along 1648 would result in additional sediment input into Bosenberg creek from the existing road and removal of existing shade. The stream banks along Bosenberg Creek are

relatively soft and composed of organic matter deposited following fire. The locations for the water gaps are adjacent to road crossings, on already disturbed sites and where access for livestock is ideal. Design criteria within the ARBO would be adhered to for construction of water gaps and would minimize the effects listed above. Utilizing concentrated water points would minimize the ground disturbance from livestock accessing the stream to water in other portions of the reach.

The headwater spring proposed for development is within a highly sensitive area on a hill side because of the steep gradient. The dominant vegetation is hydric plant species. Soil composition is primarily organic and saturated. The spring has not fully recovered from the effects of past land management actions and the fire. Areas adjacent to the spring appear to have sloughed downhill. The direct and indirect effects of development of the spring would likely result in additional damage to the soils and vegetation surrounding the outlet of the spring. Movement of groundwater into a trough exposed to solar radiation may result in increased water temperatures on water returns to Bosenberg Creek. Bosenberg creek is one of a few creeks within the Upper Malheur watershed that likely meets bull trout temperature criteria (mostly groundwater inputs). Implementing design criteria for the development of the spring outflow would minimize the effects listed above. The trough would have a float that would minimize the amount of water withdrawn from the spring outlet. The spring would be fenced off and would reduce grazing effects to the spring. Wetland obligate vegetation would expand and cold water storage functions from the spring would be maximized.

A water withdrawal location approximately a half mile from the junction of the Forest Service road 1648 and 1649 to a trough located approximately 100 feet away. The direct and indirect effects from the removal of water from Bosenberg creek would likely result in less cold water reaching occupied bull trout CH within the lower portions of Bosenberg Creek and Big Creek. Implementing design criteria for the development of the spring outflow would minimize the effects listed above. The trough would have a float that would minimize the amount of water withdrawn from the spring outlet.

The direct and indirect effects of constructing 7 miles of fence within the Bosenberg unit may result in minimal ground disturbance from initial fence construction. Implementing the design criteria would minimize any effects to riparian areas, the viability of bull trout, redband trout or Columbia spotted Frog within the project area. The short term effects of fence construction are expected to result in long term beneficial effects for bull trout critical habitat within the Sagehen and Little Logan units in the Summit Prairie allotment.

The re-initiation of livestock grazing within the Bosenberg Unit with a scheduled rest of 3 years out of 10, establishment of two DMA's, reduction in bank alteration levels, adaptive management strategy of additional rest, and a rider would facilitate continual movement towards desired conditions identified within (Appendix A, part 2), but at a slower rate than that of Alternative 1 where no livestock grazing disturbance occurs. Riparian vegetation within the Bosenberg Unit would continue to recover from the historical effects of fire, grazing and road related impacts but not likely achieve desired condition within 10 years (Appendix A, part 2) as a result of of the slow recovery observed from the effects of fire from 22 years ago. Bull Trout Critical Habitat within the Bosenberg Unit would likely not achieve desired condition for channel characteristics within the scheduled time frame (Appendix A, part 2 10 years). Resumption of grazing within the Bosenberg Unit would not retard movements towards or achievement of desired condition but would result in a slower rate of recovery than that of

Alternatives 1 within the Bosenberg Unit where no livestock use occurs. The Bosenberg Unit would likely be rated as PFC or FAR UP. Fish habitat criteria related to Bull Trout Critical Habitat are often achieved beyond a minimum rating of PFC for which the channel characteristics identified in Appendix A, part 2 are applicable. Bosenberg Creek is one of the few streams within the project area that contains water temperatures suitable for all life stages of Bull Trout. The adaptive management strategy of scheduled rest or additional rest if sufficient movement towards or maintenance of desired conditions is not achieved within the desired time frames (Appendix A, part 2) would ensure that a resilient riparian area develops along Bosenberg Creek and riparian management objectives are not retarded to a degree to prevent eventual attainment of desired condition and INFISH criteria.

Little Logan Unit

The direct effects from authorizing livestock grazing in the Little Logan unit in the Summit Prairie allotment would result in a slight decrease in hoof shearing (bank alteration) of streambanks, a continued improvement in herbaceous plant vigor from leaving more residual stubble height, and maintaining current riparian hardwoods height classes and densities.

The presence of hoof shearing from livestock use would be slightly reduced than current levels for the next 10 grazing seasons within the Little Logan unit because season long rest would occur for 3 out of 10 years. The indirect effects of reducing hoof shearing for the Little Logan unit include continued maintenance of meeting standards for streambank stability. However, the channel is still recovering from legacy grazing affects. Herbaceous plant communities expanding towards the channel are transitioning from single plants to a dense plant community. This is indicative of a wide channel narrowing and capturing soil from runoff events and building banks. This zone of streambank is very tender to livestock effects from hoof shearing and hoof shearing may severe roots. PIBO data found the bankfull width/depth ratio and bank angles have been on an upward trend and improving.

Riparian shrub densities and height classes would be maintained in their current condition. The current condition for the density of riparian shrubs is 4% of desired or 8 stems with 200 stems per unit area desired. Annual browse utilization standards of 30-50% with season long rest 3 years out of 10 would likely maintain the uncaged riparian shrubs stunted at 2 feet. Utilization values were approximately 98% for the shrubs that were uncaged and available for livestock browse. This indicates that the vigor of these shrubs is very low and growth rates of 1.2 feet per year may not occur until the vigor is improved. Shrubs that have not been grazed for 2 years are more likely to develop seed and establish the increased density of shrubs. These newly established shrubs are more likely to be browsed by wildlife and livestock than the shrubs that have been expressed above browse line, are caged or are mature.

Plant vigor and the greenline stability rating would likely continue to be improved under this management. The condition of the herbaceous plant communities is currently on an upward trend and would likely improve from the scheduled rest. This condition was assessed with a 4 inch stubble height.

Maintaining the riparian shrubs and improving the channel characteristics would not measurably increase effective shade values in the Little Logan unit within 10 years (Appendix A, part 2). These reaches represent 5 miles of all life stages for Bull Trout Critical Habitat. Since the condition of the residual pool depth, pool quality and bankfull width/depth would likely improve; spawning and rearing habitat would likely be slightly improved in their current condition.

Authorization of livestock grazing in the Little Logan unit may result in 5 miles of critical habitat moving towards PFC in both 5 and 10 years, maintaining the vegetation existing conditions, and move it towards the desired channel characteristics within 10 years. Bull trout critical habitat within the riparian pastures would likely move towards, but not likely achieve desired vegetation condition within 10 years (Appendix A, part 2). This is because Reach 5 was identified as a broad valley habitat type that requires a major component of multiple aged riparian shrubs to stabilize streambanks, provide shade and cover to fish, and creates a micro climate that reduces water temperatures through moderating air temperatures adjacent to the creek. If rest occurs only after exceedances of the previous grazing season, the vegetative and channel characteristics may retard or at a minimum maintain the current condition. Development of seed sources in the 0-3 foot height classes of shrubs may not likely occur due to the need of having consecutive years of no browse. The adaptive management strategy of additional rest or scheduled rest may allow continual movement towards or achievement of desired vegetative conditions identified in Appendix A part 1. The ground disturbing impacts from removal of 0.7 miles of fencing would not be measurable.

The creation of 0.25 mile exclosure on reach 5 of Summit Creek within the Summit Prairie allotment would remove the effects of hoof shearing of streambanks, woody browse use, and an increase in hydric plant vigor within reach 5 (Little Logan unit) of Summit Creek. Movement towards or achievement of desired condition is expected to be at the same rate as the No action alternative following removal of livestock. The construction of the exclosure fence may deter wildlife use within Summit Creek reach 5 and therefore recovery would be at a slightly faster rate than that of the alternative 1 (No Action). Reach 5 of Summit Creek was identified as having the greatest potential for willow recovery of all reaches within Summit Creek (CWG 2012).

The indirect effects of reducing hoof shearing, riparian hardwood browse utilization, and increasing hydric plant vigor include an increase in shrub density, height and vigor, resulting in an increase in shade within reach 5 of Summit Creek. It would also facilitate movement towards or achievement of the potential channel type (C4 to E4/5) by reducing bankfull width to depth. Bull trout critical habitat within the exclosure would likely be moving towards or achieve desired condition (Appendix A part 2 within 10 years) by increasing residual pool depth, undercut banks, and the numbers of quality pools within the exclosure on Summit Creek reach 5. A result of the increase in residual pool depth, number of quality pools, decrease in bankfull width to depth, increase in riparian hardwood density and height, and increase in shade would be cooler water temperatures. Effects related to changes in water temperature as a result of vegetative changes would be expected within 5 years and effects related to channel characteristics and water temperature are expected within 10 years. Removal of grazing within the newly constructed exclosure would facilitate movements towards/or achievement of desired condition at a rate similar to alternative 1 (No Action). Summit Creek reach 5 was rated as FAR in 2007 with poor plant vigor and less than desirable bank cover of stabilizing plants. Fish habitat related to bull trout critical habitat and water quality criteria (temperature) are often achieved beyond a minimum rating of PFC. Removal of grazing would facilitate/expedite movement towards or achievement of desired condition within the exclosure on Reach 5 of Summit Creek.

North Summit Unit

Direct effects related to authorizing the grazing system would result in maintenance in existing levels of hoof shearing on streambanks, maintenance in woody browse use, and a slight improvement in hydric plant vigor within Reach 7 of Summit Creek. This site was rated at PFC

in 2007 with woody shrub use was identified as an issue. The Carex Working Group identified a deficiency in shrub density and particularly height classes. None of the shrubs present were greater than 3 feet tall. A DMA exists on Reach 7 to aid in comparing condition in 5 years with the developed management objectives. The adaptive management strategy would change allowable use if sufficient movement towards or achievement of desired conditions (Appendix A, part 1).

The indirect effects of maintaining livestock effects would likely result in a maintenance of the existing conditions. The streambank stability is within the standard error of meeting the long term desired condition and would likely continue to meet the standards. The bankfull/width depth was observed to be not in balance during the PFC assessments. Bankfull width/depth may slightly improve because the herbaceous plant community is approximately 84% of desired. However, shrubs are not above the browsing line and may not be developing the seeds to increase the density towards desired conditions. Bull trout critical habitat within the riparian pastures would likely move slightly towards desired condition (Appendix A, part 2 within 10 years) by increasing residual pool depth, undercut banks, and the number of quality pools. As a result of the increase in residual pool depth, number of quality pools, decrease in bankfull width to depth, and increase in shade is cooler water temperatures. Effects related to changes in water temperature as a result of vegetative changes would likely be slightly improved within 10 years. The use levels identified in Appendix E for the North Summit unit, monitoring and the adaptive management strategy (change allowable use) would ensure movement towards desired conditions.

The 0.97 miles reach is identified at PFC in 2007 and is expected to improve beyond a rating of PFC within the next 10 years based on the management actions within the North Summit unit. Any improvement beyond a rating of PFC is directly related to improvements in bull trout critical habitat. It is likely that the current annual use levels would facilitate limited improvement beyond a rating of PFC within the North Summit unit. This slight improvement is due to the herbaceous plant community alone that is currently in a good condition. This herbaceous community would likely tighten the channel characteristics slowly over time. However, it is not likely that the riparian shrubs would reach the desired condition within the time frame identified in Appendix A, part 2. The adaptive management strategy of changing allowable use for the North Summit unit if sufficient progress towards or achievement of desired conditions (Appendix A, part 1) has not been made would benefit the riparian shrubs in this reach. This would ensure that movement towards desired is not impeded by land management actions.

Sagehen Unit

The direct effects from authorizing livestock grazing in the Sagehen unit in the Summit Prairie allotment would result in a slight decrease in hoof shearing (bank alteration) of streambanks, a continued improvement in herbaceous plant vigor from leaving more residual stubble height, and maintenance in the current riparian hardwoods height classes and densities in reach 2 and slightly improve reach 4. There are approximately 4.7 miles of bull trout critical habitat within the Sagehen unit and represents 22% of the Bull Trout Critical Habitat found in the Summit Creek Subwatershed. PFC assessments stratified 4 reaches in Sagehen unit and found 33% of Sagehen to be at a PFC rating and 67% to be functioning at risk.

The presence of hoof shearing from livestock use would be slightly reduced than current levels for the next 10 grazing seasons within the Sagehen unit because season long rest would occur for 3 out of 10 years. The indirect effects of reducing hoof shearing for the Sagehen unit include a slight improvement for streambank stability, primarily in Reaches 2 and 4. These specific reaches also have channel form still recovering from legacy grazing effects. These areas are prioritized because Reaches 1 and 3 are constrained rocky reaches that are relatively resistant to hoof action. Herbaceous plant communities expanding towards the channel are transitioning from single plants to a dense plant community. This is indicative of a wide channel narrowing and capturing soil from runoff events and building banks. This zone of streambank is very tender to livestock effects from hoof shearing and hoof shearing may severe roots.

The herbaceous component in Sagehen would likely be continually improved in plant vigor and expansion of plant communities. The 3 years out of 10 years rest would provide a full growing season for plants to expand and improve.

Riparian shrub densities and height classes would be maintained in their current condition for Reach 2 with a slight improvement in Reach 4. The current condition for riparian shrubs is near desired in Reaches 1 and 3. These are constrained, rocky reaches that are dominated with alders. The current condition of riparian shrubs for Reaches 2 and 4 are well below the desired levels. Riparian shrubs in Reaches 2 and 4 both have 23% of desired or approximately 45 stems with 200 stems per unit area. Annual browse utilization standards of 30-50% with season long rest 3 years out of 10 would likely maintain the uncaged riparian shrubs stunted at 2 feet. Utilization values were approximately 98% for the shrubs that were uncaged and available for livestock browse. This indicates that the vigor of these shrubs is very low and growth rates of 1.2 feet per year may not occur until the vigor is improved. Shrubs that have not been grazed for 2 years are more likely to develop seed and establish the increased density of shrubs. These newly established shrubs are more likely to be browsed by wildlife and livestock than the shrubs that have been expressed above browse line, are caged or are mature.

Maintaining the riparian shrubs and improving the channel characteristics would not measurably increase effective shade values in the Sagehen unit within 10 years (Appendix A, part 2). These reaches represent 4.7 miles of all life stages for Bull Trout Critical Habitat. Since the condition of the residual pool depth, pool quality and bankfull width/depth would likely slightly improve; spawning and rearing habitat would likely be slightly improved in their current condition for Reaches 2 and 4. Reaches 1 and 3 are in a good condition and would improve.

Authorization of livestock grazing in the Sagehen unit would result in movement towards PFC, maintaining the vegetation existing conditions, and moving it towards the desired channel characteristics. Bull trout critical habitat on Reaches 1, 3 and 4 would likely achieve PFC in both 5 and 10 years. Reach 2 would likely move towards FAR UP in both 5 and 10 years, but not likely to achieve PFC because of the channel and riparian shrub existing conditions. Reaches 1, 3, and 4 would likely move towards the desired vegetation condition within 10 years (Appendix A, part 2). Reach 4 is adjacent to the road and would allow more efficient management of livestock. Reach 2 would likely maintain its existing vegetation condition because of the deficiency in riparian shrub, height classes and channel characteristics. Reaches 1, 3 and 4 would likely move towards desired channel characteristics. Reach 2 would likely move towards desired channel characteristics, but at a slow rate. If rest occurs only after exceedances of the previous grazing season, the vegetative and channel characteristics may retard or at a minimum maintain the current condition. Development of seed sources in the 0-3

foot height classes of shrubs may not likely occur due to the need of having consecutive years of no browse. The adaptive management strategy of additional rest or scheduled rest may allow continual movement towards or achievement of desired vegetative conditions identified in Appendix A, part 1.

Summit Rock Unit

The Summit Rock unit was rated as PFC in 2007 for reaches 6 and 8 for a total of 3.5miles. Livestock grazing would occur annually with no season of rest. Annual use levels would include the endpoint indicators of 4 inch stubble height, 30-50 percent browse, and 20 percent bank alteration. The adaptive management strategy would include changes in annual use levels (Appendix F). Reach 6 is expected to improve slightly beyond PFC or maintain a rating of PFC. Annual use levels are sufficient to continue a slight improvement in herbaceous vigor. Bank stability would improve as a result of the improvement in herbaceous plant and woody plants. Bank alteration levels are sufficient to maintain the existing condition with a possible increase in bank stability due to improvements in vegetation. Reach 6 is likely to maintain a rating of PFC and not achieve desired conditions within 10 years. PFC is a minimum and does not equate to quality fish habitat until a rating beyond PFC is achieved.

Reach 8 is expected to maintain at PFC with limited improvement in herbaceous vigor, browse utilization, and bank alteration within the lower portion of reach identified in 2007. Without rest, sufficient improvement in riparian hardwoods and herbaceous plant vigor is unlikely to occur in reach 8 under the current proposed levels of use to achieve desired condition in 10 years.

Reach 2 of West Fork Summit Creek had channel incision in the reach. The same annual use levels apply to reach 2 of West Fork Summit Creek. Improvements in channel characteristics are unlikely to occur without an improvement in riparian vegetation. Stream reaches that are FAR DN are highly susceptible to impacts from livestock grazing and improvements in herbaceous, hardwood cover are easily set back in this condition (resiliency).

West Fork Summit Recovery Unit

The creation of 0.85 mile temporary exclosure on West Fork Summit Creek within the Summit Prairie allotment would remove the effects of hoof shearing of streambanks, woody browse use, and an increase in hydric plant vigor within reach 1 of West Fork Summit Creek. Movement towards or achievement of desired condition is expected to be at the same rate as the No action alternative. The construction of the exclosure fence may limit wildlife use within Reach 2 and therefore recovery would be at a slightly faster rate than that of the alternative 1 (No Action).

The indirect effects of reducing hoof shearing, riparian hardwood browse utilization, and increasing hydric plant vigor for the 0.85 mile temporary exclosure would likely result in an increase in herbaceous plant communities, resulting in an increase in shade and improvement in channel morphology within reach 1 of West Fork Summit Creek. It would also facilitate movement towards or maintenance of the potential channel type by reducing bankfull width to depth. Bull trout critical habitat within the riparian pastures would likely achieve desired condition (Appendix A, part 2 within 10 years) by increasing residual pool depth, undercut banks, and the number of quality pools within West Fork Summit Creek Reach 1. A result of the increase in residual pool depth, number of quality pools, decrease in bankfull width to depth, increase in riparian hardwood density and height, and increase in shade is cooler water temperatures. Effects related to changes in water temperature as a result of vegetative changes

would be expected within 5 years and effects related to channel characteristics and water temperature are expected within 10 years. Removal of grazing within the newly constructed temporary exclosure would facilitate movements towards/or achievement of desired condition at a similar rate to Alternative 1 (No Action) for the first 5 years. However, following the immediate rest, movement towards desired conditions would likely be at a slower rate than Alternative 1. West Fork Summit Creek reach 1 was rated as FAR DN in 2007 with several headcuts and channel incision. Fish habitat related to bull trout critical habitat and water quality criteria (temperature) are often achieved beyond a minimum rating of PFC. Minimum rest requirements of 3-5 years followed by additional rest if sufficient movement towards desired condition has not been achieved would facilitate movement towards desired condition within Reach 1 of West Fork Summit Creek by increasing the resiliency of the riparian vegetation and facilitating advancement in seral state.

Effects Determination

Columbia River Basin Bull Trout (T): Likely to Adversely Affect (LAA) in the short term.

Bull Trout Designated Critical Habitat (D): Likely to Adversely Affect (LAA) in the short term.

Rationale

Habitat for Bull Trout in the aquatic analysis area is currently in a degraded state. High water temperatures, riparian hardwood suppression and altered stream channels have reduced the habitat capability of streams in the aquatic analysis area to support Bull Trout. Riparian areas within the project area are deficient in riparian hardwoods. Some recovery has occurred from past activities related to livestock grazing and timber harvest and natural disturbances such as fire. However many of the stream reaches are early seral with sensitive stream banks and or have not achieved a rating of PFC which is the minimum required to withstand flood events. Many of the areas have not achieved a state of resiliency and are susceptible to degradation from livestock. The addition of approximately 4.36 miles of Bull Trout Critical Habitat within the Bosenberg Unit that is currently vacant and development of cold water spring sources within the Unit would result in adverse affects to Bull Trout Critical Habitat due to the early seral state of the riparian area within the Unit that is currently recovering from wildfires in 1990 (Snowshoe, Corral Basin, and Sheep) and 2002 High Roberts wildfire. The streambanks are composed of soft organic material that is easily sheared and compacted from hoof action.While measures such as a full time rider, adaptive management strategy of additional rest, establishment of two DMA's, bank alteration standards of 10% and 15% would alleviate the possible impacts the sensitivity of the riparian area to disturbance and likelihood that cattle would prefer to congregate within the riparian area based on forage availability carries a high degree of uncertainty whether these measures would be effective. Forage production within this unit is primarily in the riparian area with the uplands dominated by Ceanothus and young ponderosa pine.

Cumulative Effects

Table A-12: Summary of Expected Recovery for PFC Ratings by Unit Based on the Actions Proposed

Allotment	Unit	Miles	PFC in 5 Years	PFC in 10 Years	Desired Condition in 10 Years
Lake Creek	Corral Basin	3.59	>PFC	>>PFC	Y

Allotment	Unit	Miles	PFC in 5 Years	PFC in 10 Years	Desired Condition in 10 Years
	McCoy Creek	6.35	>PFC	>>PFC	Y
Logan Valley	Big Creek Riparian Pasture	1.67	>PFC	>PFC	Y
	Corral Holding	0.12	PFC	>>PFC	Y
	Flat Field	0.02	>PFC	>>PFC	Y
	Lower Field	0.12	PFC	>PFC	Y
	West Bosenberg Riparian Pasture	0.13	>PFC	>>PFC	Y
	West Lake Creek Riparian Pasture	0.95	N	PFC	N
McCoy Creek	Lake Creek Willow Exclosure	0.51	>PFC	>>PFC	Y
Summit Prairie	Bosenberg	4.36	PFC	PFC	N
	Little Logan	5.03	PFC	PFC	N
	North Summit	0.97	PFC	PFC	N
	Sagehen	2.43	N	N	N
		0.32	N	N	N
		1.10	PFC	PFC	N
		0.89	PFC	PFC	N
	South Summit	0.04	Water gap		
	Summit Rock	0.83	N	N	N
		3.71	>PFC	>PFC	Y
		1.00	>PFC	>PFC	Y
	West Summit Recovery Unit	0.39	N	PFC	N

When cumulative effects common to Alternatives 2, 3, and 4 are considered with the Proposed Actions from Alternative 2, the result is the fourth fastest rate of recovery or movement towards a proper functioning condition and the desired condition for riparian areas and Bull Trout Critical Habitat within the Project Area. The rate of recovery is because of the fundamental livestock management strategy for Alternative 2 that largely includes deferment and 3 years out of 10 years rest for improvement. The cumulative effects are within the scope of anticipated effects to aquatic resources determined in the Malheur National Forest Land and Resource Management Plan EIS.

Alternative 3

Direct and Indirect Effects

Lake Creek Allotment

McCoy Creek and Bosenberg Units

The Bosenberg unit would not be added within this alternative resulting in no impacts from livestock grazing related to bull trout CH and water quality. Construction of approximately 7 miles of new fence subdividing the Bosenberg unit would not occur. Water gaps at the two

locations where the Forest Service road 1648 crosses Bosenberg Creek and an unnamed tributary of Big Creek would not occur. Three stock ponds in the uplands, a spring development with approximately 300-400 feet of piping to a trough and an in-stream water withdrawal piped 100 feet to a trough would not occur. The effects from these actions analyzed in alternative 2 would not occur. These actions would occur in alternative 2 and would not occur in alternatives 1 and 3. Bosenberg creek would continue to recover from past disturbances related to fire and historic land management practices and likely achieve recovery objectives within 10 years (Appendix A, part 1 and 2).

The southwest corner of the McCoy Creek unit (407 acres) would not be removed from the Lake Creek allotment. This action is unique from alternatives 1 and 2.

Logan Valley Allotment

Big Creek Riparian Pasture

Direct effects related to hoof shearing, browse utilization, and stubble height would be decreased on Big Creek reaches 1, 2 and 3 within the Big Creek Riparian pasture. This decrease is because the annual use levels are reduced to allow more expression in riparian vegetation.

The direct and indirect effects of livestock grazing on the riparian vegetation, channel characteristics, water temperature and Bull Trout Critical habitat would be similar to Alternative 2, with the exception of the annual use levels would be reduced, there would be no season long rest periods and the adaptive management strategies are different. The annual use levels for stubble height would be reduced from 4 to 7 inches, woody browse from 30-50 to 30% use and bank alteration from 20-15%. The stubble height increase would improve plant vigor. The woody browse would further increase the density and height classes of riparian shrubs across the entire reach. The bank alteration reduction would facilitate movement towards of improvements in the bankfull width/depth, undercut banks and shade values. Thus, it benefits Bull Trout critical habitat. Decreasing the intensity of grazing through reducing annual livestock use effects would likely improve riparian shrubs more than 3 years out of 10 season long rest. Bull trout critical habitat within the riparian pastures would be moving towards desired condition within 10 years (Appendix A, part 2). The adaptive management strategy of a change in allowable use levels would allow continual movement towards or achievement of desired vegetative and channel characteristic conditions identified in Appendix A, part 1. Allowing shrubs to attain a height greater than 5ft and reducing the utilization of shrubs less than 5ft would allow movement towards a late seral stage. Riparian areas that have a balance of early, mid and late seral stages are more resistant to impacts from livestock and are more resilient being able to recover from livestock impacts within one year depending on the magnitude of disturbance.

West Lake Creek Riparian Pasture

Direct effects related to hoof shearing, browse utilization, and stubble height would be decreased on Lake Creek reaches 1, 2 and 3 within the West Lake Creek Riparian pasture. This decrease is because the annual use levels are reduced to allow more expression in riparian vegetation.

The direct and indirect effects of livestock grazing on the riparian vegetation, channel characteristics, water temperature and Bull Trout Critical habitat would be similar to Alternative 2, with the exception of the annual use levels would be reduced. The annual use levels for stubble height would be reduced from 6 to 7 inches, woody browse from 30-50 to 30% use and bank alteration from 20 to 15%. The stubble height increase would improve plant vigor. The

woody browse would further increase the density and height classes of riparian shrubs across the entire reach. The bank alteration reduction would facilitate movement towards of improvements in the bankfull width/depth, undercut banks and shade values. Thus, it benefits Bull Trout critical habitat. Decreasing the intensity of grazing through reducing annual livestock use effects would likely improve riparian shrubs in combination with 3 years out of 10 season long rest. Bull trout critical habitat within the riparian pastures would be moving towards desired condition within 10 years (Appendix A, part 2). The adaptive management strategy of developing additional rest would allow continual movement towards or achievement of desired vegetative and channel characteristic conditions identified in Appendix A, part 1. This reach would likely attain PFC in 5 years. The rate of recovery for Alternative 3 would be greater for the West Lake Creek Riparian pasture than alternative 2.

Summit Prairie Allotment

Little Logan Unit

The direct effects from authorizing livestock grazing with the creation of the two new riparian pastures in the Little Logan unit in the Summit Prairie allotment would result in a decrease in hoof shearing (bank alteration) of streambanks, a continued improvement in herbaceous plant vigor from leaving more residual stubble height, and improve current riparian hardwoods height classes and densities (browse utilization). There are approximately 5 miles of bull trout critical habitat within the Little Logan unit and represents 35% of the Bull Trout Critical Habitat found in the Summit Creek Subwatershed.

The effects of hoof shearing from livestock use would be removed for 3-5 years and only resume once sufficient progress towards desired condition has been made towards desired conditions. Once grazing is resumed streambanks would have developed sufficient root systems to recover from bank alterations.

The indirect effects of removing (3-5 years) and reducing (15%) bank alteration hoof shearing for the Little Logan unit include continual achievement of standards for streambank stability. The channel is still recovering from legacy grazing affects but would likely meet desired conditions (Appendix A part 2). Herbaceous plant communities would likely expand towards the channel area transitioning from single plants to a dense plant community. This is indicative of a wide channel narrowing and capturing soil from runoff events and building banks. PIBO data found the bankfull width/depth ratio and bank angles have been on an upward trend and improving. Removing the effects of hoof shearing for 3-5 years would expedite this process facilitating development of undercut banks.

Riparian shrub densities and height classes would be improved from their current condition. The current condition for the density of riparian shrubs is 4% of desired or 8 stems with 200 stems per unit area desired. Annual browse utilization standards of 30% with season long rest 3 years out of 10 once desired conditions have been achieved would likely result in a release of riparian shrubs currently stunted at 2 feet. Utilization values were approximately 98% for the shrubs that were uncaged and available for livestock browse. This indicates that the vigor of these shrubs is very low and growth rates of 1.2 feet per year would likely occur once the vigor has improved. Shrubs that have not been grazed for 2 years are more likely to develop seed and establish the increased density of shrubs. These newly established shrubs are more likely to be browsed by wildlife and livestock than the shrubs that have been expressed above browse line, are caged or are mature.

Plant vigor and the greenline stability rating would likely continue to improve under this management. The condition of the herbaceous plant communities is currently on an upward trend and would likely improve from the minimum rest requirements and scheduled rest. This condition was assessed with a 4 inch stubble height.

Improving the riparian shrubs and channel characteristics would measurably increase effective shade values in the Upper and Lower Riparian pasture within 10 years (Appendix A, Part 2). These reaches represent 5 miles of all life stages for Bull Trout Critical Habitat. Since the condition of the residual pool depth, pool quality and bankfull width/depth would likely improve; spawning and rearing habitat would likely be slightly improved in their current condition. Quality fish habitat related to bull trout is often achieved beyond a rating of PFC. Reach 5 within the Upper and Lower Little Logan riparian pastures would like improve beyond a rating of PFC within 5 years.

The creation of the upper and lower Little Logan riparian pastures in the Summit Prairie allotment in Alternative 3 would likely result in an increase in shrub density, height and vigor, and an increase in shade. It would also facilitate movement towards or achievement of the potential channel type (C towards E) by reducing bankfull width to depth. Bull trout critical habitat within the riparian pastures would likely move towards or achieve desired condition (Appendix A, part 2 within 10 years) by increasing residual pool depth, undercut banks, and the number of quality pools within Summit Creek reach 5. A result of the increase in residual pool depth, number of quality pools, decrease in bankfull width to depth, increase in riparian hardwood density and height, and increase in shade is cooler water temperatures. Effects related to changes in water temperature as a result of vegetative changes would be expected within 5 years and effects related to channel characteristics and water temperature are expected within 10 years. Resting for 3-5 years would facilitate movements towards or achievement of recovery objectives and desired condition and a faster rate than that of alternative 2. The more restrictive use levels identified in Appendix E for Alternative 3 and monitoring (review of riparian condition 5 years out of recovery trajectory) would ensure movement towards recovery objectives following re-initiation of livestock grazing within the upper and lower little Logan riparian pastures. The adaptive management strategy of additional rest within the Upper and Lower Little Logan riparian pasture would ensure that adequate recovery has been achieved to facilitate continual movement towards desired conditions identified in Appendix A, part 1 and Appendix A, part 2 and ensure sufficient resiliency has been achieved to resume livestock grazing.

North Summit Riparian Pasture

Direct effects related to authorizing the grazing system would result in decrease in existing levels of hoof shearing on streambanks, reductions in woody browse use, and an improvement hydric plant vigor within Reach 7 of Summit Creek. This site was rated at PFC in 2007 with woody shrub use was identified as an issue. The Carex Working Group identified a deficiency in shrub density and particularly height classes. None of the shrubs present were greater than 3 feet tall. A DMA exists on Reach 7 to aid in comparing condition in 5 years with the developed management objectives. The adaptive management strategy would change allowable use if sufficient movement towards or achievement of desired conditions (Appendix A, part 1).

The direct and indirect effects of constructing 0.8 miles of fence along the boundary of the North Summit Riparian pasture may result in minimal ground disturbance from initial fence

construction. Implementing the design criteria would minimize any effects to riparian areas, the viability of bull trout, redband trout or Columbia spotted Frog within the project area. The short term effects of fence construction are expected to result in long term beneficial effects for bull trout critical habitat within the North Summit Riparian pasture.

The indirect effects related to authorizing livestock grazing and creating the North Summit Riparian pasture within the Summit Prairie allotment in Alternative 3 would likely result in an increase in shrub density, height and vigor, and an increase in shade. The streambank stability would continue to meet standards and improve. The bankfull/width depth was observed to be not in balance during the PFC assessments. Bankfull width/depth would improve from the expansion of herbaceous and riparian shrub plant communities. Bull trout critical habitat within the riparian pasture would likely move towards desired condition (Appendix A, part 2 within 10 years) by increasing residual pool depth, undercut banks, and the number of quality pools within Summit Creek reach 7. Attributes related to quality fish habitat are often achieved beyond a riparian rating of PFC. The effects of an increase in residual pool depth, number of quality pools, decrease in bankfull width to depth, increase in riparian hardwood density and height, and increase in shade is cooler water temperatures. Effects related to changes in water temperature as a result of vegetative changes would be expected within 5 years and effects related to channel characteristics and water temperature are expected within 10 years. Resting for 3-5 years would facilitate movements towards or achievement of recovery objectives and desired condition and a faster rate than that of Alternatives 2. The more restrictive use levels identified in Appendix E for Alternative 3 and monitoring (review of riparian condition 5 years out of recovery trajectory) would ensure movement towards recovery objectives following re-initiation of livestock grazing within the North Summit riparian pasture. The adaptive management strategy of additional rest within the North Summit riparian pasture would ensure that adequate recovery has been achieved to facilitate continual movement towards desired conditions identified in Appendix A, part 1 and part 2. The annual use levels for the North Summit riparian pasture would be similar to Alternative 2, with the reduction of woody browse to 30% from 30-50%. This would likely improve the riparian shrubs across the unit with the greatest magnitude. The changes in annual use for stubble height, browse, and bank alteration for the West Fork Summit Creek within the Summit Rock Unit and reach 6 of Summit Creek (Appendix E) would facilitate movement towards or achievement of desired conditions outside of the North Summit Riparian pasture.

The 0.97 miles reach is identified at PFC in 2007 and is expected to improve beyond a rating of PFC within the next 10 years based on the management actions within the North Summit unit. Any improvement beyond a rating of PFC is directly related to improvements in bull trout critical habitat. The 3-5 years of immediate rest, scheduled rest and allowable use levels would improve both the herbaceous plant community and the riparian shrubs. The vegetative and channel characteristic desired condition would likely be met (Appendix A, part 1 and 2). The adaptive management strategy for the North Summit unit if sufficient progress towards or achievement of desired conditions (Appendix A, part 1) has not been made would benefit the riparian shrubs in this reach. This would ensure that movement towards desired is not impeded by land management actions.

Sagehen Unit

The creation of the Sagehen riparian pasture within the Summit Prairie allotment with minimum rest requirements of 3-5 years and implementation of the use levels within Appendix E once it is determined that recovery objectives have been achieved or are moving toward desired conditions

would result in a reduction in hoof shearing of streambanks, reduction in woody browse use, and an increase in hydric plant vigor within Reach 2 of Summit Creek for the Sagehen riparian pastures.

The creation of the Sagehen riparian exclosure would have the same effect as that of the Sagehen riparian pasture with the exception that livestock grazing would not be reinitiated within the exclosure and recovery rates are expected to be slightly faster than that of the Sagehen riparian pasture towards desired condition.

The direct and indirect effects from the creation of the Sagehen riparian pasture within the Sagehen Unit of the Summit Prairie allotment in alternative three would likely result in an increase in shrub density, height and vigor, and an increase in shade. It would also facilitate maintenance of the potential channel type (C towards E) by reducing bankfull width to depth. Bull trout critical habitat within the riparian pasture would likely move towards desired condition (Appendix A, part 2 within 10 years) by increasing residual pool depth, undercut banks, and the number of quality pools within Summit Creek reach 2. Attributes related to quality fish habitat are often achieved beyond a riparian rating of PFC. The effects of an increase in residual pool depth, number of quality pools, decrease in bankfull width to depth, increase in riparian hardwood density and height, and increase in shade is cooler water temperatures. Effects related to changes in water temperature as a result of vegetative changes would be expected within 5 years and effects related to channel characteristics and water temperature are expected within 10 years. Resting for 3-5 years would facilitate movements towards or achievement of recovery objectives and desired condition and a faster rate than that of Alternatives 2 where no rest from livestock is proposed within Reach 2 of Summit Creek. The more restrictive use levels identified in Appendix E for Alternative 3 and monitoring (review of riparian condition 5 years out of recovery trajectory) would ensure movement towards recovery objectives following re-initiation of livestock grazing within the North Summit riparian pasture. The adaptive management strategy of addition rest if sufficient progress towards or achievement of desired conditions Appendix A, part 1 has not been made following 3-5 years of rest would facilitate recovery towards a more resilient riparian area within the riparian pasture.

Creation of the Sagehen riparian exclosure would have the same effects as the Sagehen riparian pasture with the exception that the rate of recovery within the exclosure is expected be faster than that of the riparian pasture due to the absence of livestock grazing (after 3-5 years of rest) and limited wildlife use.

The additional adaptive management strategy for riparian areas outside of the Sagehen Riparian pasture and Sagehen Riparian exclosure for changes in allowable use levels would facilitate recovery and movement towards desired riparian condition outside of the riparian pastures not proposed for 3-5 years of rest.

<u>Summit Rock Unit</u>

Reach 6 is expected to improve beyond PFC. Annual use levels for stubble height increase from an endpoint indicator of 4 inches to 6 inches that would likely result in an improvement in herbaceous vigor. Bank stability would improve as a result of the improvement in herbaceous plant and woody plants. Bank alteration levels are sufficient to maintain the existing condition with a likely increase in bank stability due to improvements in vegetation. Reach 6 is likely to improve beyond a rating of PFC and achieve desired conditions within 10 years (Appendix A,

part 1). PFC is a minimum and does not equate to quality fish habitat until a rating beyond PFC is achieved.

Reach 8 is expected at a minimum to be maintained at PFC or improve beyond PFC due to improvement in herbaceous vigor from a reduction in stubble height, browse utilization, and bank alteration within the lower portion of reach identified in 2007. Without rest, improvement in riparian hardwoods would be limited but herbaceous plant vigor is likely to increase in Reach 8 under the current proposed levels of use and achieve a rating of greater than PFC in 10 years.

Reach 2 of West Fork Summit Creek would have higher endpoint indicator for stubble height and lower value for bank alteration. These indicators would likely increase herbaceous riparian vigor within reach 2 and allow healing of destabilized stream banks. A portion of reach 2 is primarily herbaceous and development of riparian herbaceous vigor in this reach would result in improvements in bank stability and channel characteristic but at a slower rate than if rested entirely from livestock grazing for a period of time.

Effects Determination

Columbia River Basin Bull Trout (T): May Affect, Not Likely to Adversely Affect (NLAA) in the short term. Beneficial Impact (BI) in the long-term.

Bull Trout Designated Critical Habitat (D): May Affect, Not Likely to Adversely Affect (NLAA) in the short term. Beneficial Impact (BI) in the long-term.

Rationale

Habitat for Bull Trout in the aquatic analysis area is currently in a degraded state. High water temperatures, riparian hardwood suppression, reduced herbaceous plant vigor and altered stream channels have reduced the habitat capability of streams in the aquatic analysis area to support Bull Trout.

The creation of several riparian pastures on stream reaches identified with the above issues containing Bull Trout Critical Habitat combined with minimum rest requirements of 3-5 years, an adaptive management strategy of additional rest prior to resumption of grazing, 3 years out of 10 rest, and changes in annual use level would expedite recovery within these areas similar to that of Alternative 1 and likely result in achievement of desired conditions resulting in a long term benefit to Bull Trout and Bull Trout Critical Habitat within the project area.

Cumulative Effects

Table A-13: Summary of Expected Recovery for PFC Ratings by Unit Based on the Actions Proposed

Allotment	Unit	Miles	PFC in 5 Years	PFC in 10 Years	Desired Condition in 10 Years
Lake Creek	Bosenberg	8.64	>PFC	>>PFC	Y
	McCoy Creek	5.66	>PFC	>>PFC	Y
Logan Valley	Big Creek Riparian Pasture	1.67	>PFC	>>PFC	Y
	Corral Holding	0.12	PFC	>>PFC	Y
	Flat Field	0.02	PFC	>>PFC	Y
	Lower Field	0.12	PFC	>PFC	Y

Allotment	Unit	Miles	PFC in 5 Years	PFC in 10 Years	Desired Condition in 10 Years
	West Bosenberg Riparian Pasture	0.13	PFC	>>PFC	Y
	West Lake Creek Riparian Pasture	0.95	PFC	>PFC	Y
McCoy Creek	Lake Creek Willow Exclosure	0.51	>PFC	>>PFC	Y
Summit Prairie	Little Logan	0.09	PFC	PFC	N
	Lower Little Logan Riparian Pasture	4.11	PFC	>>PFC	Y
	North Summit Riparian Pasture	0.97	>PFC	>>PFC	Y
	Sagehen	0.04	N	N	N
		0.32	N	PFC	N
		1.10	PFC	PFC	N
		0.89	>PFC	>>PFC	Y
	Sagehen Riparian Exclosure	0.76	>PFC	>PFC	Y
	Sagehen Riparian Pasture	1.62	PFC	>PFC	Y
	South Summit	0.04	Water gap		
	Summit Rock	0.83	N	PFC	N
		3.71	>PFC	>>PFC	Y
		1.00	>PFC	>>PFC	Y
	Upper Little Logan Riparian Pasture	0.83	PFC	>>PFC	Y
	West Summit Recovery Unit	0.39	PFC	>PFC	Y

When cumulative effects common to Alternatives 2, 3, and 4 are considered with the Proposed Actions from Alternative 3, the result is the second fastest rate of recovery or movement towards a proper functioning condition and the desired condition for riparian areas and Bull Trout Critical Habitat within the Project Area. The rate of recovery is because of the fundamental livestock management strategy for Alternative 3 that largely includes creation of riparian pastures with minimum rest requirements of 3-5 years on 11 miles of Bull Trout Critical Habitat, adaptive management of additional rest and more conservative allowable use levels. The cumulative effects are within the scope of anticipated effects to aquatic resources determined in the Malheur National Forest Land and Resource Management Plan DEIS.

Alternative 4

Direct and Indirect Effects

Lake Creek Allotment

The effects to these areas remaining vacant were discussed Alternative 2 (for portions other than Bosenberg Creek) and Alternative 3 (including Bosenberg Creek).

The southwest corner of the McCoy Creek allotment (407 acres) would be removed from the Lake Creek allotment. This would require the construction of 2.5 miles of new fencing. This area may be added to the Dollar Basin allotment in the future. A separate environmental analysis would be required to add this area to the Dollar Basin allotment. The effects to this action are similar to Alternative 2 and are discussed there. This is unique to Alternatives 2 and 4.

Logan Valley Allotment

Big Creek Riparian Pasture

Direct effects related to hoof shearing, browse utilization, and stubble height would be decreased on Big Creek Reaches 1, 2 and 3 within the Big Creek Riparian pasture. This decrease is because the annual use levels are reduced and schedule rest would allow more expression in riparian vegetation.

The direct and indirect positive effects of livestock grazing on the riparian vegetation, channel characteristics, water temperature and Bull Trout Critical habitat would be from a combination of actions between Alternative 2 and 3, with the exception of the annual use levels and season long rest periods. Decreasing the intensity of grazing through reducing annual livestock use effects would likely improve riparian shrubs in concert with scheduled 3 years out of 10 season long rest. Bull trout critical habitat within the riparian pastures would be moving towards desired condition within 10 years (Appendix A, part 2). The adaptive management strategy of scheduled rest or develop additional rest would allow continual movement towards or achievement of desired vegetative and channel characteristic conditions identified in Appendix A, part 1. The rate of recovery for this unit would result in the second fastest movement towards desired conditions, behind Alternative 1.

West Lake Creek Riparian Pasture

Direct and indirect effects for the West Lake Creek unit are the same as Alternative 3.

Summit Prairie Allotment

Little Logan Unit

The direct effects from authorizing livestock grazing with the creation of riparian exclosures and cages approximately 10% of the total length in the Little Logan unit would result in a decrease in hoof shearing (bank alteration) of streambanks, a continued improvement in herbaceous plant vigor from leaving more residual stubble height, and improve current riparian hardwoods height classes and lessor for shrub stem densities (browse utilization). There are approximately 5 miles of bull trout critical habitat within the Little Logan unit and represents 35% of the Bull Trout Critical Habitat found in the Summit Creek Subwatershed.

The effects of hoof shearing from livestock use would be partially reduced for the next 10 grazing seasons because of reduced allowable use standards. The change from 20% bank alteration to 15% may not influence the condition of the streambanks because it is already consistent with the standards. The larger issue is the riparian shrubs for the Little Logan unit. The range rider may not affect the condition of riparian resource. It is more likely the rider would influence the number of days the livestock spend in the uplands, not causing streambank alterations. This would improve the duration of time the livestock can spend in the Little Logan unit before the use standards are met.

Riparian height classes would be improved from their current condition and a slight improvement would occur in riparian densities where they become established in riparian exclosures. Recovery of height classes and densities of riparian shrubs outside of the riparian exclosures would be slightly improved. The current condition for the density of riparian shrubs is 4% of desired or 8 stems with 200 stems per unit area desired. Building riparian exclosures and cages around stunted riparian shrubs would likely result in a release of riparian shrub height classes. Utilization values were approximately 97% for the shrubs that were uncaged and available for livestock browse. This indicates that the vigor of these shrubs is very low and growth rates of 1.2 feet per year would likely occur once the vigor has improved. Shrubs that have not been grazed for 2 years are more likely to develop seed and establish the increased density of shrubs. These newly established shrubs are more likely to be browsed by wildlife and livestock than the shrubs that have been expressed above browse line, are caged or are mature.

Plant vigor and the greenline stability rating would likely continue to improve under a 7 inch stubble height. The condition of the herbaceous plant communities is currently on an upward trend and would likely continue to improve with the change in allowable use.

Slight improvement in the riparian shrubs and improve the channel characteristics would measurably increase effective shade values if the riparian exclosures and cages are placed adjacent to the southwest side of the streambank in the Little Logan unit within 10 years (Appendix A, part 2). These reaches represent 5 miles of all life stages for Bull Trout Critical Habitat. Since the condition of the residual pool depth, pool quality and bankfull width/depth would likely improve; spawning and rearing habitat would likely be slightly improved in their current condition. Quality fish habitat related to bull trout is often achieved beyond a rating of PFC. Reach 5 within the Upper and Lower Little Logan riparian pastures would likely improve beyond a rating of PFC within 10 years.

It would also facilitate movement towards or achievement of the potential channel type (C towards E) by reducing bankfull width to depth. Bull trout critical habitat within the riparian pasture would likely move towards desired condition (Appendix A, part 2 within 10 years) by increasing residual pool depth, undercut banks, and the number of quality pools within Summit Creek reaches 1,2,3,4, and 5. Attributes related to quality fish habitat and the PCE's for bull trout critical habitat are often achieved beyond a riparian rating of PFC. The effects of an increase in residual pool depth, number of quality pools, decrease in bankfull width to depth, increase in riparian hardwood density and height, and increase in shade is cooler water temperatures. Effects related to changes in water temperature as a result of vegetative changes would be expected within 5 years and effects related to channel characteristics and water temperature are expected within 10 years. This would facilitate movement towards or achievement of recovery objectives and desired condition at a faster rate than that of Alternatives 2, and the same rate as Alternative 1 within the exclosures but to a greater lesser extent than Alternative 3. The adaptive management strategy of enlarging exclosures if sufficient movement towards or achievement of desired condition has not been met within 5 years for areas outside the exclosures.

Prairie Riparian Pasture

Direct effects related to authorizing the grazing system would result in maintenance in existing levels of hoof shearing on streambanks, a slight reduction in woody browse use, and an improvement in the hydric plant vigor within Reach 7 of Summit Creek and West Fork Summit Reaches 1 and 2. West Fork Summit Reach 1 would not have any direct effects for immediate 3-

5 years or until management objectives have been met. Allowable use levels in this Alternative would be a general reduction from Alternative 2, with an increase in the height for stubble height from 4 inches (Alternative 2) to 6 inches for the Prairie Riparian pasture. The woody browse value is also more conservative than Alternative 2, changing from 30-50% to 30% use. Bank alteration values are the same across all alternatives. The effects for Summit Reach 7 are the same as discussed in the North Summit unit in Alternative 2, because of the use levels and no minimum rest requirements. This analysis would only discuss direct and indirect effects occurring in the West Fork Summit Reaches 1 and 2.

The indirect effects of livestock effects for West Fork Summit Reach 1 would be an improvement in vigor and expansion of wetland obligate plant communities, improved stream bank stability and ultimately better fish habitat. Bull trout critical habitat within the riparian pastures would likely achieve desired condition (Appendix A, part 2 within 10 years) by increasing residual pool depth, undercut banks, and the number of quality pools within West Fork Summit Creek Reach 1. A result of the increase in residual pool depth, number of quality pools, decrease in bankfull width to depth, increase in riparian hardwood density and height, and increase in shade is cooler water temperatures. The vertical stability issues from active headcutting may impede improvement until they are addressed through active restoration. Effects related to changes in water temperature as a result of vegetative changes would be expected within 5 years and effects related to channel characteristics and water temperature are expected within 10 years.

The indirect effects of livestock effects for West Fork Summit Reach 2 would result in an improvement to the herbaceous plant community and channel characteristics, but maintenance of the existing riparian shrub conditions for West Fork Summit Reach 2. The riparian shrub conditions are critical for the resource values present in these areas. For example, beaver complexes were evident in the PFC assessments for these reaches, however, it is not likely that this alternative would provide the dietary conditions needed to support beaver populations or Bull Trout overwintering habitat. The vertical stability issues from active headcutting may impede improvement until they are addressed through active restoration. West Fork Summit Reaches 1 and 2 were found to be functioning at risk with a downward trend. Reaches rated functioning at risk are not stable or resilient to impacts from frequent flooding or other land management actions but a minimum rest requirement of 3-5 years would facilitate recovery.

West Fork Summit Reaches 1 and 2 are connected to Bull trout critical habitat, but are not on the Critical Habitat list. It has potential for Bull Trout and field observations have observed Bull Trout individuals likely foraging. These two reaches were evaluated as if they are Bull Trout Critical Habitat.

West Fork Summit Reach 1 would likely move towards desired condition (Appendix A, part 2 within 10 years) by increasing residual pool depth, undercut banks, and the number of quality pools. As a result of the increase in residual pool depth, number of quality pools, decrease in bankfull width to depth, and increase in shade is cooler water temperatures are expected. Effects related to changes in water temperature as a result of vegetative and channel changes would likely be expected within 10 years. This reach may not likely achieve PFC in 5 years; however, it would likely meet in 10 years. The use levels identified in Appendix E for the Prairie Riparian pasture and monitoring (review of riparian condition 3-5 years out of recovery trajectory) as well as the adaptive management strategy (change allowable use) would ensure movement towards desired conditions. West Fork Summit Creek Reach 1 would be incorporated into the Prairie

riparian pasture and have the same use levels as the Prairie Riparian pasture once grazing is resumed. The temporary fence for the West Summit Recovery unit (Reach 1) would be removed only after sufficient recovery has been achieved for resilient riparian area that is resistant to the impacts of livestock grazing.

West Fork Summit Reach 2 would likely move towards desired condition (Appendix A, part 1 and 2 within 5-10 years). An improvement in existing vegetative cover for riparian hardwood and herbaceous ground cover would occur, to a greater extant then that of Alternative 3 because of the 3-5 years minimum rest, adaptive management strategy of additional rest, and use levels that are the same as Alternative 3 once grazing is resumed. Residual pool depth, undercut banks, and the number of quality pools are expected to improve under the management proposed in Alternative 4. As a result of the improvement in residual pool depth, quality pools, bankfull width to depth, and shade change in water temperatures are expected for WF Summit Creek Reach 2. The use levels identified in Appendix E for the Prairie Riparian pasture would be applied to Reach 2 of West Fork Summit Creek rated as FAR-DN. Annual use levels for riparian hardwoods and bank alteration criteria along with minimum rest requirement are sufficient to facilitate achievement of a rating of >PFC within 10 years and acquire adequate resiliency to support livestock grazing and continually improve riparian condition within the West Fork Summit Creek Reach 2.

The direct and indirect effects of constructing 0.8 miles of fence along the boundary of the North Summit Riparian pasture may result in minimal ground disturbance from initial fence construction. Implementing the design criteria would minimize any effects to riparian areas, the viability of bull trout, redband trout or Columbia spotted Frog within the project area. The short term effects of fence construction are expected to result in long term beneficial effects for bull trout critical habitat within the North Summit Riparian pasture.

Reaches are expected to improve beyond a rating of PFC within the next 10 years based on the management actions within the Prairie Riparian pasture. Any improvement beyond a rating of PFC is directly related to improvements in bull trout critical habitat. It is likely that the current annual use levels would facilitate improvement beyond a rating of PFC. This improvement is due to the herbaceous plant community alone that is currently in a good condition for Reach 7. This herbaceous community would likely improve the channel characteristics slowly over time. However, it is not likely that the riparian shrubs would reach the desired condition within the time frame identified in Appendix A, part 2. West Fork Reach 2 needs more ground cover and an increase in riparian shrub density and height class diversity. The adaptive management strategy for the Prairie Riparian pasture if sufficient progress towards or achievement of desired conditions (Appendix A, part 1) has not been made would benefit the riparian shrubs in this reach. This would ensure that movement towards desired is not impeded by land management actions.

Summit Rock Unit

In Alternative 4, the West Fork Summit Creek reaches 1 and 2 would be incorporated into the Prairie riparian pasture. Reaches 6 and 8 would remain within the Summit rock unit. The Summit Rock unit was rated as PFC in 2007 for reaches 6 and 8 for a total of 3.5 miles. Livestock grazing would occur annually with no season of rest. Annual use levels would include the endpoint indicators of 6 inch stubble height, 30-50% browse, and 15 percent bank alteration. The adaptive management strategy would include changes in annual use levels (Appendix E).

Reach 6 is expected to improve slightly beyond PFC or maintain a rating of PFC. Annual use endpoint indicators are sufficient to facilitate an improvement in herbaceous vigor. Bank stability would improve as a result of the improvement in herbaceous plant and woody plants. Bank alteration levels are 15% which is less than Alternative 2. Reach 6 is likely at a minimum to maintain a rating of PFC or improve beyond PFC and achieve desired conditions within 10 years (Appendix A, part and 2). PFC is a minimum and does not equate to quality fish habitat until a rating beyond PFC is achieved.

Reach 8 is expected to at a minimum maintain a rating of PFC or improve beyond PFC because of the improvement in herbaceous vigor, browse utilization, and bank alteration within the lower portion of reach identified in 2007. Without rest improvement in riparian hardwoods is unlikely to occur. Improvement in herbaceous plant vigor is likely to occur in reach 8 under the current proposed levels of use. Thus, a rating of greater than PFC is likely to occur in 10 years.

Effects Determination

Columbia River Basin Bull Trout (T): May Affect, Not Likely to Adversely Affect (NLAA) in the short term. Beneficial Impact (BI) in the long-term.

Bull Trout Designated Critical Habitat (D): May Affect, Not Likely to Adversely Affect (NLAA) in the short term. Beneficial Impact (BE) in the long-term.

Rationale

The effects are the same as Alternative 3 with the exception that changes in allowable use levels and a full time rider are the primary drivers as to whether recovery objectives are met within the Summit Prairie allotment and not rest as proposed in Alternative 3. Enlargement of small exclosures in the Sagehen and Little Logan Units to cover a larger percentage of Summit Creek are the adaptive management strategy in Alternative 4 for the Summit Prairie Allotment.

Cumulative Effects

Table A-14: Summary of Expected Recovery for PFC Ratings by Unit Based on the Actions Proposed

Allotment	Unit	Miles	PFC in 5 Years	PFC in 10 Years	Desired Condition in 10 Years
Lake Creek	Bosenberg	7.95	>PFC	>>PFC	Y
	McCoy Creek	6.35	>PFC	>>PFC	Y
Logan Valley	Big Creek Riparian Pasture	1.67	>PFC	>>PFC	Y
	Corral Holding	0.12	PFC	>>PFC	Y
	Flat Field	0.02	PFC	>>PFC	Y
	Lower Field	0.12	PFC	>PFC	Y
	West Bosenberg Riparian Pasture	0.13	PFC	>>PFC	Y
	West Lake Creek Riparian Pasture	0.95	PFC	>PFC	Y
McCoy Creek	Lake Creek Willow Exclosure	0.51	PFC	>>PFC	Y
Summit	Little Logan	5.03	PFC	PFC	N

Allotment	Unit	Miles	PFC in 5 Years	PFC in 10 Years	Desired Condition in 10 Years
Prairie	Prairie Riparian Pasture	0.73	PFC	>PFC	Y
		0.97	>PFC	>>PFC	Y
	Sagehen	2.43	N	PFC	N
		0.32	N	PFC	N
		1.10	PFC	PFC	N
		0.89	>PFC	>>PFC	Y
	South Summit	0.04	Water gap		
	Summit Rock	0.08	N	PFC	N
		0.01	PFC	PFC	N
		3.71	>PFC	>>PFC	Y
		1.00	>PFC	>PFC	Y
	West Summit Recovery Unit	0.39	PFC	>PFC	Y

When cumulative effects common to Alternatives 2, 3, and 4 are considered with the Proposed Actions from Alternative 4, the result is the third fastest rate of recovery or movement towards a proper functioning condition and the desired condition for riparian areas and Bull Trout Critical Habitat within the Project Area. The rate of recovery is because of the fundamental livestock management strategy for Alternative 4 that largely includes range riders, creation of riparian exclosures and units, adaptive management of enlargement of riparian exclosures and changes in allowable use levels with starting allowable use levels similar to Alternative 3. The cumulative effects are within the scope of anticipated effects to aquatic resources determined in the Malheur National Forest Land and Resource Management Plan EIS.

Consistency with Direction and Regulations

Wetlands (Executive Order 11990)

Executive Order 11990 says that Federal agencies shall avoid management practices that would adversely affect wetlands. Wetlands that occur in the Project Area would be maintained or expanded in spatial extent with improved functionality. Focusing on riparian vegetation and channel condition, it would allow increased water storage in the floodplains and is consistent with the Executive Order protecting Wetlands. Establishing allowable use levels and the adaptive management actions would prevent adverse effects.

Endangered Species Act

The ESA requires the Forest Service to manage for the recovery of threatened and endangered species and the ecosystems upon which they depend. Forests are required to consult with the FWS or the NMFS if a proposed activity may affect the population or habitat of a listed species. Preparation of a Biological Assessment for initiation of formal ESA section 7 consultation with the FWS and NMFS is expected to occur after completion of the draft Summit Logan Valley Grazing Authorization Aquatic BE. Federally listed fish species and their proposed or designated critical habitat in the project area subject to consultation include bull trout and their critical habitat. The MNF expects to receive a Letter of Concurrence from FWS regarding effects

to bull trout and proposed critical habitat. The completed BA and consultations can be found in the project file.

Floodplains (Executive Order 11988)

Executive Order 11988 says that Federal agencies shall avoid adverse effects to floodplains or minimize potential harm. Floodplains several to a hundreds of feet wide occur in the Project Area. The floodplains are primarily contained within RHCAs. Management actions would be authorized that manage the amount of streambank alteration and herbivory, defer and/or rest livestock use that would minimize avoid adverse effects to the floodplains, and thus be consistent with Executive Order 11988.

Consistency with the Forest Plan

All alternatives are consistent with Management Area 3A standards, Amendment 29, and INFISH. Modifications for shade and their respective stream reaches are proposed for Amendment #29 Numberic Values as shown in Table 2-33. The proposed values for shade would be changed from the Amendment #29 values to the values identified in the TMDL or data collected by the Carex Working Group. The proposed shade values by reach are considered to be more site specific and realistic than the value present in Amendment 29. They take into consideration more factors that have localized effects on stream shade.

Clean Water Act

The CWA requires that that the Forest Service manages for the attainment of water quality criteria that provides for the most restrictive beneficial use present on a reach of a stream. The most restrictive beneficial use that is present in the Project Area is Bull Trout spawning and rearing. Many of the streams present in the Project Area were identified as water quality limiting for water temperature with supporting data collected continuously at multiple locations. Big Creek, Lake Creek and Summit Creek were identified with 303(d) listings that were followed with the development of a TMDL. The USFS is responsible for developing a Water Quality Recovery Plan (WQRP) that would demonstrate monitoring, management changes based on monitoring and provide for a reporting process to Oregon Department of Environmental Quality every 5 years. The desired condition table (Appendix A, part 1) identifies the desired vegetative communities and used the effective shade curves or empirically collected reference data to identify what the desired effective shade values should be achieved per reach. The monitoring plan (see Chapter 2), management objectives (Appendix A, part 2) and adaptive management suite (Appendix A, part 3) developed for the Summit Logan Project would provide the management framework to ensure that the livestock effects to the Project Area are not adverse and that these streams are continuing on an upward trend towards their desired condition. The allowable use levels (Appendix I) and the flexibility to adjust these levels would provide for the recovery of the wetland obligate vegetation attributes and channel morphology.

Irreversible and Irretrievable Commitments

The project as described would not result in any irreversible or irretrievable effects to the aquatic resource.

Recreation

Introduction

This analysis describes the existing conditions of campgrounds, trails, trailheads, administrative and dispersed sites in the Summit Logan Valley Grazing Authorization Project area.

Regulatory Framework

Malheur National Forest Management Plan

The National Forest System lands encompassed within the Summit Logan Valley Grazing Authorization Project area have been inventoried using the Recreation Opportunity Spectrum (ROS) system to determine what recreation opportunities and settings are available to visitors. The project area falls within the Roaded Natural, Roaded Modified, Semi-Primitive Non-Motorized and Semi-Primitive Motorized class of the ROS. Management direction for recreation as outlined in the Forest Plan is to continue to maintain existing ROS settings. The Forest Plan Management areas in the Summit Logan Valley Grazing Authorization Project area are discussed below in relation to the ROS class.

General Forest (MA-1): Manage dispersed recreation for roaded modified conditions.

Rangeland (MA-2): Mange for dispersed recreation ranging from semi-primitive to roaded modified.

- The analysis area receives low to moderate recreation use, which is spread throughout a six month period starting in late May and running through mid-November. There are 76 established dispersed camp sites within Summit Logan Valley Grazing Authorization Project area. Dispersed campsites offer the recreationist a more primitive camping experience. Use in fall hunting season is moderate to high. Use is distributed throughout archery, deer and elk seasons. Hunter use of the dispersed site varies depending on number of hunting tags for a unit and the number of “new” hunters in the area. Use of Off Highway Vehicle Use (OHV) is often associated with dispersed camping.

Developed Recreation Sites (MA-12): Manage for developed recreation opportunities, providing interpretation and enhancement of cultural and natural resources.

- This Management Area includes Murray, Huddleston Trailhead/Sno-park, Logan Valley Interpretive Site and Big Creek Campgrounds, encompassing approximately 8 acres.

Administrative Sites (MA-19): Provide and maintain sites for facilities necessary for the administration of Malheur National Forest lands.

- This Management Area includes Lake Creek Organization Camp, and encompasses approximately 27 acres.

Analysis Methods

The analysis area analyzed for recreation impacts includes the Summit Logan Valley Grazing Authorization project area.

The Malheur National Forest uses ROS classes to develop management direction for recreation on the forest. This analysis uses the ROS classes assigned during Forest Plan development as the basis of this assessment.

The source of the recreation information is the Forest GIS data base that was compiled from the recreation inventory information and field visits to the project area.

Affected Environment

Table C1: Management Areas

Management Areas	Acres	% of Area
12: Developed Recreation	8	<1
Administrative Site	27	<1
TOTAL	**35**	**<1**

In 2006 the Malheur National Forest developed a Forest niche, which is a statement of our unique role and contribution to recreation offerings in the Pacific Northwest Region. The purpose of the niche is to help us identify what makes each Forest special and allow us to narrow our focus to the most appropriate recreation opportunities so that we can provide quality recreation. Our niche is:

A Traditional Way of Life

A dispersed recreation destination where local communities share traditions and heritage with new generations and with visitors. Recreation visitors enjoy the freedom to hunt, drive, camp, and hike in a wild place and enjoy the beauty and diversity of forest ecosystems away from major population centers.

It should be noted that livestock and livestock grazing are very much an integral part of western and local “traditional way of life”. That is to say, it is not an uncommon western experience to encounter livestock, or big game, and subsequent herbivore impacts to the environment. Experienced western recreationists typically adapt to the presence of livestock either by acceptance of the nearby presence, hazing livestock away, or choosing alternate sites removed from, or with less obvious presence, of livestock activities.

Recreational use in the Summit Logan Valley Grazing Authorization Project area is oriented toward enjoyment of the area’s natural and historic resources. People visit the project area to view wildlife and birds, to see the spectacular wildflower displays in the spring, to visit the Strawberry Mountain Wilderness to just enjoy the solitude. Other visitors enjoy hunting opportunities in the mountains surrounding the valley, camping in the foothills, horseback riding, hiking, and various other outdoor activities.

A majority of the recreational use of the Summit Logan Valley Grazing Authorization Project area is concentrated around Murray and Big Creek campgrounds, Lake Creek Organization Camp and Huddleston Trailhead and Snopark (colloquialism for snow mobile parking and unloading recreation sites). Seasonal use varies based on the wildflower bloom in a given year, weather, and the availability of upland birds and big game. The highest visitation occurs from May through December. The lowest visitation occurs during the winter months, when the

temperatures drop and access is limited, nevertheless the grazing allotments are not active past mid-October.

Lake Creek Allotment

Developed Recreation Sites

Murray Campground

Murray Campground is located within Logan Valley on Forest Service Road 1600924 (T.16S, R.34E, and Section 3). Murray campground is in close proximity to the south side trailheads: Lake Creek, Meadow Fork, and Big Creek and one of the major access roads to the high elevation trailheads (Road's End High Lake Overlook), which accesses the Strawberry Mountain Wilderness. The proximity to Logan Valley and the Wilderness make this a popular campground for weekends and during hunting seasons.

The site is used consistently throughout the summer recreation use season, but use is higher highest during the big game hunting seasons. Murray campground provides a newer type vault toilet, 6 developed campsites with firerings and picnic tables. Fee's are charged at this site. The site can facilitate vehicles with trailers, but has limited sites for motor homes. No Vegetation Management plan has been done for this campground.

The Lake Creek Allotment is currently not active. East of the campground is an adjacent allotment that is not in use, thus lessening conflicts for recreating publics. However, livestock from a northwestern direction have occasionally entered the campground for the past several years As MA12, livestock is prohibited within campgrounds, however the campground has not been fenced excluding livestock entry.

Dispersed Sites

There are 30 known dispersed campsites, with the majority within riparian areas that show limited evidence of water quality impacts attributed to livestock use. The 30 dispersed campsites are scattered throughout the allotment, with eight campsites located in Bosenberg, two in Horse Pasture, and 20 in McCoy Creek pastures. Use of these sites varies throughout the year, with the majority of sites showing heaviest use during the fall hunting season and no use during the winter. Dispersed campsites are characterized by primitive structures such as self-made toilets, meat poles, rock fire ring, and log benches built by campers. Campsites are concentrated primarily in flat areas off main transportation systems where water can be accessed. Many are near springs or creeks. Varied degrees of vegetation and riparian zone damage occur throughout the watershed due to vehicles, sanitation practices, and removal of vegetation for various purposes. Use of Off Highway Vehicle Use (OHV) is often associated with dispersed camping.

Snowmobile Trail

There are approximately 16 miles of Forest Service snowmobile system trails developed on Forest Roads within the allotment. Use of these routes during the winter recreational season is generally Decemeber 15th through April 15th (though timing varies with snow conditions).

Bike Trail

Bike trails B-5053, B05045, B-5055 follows on Forest Roads and on Forest Trail 385 for 6 miles. This is a shared route. These trails have low use during the spring, summer, and fall seasons.

Logan Valley Allotment

Administrative Sites

Lake Creek Organization Camp

Located on Forest Service Road 1600924. (T.16S, R.34E, and Section 3). Lake Creek is a private business located on Forest Service land. The permitted area is 27 acres and is operated under a Special Use permit. The fences have been replaced within the last 3 years and are in good shape all the way around the camp. Livestock, including horses, are not allowed within Lake Creek Organization Camp.

Developed Recreation Sites

Big Creek Campground

Big Creek is located on Forest Service Road 1600815 along Big Creek, (T.16S., R331/2E., Section 14). Big Creek is the most popular campground in this area. The campground has 15 camp sites with fire rings, picnic tables, and two vault toilets with fees being charged. All 15 campsites are within the Big Creek RHCA and outside of the active flood plain, with a buck-n-pole barrier fence along Big Creek. There is approximately 5000 feet of barb wire around the campground that is in good shape to keep livestock out of the campground. Livestock is prohibited within campgrounds, but cattle have been able to access the campground during periods when fence maintenance has been needed.

Logan Valley Interpretive Site

Logan Valley is located on Forest Service Road 16 (T.16.,R331/2E.,Section 14). Logan Valley is a popular site to view wildlife, flowers and Strawberry Mountain in the background. It is a pullout with parking for 3 vehicles.

Dispersed Sites

The 1 dispersed campsite located in the South Big Creek pasture. Dispersed campsites are characterized by primitive structures such as self-made toilets, meat poles, rock fire ring, and log benches built by campers. Campsites are concentrated primarily in flat areas off main transportation systems where water can be accessed. Many are near springs or creeks. Varied degrees of vegetation and riparian zone damage occur throughout the watershed due to vehicles, sanitation practices, and removal of vegetation for various purposes. Use of Off Highway Vehicle Use (OHV) is often associated with dispersed camping. Recreation use is mostly distributed throughout archery, deer and elk seasons and the allotment is not used during the winter season.

Special Use Permit

Annually a horse group consisting of 100 with horses, horse trailers, catering trucks and showers has been issued a special use permit. The event lasts for 1 week where horses with riders leave Horse Pasture to nearby trail system for day rides. Hay brought in for horse use is weed free hay.

Snowmobile Trail

There are approximately 5.1 miles of Forest Service snowmobile system trails developed on Forest Roads within the allotment. Use of these routes during the winter recreational season is generally Decemeber 15th through April 15th (though timing varies with snow conditions) when the allotment is not in use.

Bike Trail

Bike trails B-5053 and B-5054 follows on Forest Roads for 5 miles. This is a shared route. These trails have low use during the spring, summer, and fall seasons and are inaccessible during the winter.

McCoy Creek Allotment

Dispersed Sites

There are no known or GIS identified dispersed campsites, bike or snowmobile trails in the allotment. Cows are permitted according to Forest Plan Standards and would not be addressed in the effects section.

Summit Prairie Allotment

Dispersed Sites

There are 38 known dispersed campsites, with the majority within riparian areas that show limited evidence of water quality impacts attributed to livestock use. The 38 dispersed campsites are scattered throughout the allotment, with 10 in Crane Rock, 13 in Little Logan, 10 in Sagehen and 4 in Summmit Rock patures. Use of these sites varies throughout the year, with the majority of sites showing heaviest use during the fall hunting season and no use during the winter when the allotment isn't active. Dispersed campsites are characterized by primitive structures such as self-made toilets, meat poles, rock fire ring, and log benches built by campters. Campsites are concentrated primarily in flat areas off main transportation systems where water can be accessed. Many are near springs or creeks. Vehicle Use (OHV) is often associated with dispersed camping. Varied degrees of vegetationand riparian zone damage occur throughout the watershed due to vehicles, sanitatin practices, and removal of vegetation for various prurposes.

Huddleston Trailhead/Sno-park

Huddleston Trailhead/Snopark is adjacent to County Road 62 and is within the Wilderness Loop Visual Corridor a sensitivity Level 1. Huddleston is a multi-purpose trailhead and sno-park in the winter and a trailhead in the other seasons. The site is not fenced immediately around the site. Livestock are entering the site.

Snowmobile Trail

There are approximately 54 miles of Forest Service snowmobile system trails developed on Forest Roads within the allotment. Use of these routes during the winter recreational season is generally Decemeber 15th through April 15th (though timing varies with snow conditions) when the allotment is not active.

Bike Trail

Bike trail B-5053 follows on Forest Road and on Forest Trail 374 for 10 miles. This is a shared route. These trails have low use during the spring, summer, and fall seasons and are inaccessible during the winter season.

Environmental Consequences

Alternative 1 – No Grazing

Direct and Indirect Effects

There would be no direct or indirect effects from the implementation of Alternative 1 because no actions are being proposed. Recreational visits within the Lake Creek, Logan Valley, McCoy Creek and Summit Prairie allotments would remain at or near the same level as previous years. Traditional use patterns and recreational opportunities would not be impacted.

Cumulative Effects

Alternative 1 would have no cumulative effects. Affects to recreation are measured in terms of change in the recreation opportunity spectrum (ROS). There would be no effect on the ROS class for this area.

Alternative 2, 3 & 4

Direct and Indirect Effects

Lake Creek Allotment

Developed Recreation Sites

Murray Campground

Under both Alternatives 2 and 4 cattle moving from the northwestern direction (not associated with this allotment grazing permit) would no longer be able to access Murray Campground because of the new fence construction. Livestock impact to recreationists would be less, thus reducing visitor complaints of the presence of livestock and their associated smells and nuisances.

Alternative 3 would continue to allow livestock to migrate from the north toward Murray campground; livestock would continue to be present in the campground and user conflict would persist. The occasional visitor complaints would continue about the livestock presence in the campground.

Dispersed Sites

Under all of the action alternatives there is no change is anticipated in the diversity of camping style or use patterns in this area. No change in the availability of dispersed camping at the existing 30 dispersed campsite is expected for the typical use in spring, summer and fall.

Snowmobile Trails

Since snowmobile activities occur when the allotment is inactive, under all of the action alternatives, there would be no change in snowmobile access in this area. Approximately 16 miles of existing designated snowmobile routes would remain with a mix of groomed and un-groomed conditions.

Bike Trail

Alternatives 2 and 4 would affect approximately 6 miles of bike trail tread. The effects from cattle use include but are not limited to widening of trails from the existing standard, breaking down the edges of trails where construction is benched, kicking out constructed water bars,

adding to water run-off from the trail, making new trails where cattle trails leave existing trail treads, knocking down constructed trail markers, and rubbing and knocking down sign posts. Grazing would heighten recreational users encountering increased levels of trampled vegetation, creating "dust bowls" along and adjacent to trails where livestock salting areas are located.

Under Alternative 3, recreationalist would not encounter livestock on the (approximately) 6 miles of bike trail tread. No livestock grazing would lessen recreational users contending against increased levels of trampled vegetation, creating "dust bowls" along and adjacent to trails where livestock salting areas are located. Any encounters with livestock would be accidental.

Other Recreational Activities

Under Alternatives 2 and 4, there is 2.5 miles of fence proposed for construction. The fence construction may hinder recreationalist ability to directly access to the steam temporarily until an alternative route either around or over the fence is found. The removal of the 1.5 miles of fence would allow recreationalist to move freely across the landscape, easily facilitating cross-country travel. OHV travel may also be hindered by the newly constructed fences, restricting travel routes.

Alternative 3 would have no effect to recreationalist in this area. There are no improvements or structures proposed.

No adaptive management strategies are proposed for this allotment.

Logan Valley Allotment

Administrative Sites

Lake Creek Organizational Camp

There would be no physical impacts to the Lake Creek Organizational Camp from any of the action alternatives. There is a fence surrounding the Lake Creek Organizational Camp limiting impacts of livestock grazing activities. The fence is in good condition and has excluded livestock from entering the camp. There would be minimal impacts, such as cattle still being seen or heard in the vicinity, of the Lake Creek Organizational Camp from either of the action alternatives.

Developed Recreation Sites

Big Creek Campground

There would be no impacts to Big Creek Campground under any of the action alternatives. A fence is constructed around the campground and would exclude livestock from the campground, except when fence maintenance was needed. However, the presence of livestock outside of the campground and their associated smells and sounds would continue which may cause an occasional visitor complaint.

Logan Valley Interpretive Site

Under all of action alternative there would be no change in the Logan Valley Interpretive site use patterns.

Dispersed Sites

Under all of the action alternatives there is no change is anticipated in the diversity of camping style or use patterns in this area. No change in the availability of dispersed camping at the

existing single dispersed campsite is expected for the typical use in spring, summer and fall and no, or extremely minor, dispersed camping use occurs during the winter.

Snowmobile Trail

Under all of the action alternatives the allotments are inactive during the snowmobile season and there would be no change in snowmobile access in this area. Approximately 5.1 miles of existing designated snowmobile routes would remain with a mix of groomed and un-groomed conditions.

Bike Trail

Under all of the action alternatives approximately 5 miles of bike trail tread would continue to be affected by livestock grazing. The effects from cattle use include, but are not limited to, manure, widening of trails from the existing standard, breaking down the edges of trails where construction is benched, kicking out constructed water bars, adding to water run-off from the trail, making new trails where cattle trails leave existing trail treads, knocking down constructed trail markers, and rubbing and knocking down sign posts. Grazing would heighten recreational users encountering increased levels of trampled vegetation, creating “dust bowls” along and adjacent to trails where livestock salting areas are located.

Special Uses

Alternative 2 would move the Horse pasture from Lake Creek allotment to Logan Valley allotment. Making the Horse pasture an active allotment pasture could have a negative impact on the Special Use Permit Horse Group that uses the Horse Pasture for an annual Recreation Event. If cows are pastured during the time of the event, the group may not be able to use the area at the same capacity as they did in the past. The vacant Horse Pasture is used as a campsite for the Horse Group that consist of approximately 100 people with horses, trailers, catering trucks and showers.

Alternatives 3 and 4 would have no impact to the Special Use Permit Horse Group.

Other Recreational Activities

The construction of a riparian fencing in all of the action alternatives may temporarily hinder recreationalist ability to have direct access to the stream until an alternative route either around or over the fence is found. Other fence construction may also impact OHV travel, restricting travel routes. The removal of fence would allow recreationalist to move freely across the landscape, easily facilitating cross-country travel.

Adaptive management strategies proposed for this allotment would further impact recreationalist.

McCoy Creek Allotment

There are no GIS identified recreational use sites in the allotment. Cows are permitted according to Forest Plan Standards and will not be addressed in the effects section.

Adaptive management strategies proposed for this allotment would not impact recreationist.

Summit Prairie Allotment

Dispersed Sites

Under all of the action alternatives there is no change is anticipated in the diversity of camping style or use patterns in this area. No change in the availability of dispersed camping at the existing 38 dispersed campsite is expected for the typical use in spring, summer and fall.

Snowmobile Trail

Under all of the action alternatives, there would be no change in snowmobile access in this area. Approximately 54 miles of existing designated snowmobile routes would remain with a mix of groomed and un-groomed conditions.

Bike Trail

Under all of the action alternatives approximately 10 miles of bike trail tread would be continue to be affected by livestock grazing. The effects from cattle use include but are not limited to widening of trails from the existing standard, breaking down the edges of trails where construction is benched, kicking out constructed water bars, adding to water run-off from the trail, making new trails where cattle trails leave existing trail treads, knocking down constructed trail markers, and rubbing and knocking down sign posts. Grazing would heighten recreational users encountering increased levels of trampled vegetation, creating "dust bowls" along and adjacent to trails where livestock salting areas are located. In addition, there would be the sights, sounds, smells, and manure that normally accompanying livestock presence.

Huddleston Trailhead/Sno-Park

There would be limited impacts to Huddleston Trailhead/Sno-Park under any of the action alternatives. The sno-park is not fenced in; allowing cow's access to this recreational site. The presence of livestock their associated smells, sounds, and nuisances near, in, and around this area could cause occasional visitor complaints.

Other Recreational Activities

The construction of the riparian fencing in Alternatives 3 and 4 may hinder recreationalist ability to have direct access to the stream. Alternative routes may be made either around or over the fence.

Other fence construction proposed in all action alternatives could increase the difficulty for recreationalist to travel cross-county. Other fence construction may also impact OHV travel, restricting travel routes. However, in other areas the fence removal in all action alternatives would allow recreationalist to move more freely across the landscape, more easily facilitating cross-country travel.

The construction of the three upland ponds for livestock water in Alternative 2 most likely would not have an effect on the recreating public. The development of a spring may be used by the public while recreating.

The construction of the loading ramp with an attached catch pen adjacent to Forest Service Road 1647 in all of the action alternatives would not have an effect on the recreating public.

Adaptive management strategies proposed for this allotment would not further impact recreationist.

Effects Common to All

The Summit Logan Valley Grazing Authorization Project Area lies within the East Beulah, Malheur and Murderer's Creek Big Game Management Units. The area is popular during general big game bow seasons and controlled big game hunts. Seasons are in late summer and fall. Livestock are removed from the allotment pastures in mid-October, and hence are not present during portions of deer season and all of elk rifle season. It is anticipated that Oregon Department of Fish and Wildlife would continue to offer hunting opportunities in this area as part of their management of big game and upland birds. General bow-hunting, black powder and controlled hunts would have similar seasons and numbers of tags. Bow-hunter numbers have increased in recent years and this trend may continue. Hunting in the Summit Logan Valley Grazing Authorization project area is managed and regulated by the Oregon Department of Fish and Wildlife. Nothing in the Summit Logan Valley Grazing Authorization affects the jurisdiction of the State of Oregon with respect to wildlife management.

Cumulative Effects

All past, ongoing, and reasonably foreseeable future activities in Appendix C have been considered for their cumulative effects on recreation. Although the proposed activities would be evident and could have in impact to recreationalist in the short-term, these activities are not expected to noticeably impede recreational activities.

The proposed activities would move towards meeting recreation settings and continued grazing would in part fit the "Niche" character as identified in the Malheur Recreation Strategy.

The area is consistent with the roaded modified and roaded natural ROS classes under which the area is to be managed.

Consistency with Direction and Regulations

The project is consistent with the Malheur National Forest Plan, as amended. Proposed activities in each of these alternatives are allowed for and meet the direction contained in the Forest Plan relative to ROS.

Irreversible and Irretrievable Commitments

The action alternatives would not create any impacts that would cause irreversible or irretrievable damage to recreation resources.

Visual Quality

Introduction

This is a summary of the Visual Quality Report that evaluates the potential effects of livestock grazing on the visual quality within the Summit Logan Valley Grazing Authorization Project. The full specialist report can be found in Appendix F which is available for review by request.

Regulatory Framework

Malheur National Forest Land and Resource Management Plan

MA 14 Visual Corridors

Approximately 40,265 acres (60%) of the project area are identified in the Malheur National Forest Land and Resource Management Plan (Forest Plan, USDA Forest Service 1990) as Management Area 14 – Visual Corridor (Forest Plan, pg IV-108).

The Forest Plan designates Forest Service Road 16 also called the Wilderness Loop as Sensitivity Level I Corridor as MA 14.

These Visual corridors consist of the visible and potentially visible landscapes along major travel routes where the traveling public has a high-to-medium sensitivity to the scenery. The goal is to manage corridor viewsheds with primary consideration to their scenic quality and the growth of large diameter trees. Visual quality objectives of retention, partial retention and modification would be applied while providing for other uses and resources.

Standards

- Permit livestock grazing in accordance with Forest-wide Standards (#7, Forest Plan, pg IV-108).
- Design both structural and non-structural improvements to meet visual quality objective in Sensitivity Level 1 corridors to result in a natural appearing visual condition (#8, Forest Plan, pg IV-109).

Wild and Scenic River[15] (MA-22)

Approximately 15 acres (<1%) of the project is identified in the Malheur National Forest Land and Resource Management Plan (Forest Plan, USDA Forest Service 1990) as Management Areas 22 – Wild and Scenic River (Forest Plan, pg IV-135).

Standards

- Commercial livestock grazing is permitted under approved management plans which have analyzed compatibility of livestock grazing with other resource values. Design range improvements to be compatible with the visual objectives.

Analysis Methods

A new scenery element has been developed for use within the USFS Scenery Management System Scenic. The existing Scenic Stability analysis for the Summit Logan Valley Grazing Authorization area focuses on the single major scenery attribute of vegetation, addressing its ecosystem conditions.

The mapped boundaries of the visual foreground and middleground areas were computer generated using a “seen area” modeling program from selected viewpoints along County Road 62 and Forest Service Road 16.

Visual corridors were visited in the field to determine visual quality objectives based on Forest Plan direction.

Affected Environment

Wilderness Loop Visual Corridor (County Road 62 and Forest Service Road 16)

Foreground and Middleground

[15] The Forest Plan was amended by the Wild and Scenic Plan Decision for the Malheur River.

The Wilderness Loop Visual Corridor is the only visual corridor located within the Summit Logan Valley Grazing Authorization project area. There is 3,912 acres located within the visual foreground and 20,366 acres within the visual middleground (see Table V-1 below).

Table V-1: Wilderness Loop Visual Corridor Foreground and Middleground within the Summit Logan Valley Grazing Authorization project

Allotment	Unit	Foreground (acres)	Middleground (acres)
Lake Creek	Bosenberg	143	4375
	Horse Pasture	--	90
	McCoy Creek	32	2237
	TOTAL	**175**	**6,702**
Logan Valley	Big Field	273	711
	Corral Holding	15	--
	East Bosenberg	24	83
	East Lake Creek	--	450
	Flat Field	45	496
	Front Field	--	40
	Lower Field	--	233
	North Big Creek	--	191
	South Big Creek	82	46
	West Bosenberg	43	200
	West Lake Creek	--	305
	TOTAL	**482**	**2,755**
McCoy Creek	Cow Camp	4	113
	Dry	--	17
	Gov't Flat	13	183
	Lake Creek	--	190
	North Fork	--	25
	Ridge	55	193
	Starvation	--	24
	TOTAL	**72**	**745**
Summit Prairie	Crane Rock	11	2324
	Little Logan	802	1468
	North Summit	85	19
	Sagehen	50	1067
	South Summit	36	--
	Summit Rock	2184	5286
	West Summit	15	--
	TOTAL	**3,182**	**10,164**
	Overall TOTAL	**3,912**	**20,366**

Existing Scenic Stability

The Summit Logan Valley area encompasses a dramatic expansive landscape that is in a relatively undeveloped state. The scenic qualities of most landscape settings in the Logan Valley are defined by striking natural features – the vast open vistas across the floor valley, backed by stark mountain ridges. Structures from historic and present-day ranching operations are integral parts of a pastoral landscape on the valley floor. Seasonal landscape elements include one of Logan Valley and Summit Prairie's most dramatic spring wildflower blooms. Another important

component of the scenic stability of Logan Valley is Strawberry Mountain Wilderness in the background. There are outstanding opportunities for viewing the mountain and interpretive overlook into the valley for wildlife sightings.

Existing Scenic Integrity

Scenic Integrity is measured on the Malheur National Forest through Visual Quality Objective levels defined by the USFS Visual Management System. Levels and descriptions (as perceived by the public) are described in Table V-2 (below).

Table V-2: Scenic Integrity

Visual Quality Objectives	Scenic Integrity as people perceive it
Preservation	Unaltered, visually complete or intact
Retention	Unnoticeably altered
Partial Retention	Slightly altered
Modification	Moderately altered
Maximum Modification	Heavily altered
Unacceptable Modification	Unacceptably altered

The existing scenic integrity meets the visual quality objective of the Forest Plan. Within the project area there are large areas of natural appearing landscapes. Overall, from foreground, middleground and background views there is little evidence of human activities in this project area. There are existing wire fences, water troughs, springs, and livestock within the planning area. The existing condition meets the Forest Plan objective of "retention and partial retention" within the foreground, middleground and background area.

In the Summit Logan Valley Grazing Authorization the valley and the surrounding mountains represent a vast dramatic landscape of very high scenic integrity and quality. The Wilderness Loop along County Road 62 side of the Summit Logan Valley project area although scenic, is more typical of landscapes in other parts of the forest.

Environmental Consequences

Alternative 1 - No Grazing

Direct and Indirect Effects

There would be no direct or indirect effects from the implementation of Alternative 1 because no action is being proposed. The visual foreground would remain at 3,912 acres and the visual middleground would remain at 20,366 acres.

Cumulative Effects

Alternative 1 would have no cumulative effects to the exiting visual quality within the project area.

Alternative 2, 3 and 4

Direct and Indirect Effects for All Action Alternatives

Wilderness Loop Visual Corridor (County Road 62 and Forest Service Road 16)

Foreground and Middleground

Improvements and structures proposed for the Lake Creek, Logan Valley, McCoy Creek and Summit Prairie allotments would vary based on the alternative (see Chapter 2 for further detail). Acres within the foreground and middleground would also fluctuate per alternative however all proposed activities would be designed to meet the visual quality objectives as directed by the Forest Plan.

The scenic quality condition in within the project area is not expected to diminish under any of the action alternatives.

Adaptive management strategies would also vary based on the alternatives (see Appendix A, part 3 for further detail) however all of the adaptive management strategies that are proposed would have no effect on the visual quality of the foreground and middleground of the Lake Creek, Logan Valley, McCoy Creek and Summit Prairie allotments.

Malheur River Wild and Scenic River Corridor

There are no improvements and/or structures proposed within the 15 acres of the project area that is located within the Malheur River Wild and Scenic River Corridor. There would be no effect to the outstanding remarkable value of unique scenic character to the Malheur River Wild and Scenic River Corridor. The outstanding remarkable value would continue to be protected; preserving the free flowing conditions of the river.

Cumulative Effects for All Action Alternatives

Effects from the proposed improvements and structure in combination with the past, ongoing, and reasonably foreseeable future activities (as listed in Appendix C) are considered when analyzing the cumulative effects of the action alternatives.

In 2011, 3 Decision Memo's were signed authorizing projects within the Summit Logan Valley Grazing Authorization Project areas that would enhance livestock management by implementing numerous improvements and structures (see Chapter 1 for further detail). These projects combined with the structures and improvements proposed under the Action Alternatives would have additive but minimal impact on the visual quality of the project area.

Consistency with Direction and Regulations

The project is consistent with the Malheur National Forest Plan, as amended. Proposed activities in each of these alternatives are allowed for and meet the direction contained in the Forest Plan relative to Visual Quality Objectives.

Irreversible and Irretrievable Commitments

The action alternatives would not be expected to create any impacts that would cause irreversible or irretrievable damage to the scenic integrity.

Heritage

Introduction

The purpose of this report is to analyze the effects of livestock activities proposed within the Summit Logan Valley Grazing Authorization Project area on cultural resources. Cultural

resources are fragile and irreplaceable resources that chronicle the history of people utilizing the forested environment.

Regulatory Framework

The legal framework that mandates the Forest to consider the effects of its actions on cultural resources is wide-ranging. In this case, Section 106 of the National Historic Preservation Act (NHPA) of 1966 (amended in 1976, 1980, and 1992) is the foremost legislation that governs the treatment of cultural resources during project planning and implementation. Implementing regulations that clarify and expand upon the NHPA include 36 CFR 800 (Protection of Historic Properties), 36 CFR 63 (Determination of Eligibility to the National Register of Historic Places), and 36 CFR 296 (Protection of Archaeological Resources). The Pacific Northwest Region (R6) of the Forest Service, the Advisory Council on Historic Preservation (ACHP), and the Oregon State Historic Preservation Office (SHPO), signed a programmatic agreement (PA) regarding the management of cultural resources on National Forest system lands in 2004. The 2004 PA outlines specific procedures for the identification, evaluation, and protection of cultural resources during activities or projects sponsored by the Forest Service. It also establishes the process that the SHPO utilizes to review Forest Service undertakings for NHPA compliance. The Grazing Allotment Review Strategy for Section 106 Compliance, which implements the Regional Forester policy letter of May 19, 2006, "Grazing Permit Reauthorization and National Historic Preservation Act" (Goodman 2006), is the region's policy for performing heritage reviews of grazing permit reauthorizations. This policy has also been approved by Oregon SHPO.

The National Environmental Policy Act of 1970 is also a cultural resource management directive as it calls for agencies to analyze the effects of their actions on sociocultural elements of the environment. Laws such as the National Forest Management Act (NFMA) of 1976, the Archaeological Resources Protection Act (ARPA) of 1979, the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990, and Executive Order 13007 (Indian Sacred Sites) also guide Forest Service decision-making as it relates to Heritage. The American Indian Religious Freedom Act (AIRFA) of 1978 requires that federal agencies consider the impacts of their projects on the free exercise of traditional Indian religions.

The Malheur National Forest Land and Resource Management Plan (1990), as amended, tiers to the previously mentioned laws and corresponding Forest Service manual direction as it sets forth resource management goals, objectives, and standards. Forest-wide management standards that are pertinent for this cultural resource effects analysis include:

- Conduct a professionally supervised cultural resource survey on National Forest lands to identify cultural resource properties. Use sound survey strategies and the Malheur National Forest Cultural Resource Inventory Survey Design (Thomas 1991).
- Evaluate the significance of sites by applying the criteria for eligibility to the National Register of Historic Places.
- Consider the effects of all Forest Service undertakings on cultural resources. Coordinate the formulation and evaluation of alternatives with the State cultural resource plan, the State Historic Preservation Office and State Archaeologist, other State and Federal agencies, and with traditional and religious leaders of Native American Indian groups and tribes with historic ties to the project planning area.

Consultation with Others

Many of the previously described laws, regulations, and directives instruct the Forest Service to consult with American Indian tribes, the state, and other interested parties on cultural resource management issues. This consultation has been conducted through the NEPA process and under the terms of existing agreements with American Indian Tribes. To date, there have been no concerns raised during scoping regarding the effects of grazing activities on cultural resources. Documentation of compliance with the NHPA is currently being prepared for referral to the Oregon SHPO in accordance with the 2004 PA, and consultation with that agency would be completed prior to the publication of the Summit Logan Valley Grazing Authorization Project Final Environmental Analysis.

Tribal consultation on a government-to-government basis is ongoing with the Burns Paiute Tribe, the Confederated Tribes of the Umatilla Indian Reservation, and the Confederated Tribes of Warm Springs Reservation. At this point in the consultation process no concerns regarding the effects of the Summit Logan Valley Grazing Authorization Project proposal on cultural resources have been identified**.**

Analysis Methods

The Summit Logan Valley Grazing Authorization Planning Area includes all National Forest system lands administered by the Prairie City Ranger District that are within the designated boundary established for this project. The cultural resources effects analysis, including cumulative effects, would focus on cultural properties identified within the project area. The proposed action does not have potential to have indirect effects (i.e., visual, auditory, atmospheric) on cultural resources that are distant from the project activities.

Affected Environment

Cultural resource identification efforts in the vicinity of the Summit Logan Valley Grazing Authorization project area have focused on three primary types of resources: prehistoric archaeological sites, historic archaeological sites, and places that support resources of contemporary tribal interest. Cultural resource identification efforts that have been conducted in the four allotments of this project include pedestrian cultural resource inventories, literature reviews, and consultation with American Indian tribes and other stakeholders that are historically associated with the area. In accordance with the Grazing Allotment Review Strategy for Section 106 Compliance, which implements the Regional Forester policy letter of May 19, 2006, "Grazing Permit Reauthorization and National Historic Preservation Act" (Goodman 2006), 94 sites of a total 129 sites within the grazing allotments were identified to be monitored; 67 were visited.

Archaeological resources are places where human activities have deposited physical remains or measurably altered the earth in some manner. Archaeological sites may be prehistoric or historic and are considered valuable if they have yielded, or may be likely to yield, scientific or scholarly information important in prehistory or history. Complete site avoidance is the preferred form of treatment for archaeological resources that have the ability, or may have the ability, to yield scientific data (Keyser et al. 1988). Because of the nature of grazing activities, archaeological resources cannot always be avoided. If grazing conflicts with cultural resources are identified, the adverse effects would be mitigated or eliminated by amending grazing practices authorized in the permit (Goodman 2006).

The most frequently encountered archaeological resources in the Summit Logan Grazing Authorization project area are scatters of lithic remains that are distributed in variable densities and are related to occupations of hunter-gatherers that span over 8,000 years. The prehistoric lithic scatters are largely related to hunting and tool finishing. However, several sites are associated with natural obsidian sources within the area. Another dominant artifact observed in the project area is the hopper mortar; over 180 hopper mortar bases have been found in the project area, most of which were found *in situ* (David 2004). Hopper mortars and pestles are stone tools that were used to process root crops, plant products, dried meat and fish, and other resources including insects.

Historic archaeological resources may include foundations or structural ruins, or features such as privy pits and trash dumps. Sites with historic archaeological components in the project area are believed to be associated with Depression era livestock grazing, the Hines Logging Railroad, early homesteading, agriculture, and early Forest Service administrative activities. Portions of corrals, burnt-out log troughs, historic ditches predating 1928, historic telephone lines and associated artifacts (ceramic insulators, telephone lines), railroad beds and associated artifacts from the Hines logging railroad activities, and cabins, including a snow survey cabin located at John Day Summit, have been recorded throughout the project area. Civilian Conservation Corps (CCC)-era buildings are located at the Lake Creek Organizational Camp which was an early Forest Service ranger station.

The National Environmental Policy Act, and other authorities require that federal agencies consider the impact of their actions on cultural uses of the natural environment such as those practiced by preset-day communities of American Indians. Resources of contemporary tribal interest may include traditional cultural properties (Parker and King 1998), areas important for the practice of Indian religion, Indian sacred sites on federal lands, and areas that support cultural uses of the natural environment (i.e., subsistence use of plants or animals). Ethnographic sources have identified portions of the Summit Logan Grazing project area as important for traditional American Indian land-uses (Couture 1978).

Historic Land Use

The project area lies near the boundary between two cultural areas. The ethnographic record (Whiting 1950) indicates that members of the Hu'nipwi'tika (Lomatium eaters) band of the Northern Paiute Indians were the primary inhabitants of the project area, and that two other Paiute bands visited and utilized the areas for subsistence activities. Ethnographic and historic accounts indicate that Sahaptin speaking people from the Columbia Plateau also made frequent forays into the region. Parties affiliated with Tenino (Warm Springs), Nez Perce, Cayuse, and Umatilla periodically visited the project area to gather roots, hunt game, engage in trade, acquire information, and to solidify social ties throughout the ethnographic present (Suphan 1974).

With the headwaters of the Malheur River at the southern end of the planning area, the area became one of the major fishing sites for the Burns Paiute. "It represented the scene of a prominent annual economic and social event centered on the salmon" (Couture 1996:36). The area was also rich with camas, biscuit root, chokecherries, and grasshoppers, which they processed with hopper mortars and stored for winter use.

For a brief period (1873 to 1882), the Malheur Indian Reservation encompassed a major portion of the project area. In 1873 the Federal Government set aside the reservation comprising of nearly two million acres, extending north to Strawberry Mountain, east and west from Castle

Rock to the Silvies River, and south to Malheur Lake. It is conceivable that some Paiute continued to use project areas during this time, but documentation for this is conspicuously lacking. By the end of the 1940s Indian use of the project area was primarily limited to a few families hunting and gathering traditional cultural plants as delicacies instead of staples.

Following the decline of eastern Oregon gold rush in the late 19th century, the principal land use in the southern Blue Mountains was livestock grazing. By the late 1860s large herds of cattle, sheep and horses were grazing these prairies with no limit being placed on the numbers of livestock. By 1912, more than 2,000 to 4,500 cattle, 6,000 to 8,000 sheep, and 500 to 1,000 horses grazed in the planning area and surrounding vicinity (Mosgrove 1980). Until the early 1900s livestock on the Forest was not managed and high stocking levels, stock driveways, and lack of management resulted in degraded upland and riparian conditions.

Grazing practices that started in the 1860s altered the native grasslands in and around the project areas, displacing prairie vegetation with annual grasses for livestock forage. For heavily overgrazed areas in the project area, non-native grass species were introduced, such as the reseeding project in the project area that began in the 1930s. And as early as 1915, historic irrigation ditches were being built in the project area by water rights holders with spreader ditches being plowed in the valley through the 1950s. The footprint of the ditches is still visible and some are still in use.

In the 1870s the Dalles Military Road was opened connecting Boise to The Dalles by way of Canyon City to service the miners and early settlers. A portion of the military road runs through the Summit Prairie allotment. Sheep camps and stock driveways were constructed within the planning area to support the administration of grazing.

Commercial logging began on the Forest in the early 1920s when the Malheur put up for sale 890 million board feet of timber. The Hines Logging Railroad was constructed from the mill in Seneca to Crane Prairie in the eastern portion of the project area to transport the timber. The Bear Creek to Summit Prairie section of the railroad system was used to haul timber from the project area between the late 1930s to early 1960s. Temporary spurs were constructed along creeks and drainage areas in the project area.

Other historic uses of the project area involved the administration of Forest Service lands and fire suppression. A fire lookout was in place by 1920 at Crane Point and the Lake Creek Ranger Station was constructed prior to 1909. An historic phone line was constructed between 1909 and 1915 to allow communication between the lookouts and Ranger stations in the project area. This telephone system was a critical part of the Forest fire suppression system until 1949.

Environmental Consequences

Alternative 1 - No Grazing

Direct and Indirect Effects

The No Action Alternative would have not have a direct or indirect effect on cultural resources. Alternative 1 would virtually eliminate the likelihood of livestock disturbance and damage to cultural resources, however, as a consequence of no grazing; fuel loads from an increased amount of available forage could increase the risk of archaeological sites and their overall physical integrity being affected by wild fires.

Tribal uses would have beneficial consequences under this alternative. The No Action Alternative would be beneficial to riparian vegetation and therefore beneficial to tribal uses. This alternative would not prevent the continuation of traditional practices.

Alternative 2 (Proposed Action), 3 and 4

Direct and Indirect Effects

Livestock activity in areas where cattle tend to congregate (water sources) with a high likelihood of containing buried cultural deposits, such as springs, seeps, and terraces, could expose and cause damage to cultural materials. Since the Grazing Alternatives would not change the intensity of grazing, would continue to disperse livestock across the allotments, and would manage use according to the AMPs, no additional impacts to sites within the project area are expected.

Two allotments, Logan Valley and Summit Prairie, would gain acreage with all three alternatives, but not livestock numbers. Lake Creek Allotment would remain vacant, and McCoy Creek Allotment would decrease in size with 23 acres being excluded in a riparian protection exclosure in all alternatives.

Any site-specific range developments identified, such as developing upland ponds, constructing fences and the loading ramp/catch pen and construction of a spring development would be mitigated per stipulation III A. of the 2004 Programmatic Agreement.

New fence construction (electric, barbed-wire, or buck and pole in Lake Creek Allotment (Alts. 2 and 4) and Summit Prairie Allotment (Alts 2, 3 & 4) are being proposed along with the construction of small willow (buck and pole or wire) exclosures and cages under Alternative 4 in the Summit Prairie Allotment. The conversion of 0.3 miles of electric fence to a permanent let-down fence is also being proposed in the Logan Valley Allotment under Alternatives 2, 3 and 4. Fence removal in the Logan Valley, McCoy Creek and Summit Prairie Allotments is proposed under Alternatives 2, 3, and 4. These activities would have no or minimal effects to heritage resources.

Under all alternatives, permit renewal provides for continued monitoring of grazing practices, archaeological review of proposed range projects, and inspections of known or newly identified cultural properties in the allotment. The results of this work would trigger adjustments in management practices (as appropriate) to ensure that cultural resources are considered. In the event that cultural properties could not be avoided or protected, appropriate mitigation measures would be undertaken through consultation with the SHPO for the affected cultural resource property. Vegetation that has been completely utilized by livestock is an indicator of the surface condition and integrity of archaeological sites. Where the basal condition of the grasses is intact and protecting the soil integrity, cultural materials are not as likely to be disturbed.

Specific direction concerning continued management of existing developments or activities where known cultural sites occur and are monitored would be addressed in annual operating plans.

Although these alternatives would not prevent continuation of traditional practices, impacts to tribal traditional use areas would continue at existing levels if the alternatives did not contain the adaptive management options. Livestock would continue to have direct impacts to riparian plants such as chokecherry, willow and red-osier dogwood that are used by local tribes. Other

plants such as camas, biscuit-root, bitterroot, onion, current, lomatium, yarrow, sagebrush and juniper would not be impacted directly by livestock grazing.

Under the three action alternatives, proposed improvements and adaptive management strategies have been proposed that would benefit cultural plants, both upland and riparian. These adaptive management strategies include scheduling rest or additional rest within riparian pastures and recovery units, changing the allowable use levels, and installing fences to protect sensitive areas (i.e. fen area and streams). The effects of implementing the proposed improvement options/adaptive management strategies to cultural resources and tribal traditional use areas for the gathering of cultural plants (i.e. construction of fences) would be minimal because these site specific projects would be mitigated through requirements of the 2004 Programmatic Agreement with Oregon SHPO.

Cumulative Effects for All Alternatives

Past and future forest management projects have the potential to impact cultural resources within the project area. These projects can cause surface disturbance that affect the integrity of historical structures and prehistoric sites. Implementation of the design criteria with all three action alternatives should prevent, or at least reduce, impacts that are currently affecting archaeological sites within the allotments. However, the cumulative effects of natural elements, logging, road building, grazing, surface collecting and/or illegal digging, and natural fuels reduction projects could still be reflected in these sites.

Typical vegetation management activities, such as timber harvest, thinning, fuels management, and vegetation reduction, as well as other activities, such as fence repair, culvert replacement and stock water enhancement, would occur over the next ten years. Prior to implementation of any of these projects a cultural resource survey and report would have to be completed and would meet the requirements for the Section 106 consultation process. All projects are designed to avoid adverse effects to cultural and historic properties. Also, potential impacts that cultural properties might incur from foreseeable future actions, such as pre-commercial thinning and hazard tree removal would be mitigated per stipulation III A. of the 2004 Programmatic Agreement.

Under the No Grazing alternative, grazing would not contribute to the cumulative effects to cultural resources taking place in the project area. It is possible that additional effects from wild fire could occur when cattle do not annually reduce fine fuels, but if this contributed to a return to historic fire regimes it may actually reduce the long term effects on sites.

Impacts to tribal traditional use areas would be cumulative with past and future management of the vegetation. Future fuels/vegetation projects would have beneficial impacts to tribal use of the area because the proposed activities are usually designed to have beneficial impacts to vegetation in the long term.

Consistency with Direction and Regulations

Heritage and Tribal interests are regulated by federal laws that direct and guide the Forest Service in identifying, evaluating and protecting heritage resources. All of the alternatives would comply with federal laws. The Malheur National Forest Plan tiers to these laws, therefore the proposed action alternatives would meet Forest Plan Standards. With the completion of the Heritage inventory under the terms of the 2004 PA with Oregon SHPO, the Grazing Allotment Review Strategy for Section 106 Compliance, which implements the Regional Forester policy

letter of May 19, 2006, "Grazing Permit Reauthorization and National Historic Preservation Act" (Goodman 2006), and by providing the interdisciplinary team with appropriate input as per NEPA, all relevant laws and regulations have been met.

Irreversible and Irretrievable Commitments

There are no irreversible and irretrievable commitments of resources that may result from the alternatives with respect to cultural resources. Ground disturbing management activities within each allotment would avoid all NRHP eligible and potentially eligible (unevaluated) cultural properties.

Social and Economics

Introduction

This is a summary of the Social and Economic report that provides an overview of the current social and economic conditions found in the assessment area to provide the context of the effects analysis that addresses the purpose and need and the issues discussed in Chapter 1. The full Socail and Economic report can be found in Appendix F which is available for review by request.

Regulatory Framework

The Malheur Forest Plan includes forest-wide management goals to:

- Contribute to the social/economic health of communities, which are significantly affected by national forest management (IV-3, #42).
- Provide an economic return to the public.
- Forest Service policy sets a minimum level of financial analysis for project planning (FSH 1909.17).
- Contribute to the economic and social well-being of people by providing opportunities for economic diversity and by promoting stability for communities that depend on range resources for their livelihood (FSM 2202.1(4)).

The Code of Federal Regulations (CFR) is a codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the Federal Government. Minimum specific management requirements are identified in 36 CFR 219.27, to accomplish goals and objectives for the National Forest System.

- The National Environmental Policy Act requires integrated use of the natural and social sciences in all planning and decision-making that affects the human environment. The human environment includes the natural and physical environment, and the relationship of people to the environment (40 CFR 1508.14).
- Title 40, Code of Federal Regulations for NEPA (40CFR 1502.23) addresses non-commodity values, stating "For the purposes of complying with the Act, the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis, and should not be, when there are qualitative considerations."
- 36 CFR 219.3 – National Forest System Land and Management Planning

- Executive Order 12898 (February 11, 1994) on Environmental Justice directs federal agencies to identify and address agency programs that may have a disproportionately high and adverse environmental effects on minority populations, low-income populations, or Indian tribes. The order directs federal agencies to focus attention on the human health and environment effects to ethnic minorities (American Indians, Hispanics, African Americans, and Asian and Pacific-Islander Americans), disabled people, and low-income groups.

Analysis Methods

The economic analysis focuses on two key indicators of change by alternative: 1) Forage Available for Livestock, 2) Costs of Improvements.

Affected Environment

Changes in levels of grazing use associated with the Summit Logan Valley Grazing Authorization Project Management Plan may affect the major social and economic characteristics of the surrounding geographic area. The affected area or impact zone for the Malheur National Forest consists of Grant, Harney and Baker counties in Oregon. Agriculture (particularly forage resource products) is an important source of employment and income in this region. Grant County has a low level of economic diversity, a high dependence on federal forage, and a low resiliency for change. Reliance on forage from federal lands is moderate to high in counties in the impact zone (Kohrman 2003). The rate of conversion from wildland range to other uses has been less than 1% total between 1986 and 2001 (USDA Forest Service & ODF 2004).

Many communities are closely tied to the forest in both work activities and recreation. The local communities within an hour or two drive that are anticipated to be directly or indirectly affected by the proposed action, alternatives, and their associated economics include: Prairie City (population 1,080), Burns/Hines (4,565), Dayville (140), John Day/Canyon City (2,740), Long Creek (260), Mount Vernon (650), Monument (150), Seneca (230), Sumpter (175), and Unity (145). Larger towns and cities two or more hours away from John Day include: Baker City (10,160), LaGrande (12,795), Ontario (10,680), Bend (52,029), and Pendleton (16,915). The nearest metropolitan areas are the Tri-Cities area of Kennewick, Pasco, and Richland in Washington State, and Boise, Idaho. Most of the permittees live in the listed local communities.

Ranching has played a defining role in the establishment of the western United States. Many public land permittees consider the ranching way of life vital to maintaining traditional values and their cultural heritage. This unique lifestyle had endured and evolved throughout generations. Commitment to remaining in the local communities is very strong. (USDA Forest Service RMRS-GTR-113.2003).

Nationally, regionally, and locally, the social values and demands are changing on the national forests. A recent national survey has shown there is wide support for management of public lands to provide a diversity of uses, including grazing (Shields et al., 2002). However, the same study shows the importance to manage forest and grasslands to provide different types of recreational opportunities, including preserving the ability to have a “wilderness experience”. The *Draft Current Management Situation Report* for the Blue Mountains forest plan revision also discusses changing social values (Revision Team, 2004). There is also a growing dichotomy between rural and urban Oregon (Kaylor, 2003).

Economics

Financial institutions and the Internal Revenue Service have recognized the economic value of federal grazing permits and long-term permittees have been able to capitalize this permit as part of total ranch value for loans and property sales. However, the Forest Service does not recognize the permit as having additive financial value to an individual's property because there is no guarantee that the permit would remain with current permittee in perpetuity and that the sale of the property would automatically give the permit to the new owner. Therefore the Forest Service recognizes grazing permits as a privilege and not a right.

A grazing program on portions of the Malheur National Forest has been around since the establishment of the forest as part of the Blue Mountain Forest Reserve in 1906 and as a separate unit in 1908 (Mosgrove, 1980). The cattle ranching business has been an economic mainstay in Grant County along with the forest products industry and government jobs.

Recent Forest Service range management practices, policies and procedures require more active involvement by the permittees in the form of planning participation, multiple resource management, monitoring active livestock management and cost-share of rangeland improvement projects. A special report published in 1992 by the Oregon State University Extension Service concluded that: "changes in federal grazing policies and regulations may have led to relative asset devaluation in the federal land dependent sector of the western livestock industry in Eastern Oregon" (Obermiller, 1992).

The same study found that although grazing fees on private land are considerably higher than Forest Service land, overall grazing costs are much higher on Forest Service land. The increased expense associated with grazing on public land was attributed to: the cost of taking animals on and off of federal land, livestock management, maintenance of range improvements and higher death loss (Obermiller, 1992).

The economics of the grazing program has evolved over time. Currently, stock animals, mainly cattle, spend the winter and early spring months on lower elevation private lands where they can be fed stored hay. In Grant County, the land is usually located along the John Day River and its tributaries. Most of these lands are in the ownership of the permittees. The animals are moved to higher elevation private lands and public lands as these lands become range ready in the spring. It is necessary for the cattle to be moved off their winter pastures so these private lands can be irrigated for hay production then stored for the upcoming winter.

This system of moving cattle to other pastures in the spring through fall maximizes the use of prime agricultural lands for hay production. The longer cattle are kept off these lands, the greater the opportunity to produce two or more hay crops. The more herbage produced, the more cattle can be held over the winter, and the rancher/permittee is better able to time the selling of their stock to take advantage of market prices. Through history the beef market has been very volatile, with great highs and lows in the domestic market.

In the current livestock management systems, most calving is done early. Most of the calves are born between October and February. This allows the calves to be born near ranches where they can be watched and the birth assisted when necessary by the ranchers thus reducing mortality rates. The calves develop to a size by mid-spring to where they can be safely moved to new pasturage and are large enough to be protected from most predators.

Lands within the planning area generally became ready for livestock use in mid-May or early

June depending on the weather, aspect, and amount of snow pack. The cattle remain until late summer or until the end of October depending on when use criteria (triggers) are met or when the permitted grazing season ends. Annual adjustments in the timing, intensity or duration of livestock grazing may be necessary if resource conditions are not trending towards or achieving objectives. Flexibility is needed to address resource concerns. Thus, herd numbers may change up or down, and pastures may be rested in the following year. Wildfires and prescribed fires may cause portions of allotments to be rested for a period of time. Therefore, when mitigating for ecological concerns, there are both direct and indirect economic impacts to the permittees and the local economies. Economic impacts would have a social impact to rural life styles.

If either the BLM or the FS were to reduce their role in this grazing system, the permittee would need to find other private or public lands to hold their cattle while forage is being grown, or they would need to reduce their total livestock numbers. Buying and shipping forage from outside sources is not considered economical because of the costs. In many cases, reductions in total livestock numbers would also make some family-owned businesses uneconomical.

Economic strains intensify as operational costs increase without associated increases in the prices received for livestock products. The average 300 cow/calf operation in the western United States typically yields a two percent investment return. This return is often too low to support a ranching family. Under these conditions, many family members must seek employment outside of the ranch to make ends meet (Knight et al. 2002).

Employment

Cattle production and forest products provide a portion of the core employment for Grant and Harney counties. Most of the ranches are family run businesses and not corporate owned. In 2006 13% of the total employment in Grant County was in farm and agricultural services. Local government, retail trade, and services employ the most people in Grant and Harney counties (Kohrman 2003, The Wilderness Society 2004).

Ranchers in Baker, Grant and Harney counties, with federal permits in the analysis area, are highly dependent on forage from federally managed lands, compared to other counties in the region. The value of cattle reared on forage from federally managed lands represents more than 10% of total agricultural sales in Baker, Grant and Harney counties (Haynes & Horne, 1997). Shifts in permitted use of federal grazing allotments change the availability of this forage source. The impact these shifts have on the local economy varies according to the adjustments that local ranchers have to make within their ranching operation.

Recreation-based industries, while prevalent elsewhere in the region, have not been a major contributor to the local economies. Recent efforts indicate that the volume of business is only enough to supplement income, rather than provide a primary source of income (Kohrman 2003). The exception is hunting season, which typically draws larger numbers of people into the area. Stores that sell sporting goods benefit during this period. Recreation-based employment is seasonal and service-oriented, with wages at the lower end of the pay scale (Kohrman 2003). Economic activity based on recreation may have limited growth potential for communities in the area (Kline, 2001). Seasonal limitations, the dispersed nature of recreation within the counties, along with a general lack of large, water-based recreational opportunities, does not create the concentrated numbers of recreationists and readily-identifiable recreation destinations necessary to support many recreation industries (Kohrman 2003). Recreation based industry had a small

increase in Grant County between 1990 and 2000 (The Wilderness Society 2004).

Historically, government employment and expenditures has provided a degree of stability in rural communities (Kohrman 2003). With reduced Forest Service budgets and work force, and a switch to management emphasis that produces generally lower amounts and value of commodity products, federal workforce and program expenditures has not buffered economic downturns as in the past (Oregon Department of Employment, 2001). This situation, combined with fluctuations in the other base industries, has had a significant effect on the economy (Kohrman 2003).

The communities surrounding the Summit Logan Valley Grazing Authorization Project area have a disproportionately high unemployment compared with the Oregon State average of 9.6 percent. Unemployment in Baker County for January 2012 was 12.8%, Grant County – 17.5%, and Harney County – 15.9%. (From Northwest Area Foundation (NAF) Website/ http://www.indicators.nwaf.org)

Average Wages

Average annual pay per job provides an indication of the wage contribution of jobs in the analysis area. Average income for the affected counties is below the national and state averages: United States $45,000, Oregon $43,500, Baker County $31,700, Grant County $32,500, Harney County $31,700. (Northwest Area Foundation Website) Wages in Grant and Harney counties are lower, primarily due to lower wage rates per hour and a larger number of part-time jobs, compared to the state as a whole (Kohrman 2003).

Environmental Consequences

Alternative 1 - No Grazing

Direct and Indirect Effects

Economics

Alternative 1 would eliminate authorized livestock use within the planning area, thus possibly affecting the economic viability of the associated permittees' operations (magnitude) depending on the minimum number of AUMs necessary for the permittees to remain in business.

Eliminating cattle from the allotments could affect the economic viability of the livestock operations for the permittees due to the cumulative costs associated with securing additional range or buying supplemental feed to accommodate herd sizes consistent with current permitted numbers, fencing and establishing water on the additional range, increased trucking costs, and labor costs associated with moving cattle. The intensity of the effects would depend upon the available options for the permittee; access and availability of private land, availability of forage and the costs associated with those options. Additionally, the intensity of the effects would also depend of the size of their total operations, debt structure, business goals and objectives and the market for cattle.

Alternative 1 would prohibit approximately 680 cow/calf pair from the current AUMS (3,945). The three term grazing permits associated with this allotment would be cancelled. Permittees may choose to graze the displaced livestock on their own properties if there was a large enough land base or they may have to find an alternative source for pasture lands. In Grant, Harney and Baker Counties, available pasture for grazing is limited to dispersed blocks of pasture at

approximately $10 to $20 per head month with availability depending on the season. Based on the lack of the summer rangeland and the overall shortage within the zone of influence (Grant, Harney and Baker Counties), operational costs would dramatically increase for the permittees. Costs associated with transportation and travel would increase operational costs.

The permittee may attempt to maintain their current livestock herds even if they lose their permit to graze livestock within the planning area. This may result in adverse environmental effects on adjacent privately owned lands. Or the permittee may choose to reduce the heard size which may adversely affect the permittee operations.

If selected, Alternative 1 would result in abandonment of all infrastructures in place. The investments made to date into internal pasture fences, allotment boundary fences, spring developments and other structures owned by the government would be lost. If subsequent decision is made to retain any of these improvements, funding would need to be secured for their maintenance or adjacent permittees would be reassigned maintenance responsibility. Assigning maintenance responsibility to adjacent permittee would in turn increase their operational costs.

However, Alternative 1 would eliminates all permittee costs associated with the allotment. In addition, a fair market appraisal of improvements may be necessary to determine appropriate compensation for investments made on the allotments by the current permittees. The magnitude of the direct effects of this alternative is considered to be the three ranching operations currently holding permits for the allotments under consideration and the Government.

No grazing fees would be collected from domestic livestock grazing in the project area under Alternative 1, therefore the Malheur National Forest would not receive this portion of the grazing fees collected annually, for on the ground range improvements (range betterment funds). Neither would they be needed. These funds would not be available to assist the local economy by purchase of materials for construction of improvements locally or hire local seasonal workers to complete projects on the Forest.

Employment

Grazing reductions (AUMs) could affect employment and income in several ways: (1) direct effects attributable to employment associated with the ranches, (2) indirect effects attributable to industries that supply materials, equipment, and services to the ranches, and (3) induced effects attributable to personal spending by the ranch owners, employees, families, and related industries (direct, indirect, and induced effects as defined above constitute the magnitude or area of the effect). A reduction of this magnitude in the number of authorized Animal Unit Months (AUMs) would be expected to affect the associated ranches' capacity as these grazing permits may provide for 50 to 100 percent of the ranches' summer forage.

Selection of this alternative would have an adverse effect upon the permittees and their employees. All these livestock operations are family businesses, with the exception of one. As many as 6 families (permit holders and employees) would potentially be affected by this alternative. This translates to the alternative affecting approximately 18 people. Permit holders would struggle to find comparable grazing opportunities within the proximity to their home ranches, due to the high demand and high cost for grazing lands in Grant, Harney and Baker counties.

Average Wages

This alternative would have no impact on the average wages for zone of influence.

Cumulative Effects

If Alternative 1, No Grazing, were selected there would be a cumulative economic and social effect. As the Malheur National Forest and other national forests in the Pacific Northwest Region (Oregon and Washington) prepare more allotment management plans, it is anticipated the overall amount of cattle utilizing National Forest System lands may be reduced. As family ranching becomes less profitable, the number of people employed in and enjoying this life-style would decline locally, regionally, and nationally, potentially creating a social minority group.

As agricultural lands are lost to development, communities bear higher costs. Privately owned and managed agricultural land generates more in local tax revenues than it costs in services. Carefully examining local budgets in cost of community services (COCS) studies shows that nationwide farm, forest and open lands more than pay for the municipal services they require, while taxes on residential uses consistently fail to cover costs. (Freegood, AFT, 2002).

Alternative 2 - Proposed Action

Direct and Indirect Effects

Lake Creek Allotment

- Lake Creek Allotment boundary fence change requires 2.5 miles of fence construction at $27,000.00 per mile for a total of $67,500.00.

Total cost for structural improvements on this allotment under this alternative is **$67,500**

Logan Valley Allotment

- Removal of 2.3 miles of fence (@ $3,000/mile) $6,900.
- Construction 2.5 miles of fence (@ $27,000/mile) per mile for total $67,500

Total cost for structural improvements on this allotment under this alternative is **$74,400.**

McCoy Creek Allotment

- Removal of 1 mile of fence at $3,000.

Total cost for this allotment under this alternative is **$3,000.**

Summit Prairie Allotment

- Removal of .7 miles of fence at $2,100.
- Construction 7 miles of fence (to include Bosenberg) at $27,000 per mile for a total of $189,000.
- Upland water sources (springs and troughs) 4 at $7,000 each for a total of $28,000.
- 1 catchpen and loading ramp @ $5,000.

Total cost for structural improvements on this allotment under this alternative is **$224,100.**

The total cost associated with structural improvements with the implementation of Alternative 2 would be **$593,100.**

Routine maintenance and deferred replacement costs are not factored into this analysis and should be considered as common to the action alternatives, however annual maintenance costs would increase with the addition of structural improvements. Implementation costs associated

with structural improvements and livestock management are increasing. Operational costs are increasing. Depending on the year, permittees may need to increase their active livestock management efforts and distribution techniques in order to meet utilization standards.

The Malheur National Forest would continue to receive one quarter of the grazing fees collected annually, for on the ground range improvements. Materials for construction of improvements would be purchased locally and local seasonal workers are hired to complete projects on the Forest, assisting the local economy.

This alternative meets Forest Plan goals and objectives to contribute to the social and economic health of communities which are significantly affected by National Forest management.

Alternative 3

Direct and Indirect Effects

Lake Creek Allotment

The entire allotment would remain vacant with no authorized grazing and no change in the allotment boundary. There would be no new costs associated with this alternative.

Logan Valley Allotment

- Removal of 1.5 miles of fence at $3,000.00 per mile for a total of $4,500.00.
- Construction of .3 miles of fence $8,100.

Total cost for this allotment and this alternative is **$12,600.**

McCoy Creek Allotment

- Removal of 1 mile of fence at $3,000.

Total cost for this allotment and this alternative is **$3,000.**

Summit Prairie Allotment

- Creation of riparian pastures in the existing Little Logan Pasture would require 7.3 miles of fence (@ $27,000/miles) for a total of $197,100.
- Removal of .7 miles of fence to absorb a portion of Logan Valley Allotment (@ $3,000/ mile) for a total of $2,100.
- Creation of an exclosure and riparian pasture in existing Sagehen Pasture would require 4 miles of fence, a cost of $108,000.00.
- Creation of riparian pasture in North Summit would require construction of .8 miles of fence for $21,600.
- 1 catchpen and loading ramp for $5,000.

Total cost for this allotment and this alternative is **$333,800**.

The total cost associated with structural improvements with the implementation of Alternative 3 would be **$349,400.**

Implementation costs associated with the construction of structural improvements for more intense livestock management are increasing. Operational costs (livestock management) may see a decrease if the improvements alone are effective in their purpose.

Routine maintenance and deferred replacement costs are not factored into this analysis and should be considered as common to the action alternative, however annual maintenance costs would increase with the addition of structural improvements.

The Malheur National Forest would continue to receive one quarter of the grazing fees collected annually, for on the ground range improvements. Materials for construction of improvements would be purchased locally and local seasonal workers are hired to complete projects on the Forest, assisting the local economy.

This alternative meets Forest Plan goals and objectives to contribute to the social and economic health of communities which are considerably affected by National Forest management.

Alternative 4

Direct and Indirect Effects

Lake Creek Allotment

- Lake Creek allotment boundary fence change requires 2.5 miles of fence construction at $27,000 per mile for a total of **$67,500.**

Logan Valley Allotment

- Removal of 1.5 miles of fence at $3,000 per mile for a total of $4,500.
- Construction of 2.8 miles of fence for $75,600.

Total cost for this allotment and this alternative is **$80,100**

McCoy Creek Allotment

- Removal of 1 mile of fence at $3,000.

Total cost for this allotment and this alternative is **$3,000.**

Summit Prairie Allotment

- New Prairie Riparian fence construction for 3.1 miles for $83,700.
- Removal of .7 miles of fence at $3,000 per mile for a total of $2,100.
- 1 catchpen and loading ramp for $5,000.
- Construction of combination buck & pole and wire cages along portions (10%) of Summit Creek (1.2 mi @27,000 x 2) $64,800.

Total cost for this allotment under this alternative is **$155,600**

The total cost associated with structural improvements with the implementation of Alternative 4 would be **$306,200**

Routine maintenance and deferred replacement costs are not factored into this analysis and should be considered as common to the action alternatives, however annual maintenance costs would increase with the addition of structural improvements. Implementation costs associated with the construction of structural improvements for more efficient livestock management are increasing. Operational costs would increase with daily riding requirement.

The Malheur National Forest would continue to receive one quarter of the grazing fees collected annually, for on the ground range improvements. Materials for construction of improvements

would be purchased locally and local seasonal workers are hired to complete projects on the Forest, assisting the local economy.

This alternative meets Forest Plan goals and objectives to contribute to the social and economic health of communities which are significantly affected by National Forest management.

Cumulative Effects for All Action Alternatives

Recent Forest Service range management practices, policies and procedures require more active involvement by the permittees in the form of planning participation, multiple resource management, monitoring, active livestock management and cost-share of rangeland improvement projects. A special report published in 1992 by the Oregon State University Extension Service concluded that: "changes in federal grazing policies and regulations may have led to relative asset devaluation in the federal land dependent sector of the western livestock industry in Eastern Oregon" (Obermiller, 1992).

All the action alternatives would add to the permittee cost of doing bussiness, including implementation and operational. Fences and other improvements from the 2011 signed Decision Memo's (see Chapter 1 for further detail) would further contribute to costs. Cumultively this could effect the viability of the permittees' operations.

These alternatives could have some minimal cumulative effects on social and economic resources. It is difficult to project what the cumulative effects would be since it is unknown how the permittees would adjust to the new requirements.

Consistency with Direction and Regulations

Executive Order 12898 on environmental justice requires federal agencies to identify and address any disproportionately high and adverse human health or environmental effects on minority and low-income populations.

The population of the area is predominately white (96% Grant County, 92% Harney County). The region is sparsely populated, and contains low populations of minorities (4% of the Grant County population, 8% of Harney County). The largest component in this group is Native American. The primary American Indian tribes involved are the Burns Paiute, Umatilla, and Warm Springs. The Warm Springs has purchased lands adjacent the Summit Logan Valley Grazing Authorization Project area. Virtually the entire Summit Logan Valley Grazing Authorization Project area falls within the ceded lands of the Confederated Tribes of the Warm Springs. Under the terms of the Treaty of 1855, the Confederated Tribes reserve the rights to hunt, fish, gather plant crops, and pasture livestock within these ceded lands. These reserved treaty rights are important in the maintenance of traditional economic strategies (Treaty with the Tribes of Middle Oregon).

Poverty rates provide some indication of the percentage of the population in surrounding communities with low-incomes. Poverty rates for both Grant and Harney counties are 16% and 14% respectively. The Oregon statewide average rate of persons living below poverty is 13% (NAF).

Data regarding minorities or people with disabilities employed in the region in the timber, mining, ranching, road construction, forestry services, and recreation sectors is unavailable. Some firms contracted by the Forest Service for reforestation work have traditionally hired Hispanic workers that comprise a migratory workforce in the area. Asian and Pacific Islanders

uses of the area include commercial mushroom harvesting and developed camping associated with this activity. Some contracts are reserved for award to minority businesses under the USDA Office of Small and Disadvantaged Business Utilization and the Small Business Administration, although overall contract amounts to these groups has declined since 1998 (Kohrman 2003).

Irreversible and Irretrievable Commitments

Selection of any alternative is not anticipated to result in adverse or disproportionate effect upon, nor displacement of minorities, or increases in taxes that would constitute an economic hardship. There would be no negative effects on public health.

Wildlife

Introduction

This is a summary of the Biological Evaluation (BE) and Wildlife Specialist Report that evaluates the potential effects of livestock grazing on wildlife species and their associated habitat within the Summit Logan Valley Grazing Authorization Project. The full Biological Evaluation and Wildlfe Specialist Report can be found in Appendix F which is available for review by request.

Regulatory Framework

National Forest Management Act (NFMA)

NFMA requires the Forest Service to manage fish and wildlife habitat to maintain viable populations of all native and desirable non-native wildlife species and conserve all listed threatened or endangered species populations (36CFR219.19).

Endangered Species Act (ESA)

ESA requires the Forest Service to manage for the recovery of threatened and endangered species and the ecosystem upon which they depend. Forests are required to consult with US Fish and Wildlife Service if a proposed activity may affect the population or habitat of listed species.

Migratory Bird Treaty Act (MBTA)

MBTA established an international framework for the protection and conversation of migratory birds. This Act makes it illegal, unless permitted by regulations to “pursue, hunt, take, capture, purchase, deliver for shipment, ship, cause to be carried by any mean whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird…”.

Malheur National Forest Land and Resource Management Plan

The principle policy document relevant to wildlife management on the Forest is the 1990 Malheur National Forest Land and Resource Management Plan, referred to as the Forest Plan for the remainder of this section. The Forest Plan provides standards and guidelines for management of wildlife species and habitats. Standards and guidelines are presented at the Forest level (LRMP, pp. IV-26 to IV-33) or Management Area level (LRMP pp. IV-50, IV-53, IV-56 to IV-57, IV-105 to IV-107, and IV-108).

Additional management direction is provided for conservation of migratory landbirds. This direction is consolidated in the Forest Service Landbird Strategic Plan and further developed through the Partners in Flight Program. The Oregon-Washington Partners in Flight Conservation Strategy for Landbirds in the Northern Rocky Mountains of Eastern Oregon and Washington (Altman 2000) identifies priority bird species and habitats for the Blue Mountains in Oregon.

Analysis Methods

Effects on wildlife species and habitat were assessed within National Forest System lands in the Summit Logan Valley Grazing Authorization Project area, focusing on implementation of actions described within each alternative, as well as effects of adaptive management. Some wildlife habitats require a detailed analysis and discussion to determine potential effects on a particular species. Other habitats may either not be impacted or are impacted at a level which does not influence the species or their occurrence.

Effects were analyzed within the context of the project area (40,279 acres), unless otherwise noted. For MIS primary cavity excavators the effects boundary was expanded to include adjacent subwatersheds in order to discuss nearby post-fire habitat. For wide-ranging carnivores such as the gray wolf and wolverine, the effects boundary was expanded to include discussion of remote habitat such as the Strawberry Mountain and Monument Rock Wilderness areas, the Vinegar Hill-Indian Rock Scenic Area and several roadless areas on the Forest. Cumulative effects were analyzed with respect to past, ongoing and foreseeable future activities listed in Appendix C.

Species presence/absence determinations were based on habitat presence, review of recorded wildlife sightings in District and Forest wildlife databases, the National Resources Information System (NRIS) Wildlife database, non-Forest Service databases, Oregon Department of Fish and Wildlife reports, as well as notes, maps, and summary reports of wildlife observations made during field reconnaissance for several smaller projects in the area in 2011, with some follow-up visits early spring 2012.

The Regional Forester's Sensitive Species List, December 2011, was used to determine TES wildlife species discussed in this document. Conservation status, trends, and source habitats for these and other species were obtained from the Oregon Biodiversity Information Center "Rare, Threatened and Endangered Species of Oregon" (October 2010), NatureServe Explorer (accessed 2012), USFWS Birds of Conservation Concern (2008), and viability assessments for the Blue Mountain Forest Plan Revision (USFS, draft 2011).

Elk management objectives (MOs) and estimated population levels were obtained from Oregon Department of Fish and Wildlife offices in Hines and John Day, Oregon.

Old growth habitat was determined using the Forest's old growth GIS map layer, and management activity layers. Aspen habitat was determined using the Forest's existing vegetation and hardwood GIS map layer.

Landbirds, including neotropical migratory birds (NTMB), were analyzed based on priority habitats identified in the Oregon-Washington Chapter of Partners in Flight, Northern Rocky Mountains Bird Conservation Plan (Altman 2000). Species lists of birds seen or heard in Logan Valley were obtained from District records as well as local birding groups (Grant County Bird Club).

The duration of effects on the wildlife resource is described according to the following terms and definitions:

- Immediate – Approximately one growing season or several months or less
- Short-term – 0 to 5 years
- Mid-term – 5 to 25 years
- Long-term – 25+ years

Rather than addressing all wildlife species, the Forest Plan focuses on three categories of wildlife: threatened, endangered, and sensitive (TES) species, management indicator species (MIS), and featured species. In addition, interest has been raised for landbirds including neotropical migratory birds. Categories and wildlife species are summarized below:

- Threatened, Endangered and Sensitive Species: This analysis uses the December 2011 Regional Forester's Sensitive Species List
- Management Indicator Species: Rocky Mountain elk represent a big game species. American (pine) marten, pileated woodpecker, and northern three-toed woodpecker represent old growth habitats. Primary cavity excavators (most woodpeckers) represent dead wood habitat. Effects to MIS species are discussed in the Big Game Habitat, Old Growth Forest, and Primary Cavity Excavator sections respectively.
- Featured Species: The featured species associated with the project area are northern goshawk, blue grouse, osprey, and pronghorn antelope. Effects are discussed in the Featured Species section. Upland sandpiper and sage grouse are both sensitive and featured species, and are addressed in the TES section. In addition, due to their influence on riparian habitat, beaver will also be discussed.
- Landbirds including Neotropical Migratory Birds: These species and associated habitats are discussed in the Landbirds including Neotropical Migratory Birds section.

Affected Environment

Threatened, Endangered and Sensitive Wildlife Species

Table W-1 describes the TES wildlife species that have suitable habitat within or near the project area. There is no suitable habitat present for American peregrine falcon (*Falco peregrinus anatum*), pygmy rabbit (*Brachylagus idahoensis*), tricolored blackbird (*Agelaius tricolor*), bufflehead (*Bucephala albeola*), or Wallowa rosy finch (*Leucosticte tephrocotis wallowa)*. These species will not be discussed.

There is no designated or proposed critical habitat for Canada lynx in the affected subwatersheds. Based on the National Lynx Survey, the Malheur National Forest falls under the designation of "Unoccupied Mapped Lynx Habitat" (USFWS Memo, 2006). Consequently, there is No Effect (NE) to Canada lynx.

Table W-1: Threatened, Endangered and Sensitive Wildlife Species Summary

Terrestrial Species	Status	Species Occurrence	Effects Determination[16]			
			Alt 1	Alt 2	Alt 3	Alt 4
Canada Lynx *Lynx canadensis*	T	HN/N	NE	NE	NE	NE

[16] See Environmental Consequences section for further discussion on Effects Determination for threatened, endangered and sensitive wildlife species.

Terrestrial Species	Status	Species Occurrence	Effects Determination[16]			
			Alt 1	Alt 2	Alt 3	Alt 4
Gray Wolf *Canis lupus* East of Hwy 395	S	HD/S	NI	NI	NI	NI
Bald Eagle *Hailaeetus leucocephalus*	S	HD/S	NI	NI	NI	NI
American Peregrine Falcon *Falco perigrinus anatum*	S	HN/N	NI	NI	NI	NI
California Wolverine *Gulo gulo luteus*	S	HD/S	NI	NI	NI	NI
Pygmy Rabbit *Brachylagus idahoensis*	S	HN/N	NI	NI	NI	NI
Greater Sage-Grouse *Centrocercus urophasianus phaios*	S	HD/D	NI	MIIH	MIIH	MIIH
Silver-bordered Fritillary *Boloria selene*	S	HD/S	NI	MIIH	MIIH	MIIH
Wallowa Rosy Finch *Leucosticte tephrocotis wallowa*	S	HN/N	NI	NI	NI	NI
Bobolink *Dolichonyx oryzivorus*	S	HD/S	NI	MIIH	MIIH	MIIH
Grasshopper Sparrow *Ammodramus savannarum*	S	HD/S	NI	MIIH	MIIH	MIIH
Upland Sandpiper *Bartramia longicauda*	S	HD/D	NI	NI	NI	NI
Tricolored Blackbird *Agelaius tricolor*	S	HN/N	NI	NI	NI	NI
Bufflehead *Bucephala albeola*	S	HN/N	NI	NI	NI	NI
Lewis's Woodpecker *Melanerpes lewis*	S	HD/D	NI	MIIH	MIIH	MIIH
White-headed Woodpecker *Picoides albolarvatus*	S	HD/D	NI	MIIH	MIIH	MIIH
Townsend's Big-Eared Bat *Corynorhinus townsendii*	S	HD/S	NI	MIIH	MIIH	MIIH
Pallid Bat *Antrozous pallidus*	S	HD/S	NI	MIIH	MIIH	MIIH
Fringed Myotis *Myotis thysanodes*	S	HD/S	NI	MIIH	MIIH	MIIH
Johnson's Hairstreak *Callophrys johnsoni*	S	HD/S	NI	NI	NI	NI
Columbia Clubtail *Gomphus lynnae*	S	HD/S	NI	MIIH	MIIH	MIIH
Columbia Spotted Frog *Rana luteiventris*	S	HD/D	See Aquatic Section	MIIH	MIIH	MIIH

Status

T	Federally Threatened
S	Sensitive species for Regional Forester's list

Occurrence

HD	**Habitat Documented** or suspected within project area or near enough to be impacted by project

	activities
HN	**Habitat Not** within the project area or affected by its activities
D	Species **Documented** in general vicinity of project activities
S	Species **Suspected** in general vicinity of project activities
N	Species **Not** documented and not suspected in general vicinity of project activities

Effects Determination

Threatened and Endangered Species

NE	No Effect

Sensitive Species

NI	No Impact
MIIH	May Impact Individuals or Habitat but Will Not Likely Contribute to a Trent Toward Federally Listing or Cause a Loss of Viability to the Population or Species
BI	Beneficial Impact

Management Indicator Species (MIS)

The National Forest Management Act directs National Forests to designate management indicator species and the Forest Service Manual Direction 2621.1 defines the criteria for selection of management indicator species. Management activities on the Forest that would affect MIS populations and habitat, would also affect populations of other species with similar habitat needs.

The Malheur National Forest Land and Resource Management Plan identifies twelve (12) management indicator species. In order to appropriately analyze potential project impacts to MIS, three habitat types were selected. Big Game Habitat, Old Growth Habitat, and Primary Excavator Habitat (standing dead and downed wood) are discussed.

Table W-2 describes the 12 management indicator species selected for the Malheur National Forest. The table also includes associated habitat requirements and whether habitat occurs within the project area.

Table W-2: Management Indicator Species Summary (Malheur National Forest)

MIS Species	Representing	Habitat Requirements	Habitat Present in Analysis Area
Elk	Commonly hunted Big-game Species	Forested Mountains and meadows with grasses and forbs	Yes, including known calving area within Logan Valley fen and vicinity
American (Pine) Marten	Old Growth	Mature, mesic coniferous forests, with high structural diversity in the under story	Higher elevation mixed conifer stands: designated old growth stands, replacement old growth stands, late and old structure on Lake Creek and Big Creek.
Pileated Woodpecker	Old Growth, Primary Cavity Nester, Snags and Down Wood	Extensive areas of dense coniferous forests with tall closed canopy, high basal area and large diameter snags	Yes, mixed conifer stands, drainages, designated old growth stands, replacement old growth stands, late and old structure on Lake Creek and Big Creek.
Three-toed Woodpecker	Old Growth, Primary Cavity Nester, Snags	Higher elevation (above 4,500ft) lodgepole pine and mixed conifer forests with a lodgepole	Yes, lodgepole pine habitat within the project area.

MIS Species	Representing	Habitat Requirements	Habitat Present in Analysis Area
	and Down Wood	component	
Lewis's Woodpecker	Primary Cavity Nester, Snags and Down Wood	Open forests and nests in large snags in cavities created by other cavity nesters or in very soft snags	Yes, have been documented nesting in aspen within the project area.
Red-naped Sapsucker*	Primary Cavity Nester, Snags and Down Wood	Associated with riparian habitats consisting of a mixture of grasses shrubs and hard woods	Yes, associated with aspen stands
Williamson's Sapsucker	Primary Cavity Nester, Snags and Down Wood	Mature higher-elevation coniferous forests for nesting and feeding	Yes, associated with aspen stands, associated with larger conifer.
Downy Woodpecker	Primary Cavity Nester, Snags and Down Wood	Associated with riparian habitats consisting of a mixture of grasses shrubs and hard woods	Yes, Big Creek, Lake Creek, portions of Summit Creek provide the most suitable habitat, as well as aspen habitat in riparian areas
Hairy Woodpecker	Primary Cavity Nester, Snags and Down Wood	Habitat generalists that prefer large trees	Yes
White-headed Woodpecker	Primary Cavity Nester, Snags and Down Wood	Open ponderosa pine forests with large trees and snags in large patches	Yes, dry forest, large tree and open-canopied habitat.
Black-backed Woodpecker	Primary Cavity Nester, Snags and Down Wood	Forests with dead, insect-infested trees associated with large-scale disturbances such as fire or wind throw	Yes, lodgepole pine habitat within the project area.
Northern Flicker	Primary Cavity Nester, Snags and Down Wood	Habitat generalists that prefer large trees stands near meadows	Yes

* Red-naped sapsuckers represent the east version of red-breasted and yellow-bellied sap suckers originally listed in the Forest Plan.

Featured Species

Featured species are those identified in the Malheur Forest Plan as wildlife species of high public interest or demand. The Forest Plan (IV-30 and IV-31) provides direction (standards 50-55) for the protection of habitat for these species.

Table W-3 lists the seven featured species currently on the Malheur National Forest. The table also includes what their habitat requirements are and whether or not their habitat occurs in or near the project area. There is no potential effect to bighorn sheep or their habitat from the proposed action. This species will not be discussed further. Sage grouse and upland sandpiper, both sensitive species, are addressed in the Threatened, Endangered, and Sensitive Wildlife Species section.

In addition to Featured Species listed within the Malheur Forest Plan, American beaver are discussed, in response to public interest and comments generated by the proposed action.

Table W-3: Featured Species Habitat

Featured Species	Habitat Requirements	Habitat Present In or near Analysis Area
Northern Goshawk	Mature, multi-storied ponderosa pine stands, or mixed conifer stands that are dominated by ponderosa pine	Yes, documented within or near vicinity of the project area
Blue Grouse	Clumps of mistletoe infected Douglas-fir on tops or upper slopes of ridges	Yes, upper elevations within project area
Sage Grouse	Open sagebrush plains from 4000-9000 ft in elevation.	Yes, incidental observations, Logan Valley. See TES section.
Osprey	Large dead trees suitable for nesting (30”dbh greater than60’ in height) adjacent to or near large rivers or lakes	Yes, active nests documented on Big Creek in Logan Valley, and near Summit Prairie
Pronghorn Antelope	Open grasslands, with low sagebrush being an important component	Yes, animals use area in vicinity of fen as fawning area; also observed along Summit Creek
California Bighorn Sheep	Alpine-desert grasslands associated with mountains, cliffs, foot-hills, and river canyons	No, the project area does not fall with suitable habitat for Bighorn sheep
Upland Sandpiper	Large open mountane meadows and grasslands	Yes, potential habitat; historically nested in project area. See TES section.
American Beaver*	Lower gradient perennial streams with riparian vegetation	Yes, present in several stream reaches

***** American beaver are discussed, in response to public interest and comments generated by the proposed action.

Landbirds including Neotropical Migratory Birds

Neotropical migratory birds (NTMB) breed in temperate North America and spend the winter primarily south of the United States-Mexico border. Of the 225 neotropical migrants that are known to occur in the western hemisphere, about 102 are known to breed in Oregon and about 82 are known to breed on the Malheur National Forest. They include a large group of species, including many raptors, cavity excavators, warblers and other songbirds, with diverse habitat needs spanning nearly all plant community types and successional stages. Long-term population data on many of these birds indicate downward population trends although not all species populations are declining (Sharp 1996, Saab and Rich 1997, Altman 2000, USFWS 2008). Habitat loss is considered the primary factor in decline of neotropical migratory birds.

In 2000, the Oregon-Washington Chapter of Partners in Flight published its Northern Rocky Mountains Bird Conservation Plan (Altman 2000, also referred to as the Plan). The Plan provides conservation recommendations for the various species of landbirds that occupy the Oregon and Washington portions of the Interior Columbia Basin. The Plan identified the following priority habitats for landbird conservation: old-growth dry forest, old-growth moist forest, riparian woodland and shrubland, and unique habitats including alpine and subalpine forests, shrub-steppe, montane meadow and aspen habitats. The Plan also identified burned old forest as a limited habitat due to fire suppression.

Table W-4 lists priority habitats within the Summit Logan Valley Grazing Authorization Project area which could be affected by project implementation. The table describes habitat type, habitat features, and associated focal species. Existing condition and effects discussions will focus on

changes to priority habitats rather than the individual species that use these habitats. Alpine, subalpine, mesic mixed conifer old growth, and post-fire habitats are either not in the project area, or are not affected by this project. Short-term, mid-term and long-term definitions are defined at the beginning of the wildlife specialist report.

Table W-4: Neotropical Migratory Birds – Priority Habitat Features & Associated Focal Landbirds Species within Project Area

Habitat Type	Habitat Feature/Conservation Focus	Focal Species	Potential Grazing Effects
Dry Forest Old Forest	Large patches of old forest with large trees and snags	White-headed woodpecker	No impacts for conifer habitat impacts, associated with aspen habitat
	Old forest with interspersion of grassy openings and dense thickets	Flammulated Owl	Yes
	Open understory with regenerating pines	Chipping sparrow	Yes
	Patches of burned old forest	Lewis' woodpecker	No impacts to confier habitat, impacts associated with aspen habitat
Mesic Mixed Conifer Old Forest	Large snags	Vaux's swift	No
	Overstory canopy closure	Townsend's warbler	No
	Structurally diverse; multi-layered	Varied thrush	No
	Dense shrub layer in forest openings and understory	McGillivray's warbler	Yes
	Edges and openings created by wildfire	Olive-sided flycatcher	No
Montane Meadow	Wet or dry open tracts of short grasslands	Upland sandpiper	No impacts for upland sandpiper, contigent on monitoring (see Design Elements)
Shrub Steppe	Juniper, sage brush with small openings	Vesper sparrow	Yes
Riparian Shrub	Willow/alder shrub patches	Willow flycatcher	Yes
Aspen	Aspen stands	Red-naped sapsucker	Yes

Many of the avian species/habitats identified in the Northern Rocky Mountains Bird Conservation Plan are also addressed in the USFWS's Birds of Conservation Concern (USFWS 2008). BCR 10, Northern Rockies Region, encompasses the Blue Mountains. Table W-6 lists species status as present or absent from the Summit Logan Valley Grazing Authorization Project area, and where each species is addressed in this report.

Table W-6: BCR 10, Northern Rockies Region, USFS Birds of Conservation Concern – 2008

Species	Presence / Absence	Present & Absent Species and Reasoning
Bald Eagle	Present	See TES section
Swainson's Hawk	Suspected	See Landbird Discussion
Ferruginous Hawk	Absent	Outside Range of Project Area
Peregrine Falcon	Nesting Habitat Absent	No Suitable Nesting Habitat in project area, one incidental sighting of bird flying over area is recorded

Species	Presence / Absence	Present & Absent Species and Reasoning
Upland Sandpiper	Historically Present	TES section, historically present, current status unknown
Long-Billed Curlew	Present	See Landbird Discussion
Yellow-Billed Cuckoo	Present	Documented infrequently in Logan Valley, see Landbird Discussion
Flammulated Owl	Present	See Landbird Discussion
Black Swift	Absent	Outside Range of Project Area
Lewis' Woodpecker	Present	See TES section
Williamson's Sapsucker	Present	MIS - Primary Cavity Excavator Discussion, see Landbird Discussion
White-Headed Woodpecker	Present	See TES section
Olive-sided Flycatcher	Present	See Landbird Discussion
Willow Flycatcher	Suspected	See Landbird Discussion
Loggerhead Shrike	Suspected	See Landbird Discussion
Sage Thrasher	Absent	Outside Range of Project Area
Brewer's Sparrow	Present	See Landbird Discussion
Sage Sparrow	Absent	Outside Range of Project Area
McCown's Longspur	Absent	Outside Range of Project Area
Black Rosy-Finch	Absent	Outside Range of Project Area
Cassin's Finch	Present	See Landbird Discussion

The District has not conducted official neotropical migratory bird surveys in all habitat types within the Summit Logan Valley Grazing Authorization Project area. Informal bird surveys have been conducted by Grant County Bird Club volunteers in vicinity of the fen, and during past upland sandpiper surveys. These species lists, as well as District records were reviewed for this project. During a period from 1991 through 2012, approximately 105 bird species have been documented within Logan Valley, within the project area. This diversity of species is reflective of the diversity of habitat available in this area of the project, including grassland, shrub-steppe, aspen, fen/wetland, riparian, and both ponderosa pine and mixed conifer forest habitat.

In addition, the Oregon Breeding Bird Atlas (Adamus et al. 2001) includes observations for this area. Much of the data for the Breeding Bird Atlas for the Malheur National Forest was obtained from local biologists and ornithologists. Most NTMB species that are expected in the project area were recorded within the atlas' hexagons for the area. There is a high confidence level that most species discussed in this report are currently present in the area.

Environmental Consequences

Threatened, Endangered and Sensitive Wildlife Species

Alternative 1 - No Grazing

Direct, Indirect and Cumulative Effects

Under the No Action Alternative, there would be no management activities, no grazing would occur on any of the allotments. Impact to upland and riparian forage and shrubs from domestic livestock would be eliminated. Lack of competition for forage from cattle could be beneficial for big game species. Because there would be no direct or indirect effects from management

activities to threatened, endangered and sensitive wildlife species or their habitat, there would be no additive cumulative effects.

Determination

Due to the nature of the No Action alternative, there would be **No Impact (NI),** to threatened, endangered or sensitive wildlife species or their habitat.

Gray Wolf:

Alternative 2, 3 & 4

Direct and Indirect Effects

Wolves are limited by prey availability and are threatened by negative interactions with humans. Generally, land management activities are compatible with wolf protection and recovery, especially actions that maintain ungulate populations. Elk populations on the Malheur National Forest are stable; within the project area, elk populations are at or slightly above management objectives set by Oregon Department of Fish and Wildlife (ODFW 2010).

Due to the project's proximity to FS road 16, Lake Creek Youth Camp, Big Creek and Murray Campgrounds, Burns Paiute Tribe work center, as well as winter snowmobile and cross-country ski activities, it is unlikely that wolves would use the project area for home range, denning, or rendezvous sites. The area is easily accessed and regularly used by local residents, recreationists, and hunters during spring, summer, and fall months, and to a lesser extent during winter months. The project area may be used by animals as dispersal habitat.

Distribution of large game may shift, depending on areas used by cattle in any given year, however prey species such as elk are not limiting, and are not expected to decline as a result of the alternatives proposed. Actions including adaptive mamangement strategies aimed at improving riparian conditions would benefit big game in the long run.

Determination

No wolf populations currently occupy the Malheur National Forest. No denning or rendezvous sites have been identified on the Malheur National Forest. There is an abundance of prey available for gray wolves on the Forest. Prey distribution may be influenced, depending on the alternative chosen for implementation, however, big game populations are not expected to decline. Wolves would be able to avoid any activities occurring within the allotments.

Consequently, there would be No Impact (NI) to gray wolves or their habitat as a result of the proposed actions.

Cumulative Effects

Cumulative effects were analyzed at the project area level. All of the activities listed in Appendix C were considered for their cumulative effects on gray wolves.

Vehicle traffic, hunting, firewood cutting, camping and snowmobiling are expected to continue. Snowmobile routes are used during the winter months. Consequently human disturbance in parts of the area continues year round, limiting the area's capacity to provide remote and undisturbed habitat preferred by gray wolves.

Currently off-road vehicle travel is allowed; OHV use has the potential to disturb wildlife and reduce security for elk and deer, prey species of gray wolves, as well as dispersing gray wolves.

The Malheur National Forest is in the process of analyzing changes in its travel management plan. It is foreseeable that cross country travel would be prohibited on the Malheur National Forest (where it is not already prohibited), with the exception of accessing dispersed camping sites from open roads. Foreseeable changes in travel management would have a beneficial cumulative impact to big game (wolf prey species) in the long term, providing increased security and reducing disturbance. Open road densities would still likely limit the area as remote wolf habitat.

Fire suppression, beginning in the 1950's, eliminated or reduced most fires occurring within the drier forest types, and allowed for ingrowth of more shade tolerant conifer species. Overstocking in some stands has shaded out forage and shrub species. However, commercial and precommercial thinning activities have also occurred in the area, reducing overstocked stands. Thinning for meadow restoration (ongoing) and recent prescribed burning in the Merit Project area have potential to improve meadow habitat, and improve understory forage.

Overall, the combined effects of the Summit Logan Valley Grazing Authorization Project with the effects of past, present, and reasonably foreseeable future activities would not be expected to adversely affect prey populations that gray wolves depend on, or gray wolves themselves.

Bald Eagle:

Alternative 2, 3 & 4

Direct and Indirect Effects

Roosting or nest habitat for bald eagles would not be affected by levels of cattle grazing proposed in any of the alternatives. Should an occupied bald eagle nest be discovered during layout or construction of fences or water developments, design elements to avoid disturbance to nesting birds would be implemented. Prey species would not be negatively impacted. In the long term, actions including adaptive management strategies resulting in improvements in riparian habitat would result in beneficial impacts for fish species, prey for bald eagles.

Determination

The determination of effects for bald eagles and their habitat is **No Impact (NI).**

Cumulative Effects

Cumulative effects were analyzed at the project area level. All of the activities listed in Appendix C were considered for their cumulative effects on bald eagles and potential habitat. Past activities such as timber harvest, road construction, fire suppression, grazing, and wildfire have combined to create the current condition in the analysis area. The combined effects of the Summit Logan Valley Grazing Authorization project with the effects of past, present, and reasonably foreseeable future activities would not be expected to adversely affect populations or viability of bald eagles within the project area or at the Forest level.

California Wolverine:

Alternative 2, 3 & 4

Direct and Indirect Effects

Suitable denning habitat for wolverines does not exist within the project area. However, potential dispersal habitat may exist. Due to the wolverine's high sensitivity to human disturbance, any

dispersing individuals would most likely minimize use of the area. The project's proximity to FS road 16, Lake Creek Youth Camp, Big Creek and Murray Campgrounds, Burns Paiute Tribe work center, as well as winter snowmobile and cross-country ski activities limits its potential for use by wolverines.

Distribution of large game may shift, depending on areas used by cattle in any given year, however prey species such as elk are not limiting, and are not expected to decline as a result of the alternatives proposed. Use levels aimed at improving riparian conditions, would benefit big game in the long run.

Determination

No source habitat for wolverine exists within the project area, existing human activity and use of the area is relatively high during the spring, summer, and fall months, prey species would not be a limiting factor.

Because of limited potential use of the area by wolverines, no direct, indirect, or cumulative effects are anticipated from the Summit Logan Valley Grazing Authorization Project. The determination would be **No Impact (NI)** for wolverine populations and habitat as a result of the proposed action.

Cumulative Effects

Cumulative effects were analyzed at the project area level. All of the activities listed in Appendix C were considered for their cumulative effects on wolverines. Vehicle traffic along roads, campers, hikers, hunters, firewood cutting, and other human activities would be the greatest deterrent for wolverine use of the area. However, the combined effects of the Summit Logan Valley Grazing Authorization Project with the effects of past, present, and reasonably foreseeable future activities would not be expected to adversely affect wolverines utilizing the area as dispersal habitat.

Greater Sage-Grouse:

Alternative 2, 3 & 4

Direct and Indirect Effects

No documented leks of greater sage-grouse males, hens, or hens with broods have been recorded within the project area. Incidental sightings of sage-grouse have occurred in vicinity of Flat Field, within the Logan Valley allotment. This area may have some of the higher potential for sage grouse use, given its lack of conifer encroachment and open grass and sagebrush habitat.

Impacts to greater sage-grouse would depend on timing of cattle grazing, and concentration of animals. Water developments would be placed to limit impact to native vegetation. Because of variations in dates of turn-out, not all areas of potential habitat would be impacted by cattle in a given grazing season. Anticipated use by sage-grouse would be from May through October. Early season grazing has the highest potential for nest trampling. Grazing may also reduce forbs used by young birds.

Monitoring for upland sandpipers in within the Big Field or Flat Field pastures would allow for concurrent monitoring of greater sage-grouse in years when either of those pastures was scheduled for early season use. Once eggs are hatched, young sage-grouse are mobile and would more readily avoid cattle or other large ungulates.

Monitoring use levels for upland vegetation as well as riparian vegetation would be critical for determining trends in habitat improvement.

Adaptive management strategies such as reduced time in any given pasture, reduced numbers in cattle or additional fencing to exclude use would all benefit grassland habitat.

Determination

Because there is potential for some direct impacts to sage-grouse habitat within the project area, the proposed alternatives **May Impact Individuals or Habitat (MIIH),** but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Cumulative Effects

Cumulative effects were analyzed at the project area level. All of the activities listed in Appendix C were considered for their cumulative effects on greater sage-grouse or their habitat.

Cumulatively, livestock grazing earlier in the century may have impacted shrub, grass, and forb composition within potential greater sage-grouse habitat in the Summit Logan Valley Grazing Authorization Project. Introduction of non-native grasses, introduction of invasive weedy species, changes to habitat due to agricultural development and conversion of sagebrush to hayfields and pastures, fire suppression and resulting succession of lodgepole pine in some areas may have also impacted greater sage-grouse habitat within the project area. Over time, and with changes in grazing management, habitat has improved. It is expected that the current proposed use levels for all alternatives would continue an upward trend in riparian and upland habitat.

Overall, the combined effects of the Summit Logan Valley Grazing Authorization Project with the effects of past, present, and reasonably foreseeable future activities would not be expected to adversely affect populations of greater sage-grouse on the Forest.

Silver-bordered Fritillary:

Alternative 2, 3 & 4

Direct and Indirect Effects

Impacts to silver-bordered fritillary caterpillars or habitat would depend on timing of cattle grazing, and concentration of animals within pastures containing preferred meadow habitat. Grazing may impact butterfly eggs, young, or food plants. Because of variations in dates of turn-out, not all areas of potential habitat would be impacted by cattle in a given grazing season.

Monitoring use levels and assessing impact to meadow habitat and native vegetation would be critical for determining trends in habitat improvement.

Adaptive management strategies such as reduced time in any given pasture, or reduced numbers of cattle, as well as additional fencing to exclude use would all benefit meadow habitat.

Determination

Silver-bordered fritillary have not been documented within the project area. However, because caterpillar and butterfly food plants and meadow habitat exist within all of the allotments, there is potential for impacts to habitat from cattle utilizing vegetation. Not all habitat would be impacted concurrently throughout the project area, providing areas where food plants would persist for this butterfly and its larvae. The proposed alternatives **May Impact Individuals or**

Habitat (MIIH), but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Cumulative Effects

Cumulative effects were analyzed at the project area level. All of the activities listed in Appendix C were considered for their cumulative effects on silver-bordered fritillary or its habitat.

Livestock grazing earlier in the century impacted meadow habitat within the Summit Logan Valley Grazing Authorization Project. Over time, and with changes in grazing management, habitat has improved. It is expected that the current proposed use levels for all alternatives would continue an upward trend in meadow habitat.

Overall, the combined effects of the Summit Logan Valley Grazing Authorization Project with the effects of past, present, and reasonably foreseeable future activities would not be expected to adversely affect populations of silver-bordered fritillary on the Forest.

Bobolink:

Alternative 2, 3 & 4

Direct and Indirect Effects

Impacts to bobolink or habitat would depend on timing of cattle grazing, and concentration of animals within pastures containing preferred meadow habitat. Early season grazing may have the greatest impact to bobolink by cattle trampling eggs, or by reducing cover through grazing and increasing the exposure of nests. Because of variations in dates of turn-out, not all areas of potential habitat would be impacted by cattle in a given grazing season.

Monitoring use levels and assessing impact to meadow habitat and native vegetation would be critical for determining trends in habitat improvement.

Adaptive management strategies such as reduced time in any given pasture, or reduced numbers of cattle, as well as additional fencing to exclude use would all benefit meadow habitat.

Determination

Bobolink have not been documented within the project area. However, because meadow or grassland habitat exists within all of the allotments, there is potential for direct impacts from cattle grazing. However, not all habitat would be impacted concurrently throughout the project area, providing nesting and foraging habitat for bobolink. The proposed alternatives **May Impact Individuals or Habitat (MIIH),** but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Cumulative Effects

Cumulative effects were analyzed at the project area level. All of the activities listed in Appendix C were considered for their cumulative effects on bobolinks or their habitat.

Livestock grazing earlier in the century impacted meadow habitat within the Summit Logan Valley Grazing Authorization Project. Over time, and with changes in grazing management, habitat has improved. It is expected that the current proposed use levels for all alternatives would continue an upward trend in meadow habitat.

Overall, the combined effects of the Summit Logan Valley Grazing Authorization Project with the effects of past, present, and reasonably foreseeable future activities would not be expected to adversely affect populations of bobolink on the Forest.

Grasshopper Sparrow:

Alternative 2, 3 & 4

Direct and Indirect Effects

Impacts to grasshopper sparrow or habitat would depend on timing of cattle grazing, and concentration of animals within pastures containing preferred grassland habitat. Early season grazing may have the greatest impact to grasshopper sparrow by cattle trampling eggs, or by reducing cover through grazing and increasing the exposure of nests. Because of variations in dates of turn-out, not all areas of potential habitat would be impacted by cattle in a given grazing season.

Monitoring use levels and assessing impact to meadow habitat and native vegetation would be critical for determining trends in habitat improvement.

Adaptive management strategies such as reduced time in any given pasture, or reduced numbers of cattle, as well as additional fencing to exclude use would all benefit grassland habitat.

Determination

Grasshopper sparrow have not been documented within the project area. However, because meadow or grassland habitat exists within all of the allotments, there is potential for direct impacts to habitat from cattle grazing. However, not all habitat would be impacted concurrently throughout the project area, providing nesting and foraging habitat for grasshopper sparrow. The proposed alternatives **May Impact Individuals or Habitat (MIIH),** but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Cumulative Effects

Cumulative effects were analyzed at the project area level. All of the activities listed in Appendix C were considered for their cumulative effects on grasshopper sparrows or their habitat.

Livestock grazing earlier in the century impacted grassland habitat within the Summit Logan Valley Grazing Authorization Project. Over time, and with changes in grazing management, habitat has improved. It is expected that the current proposed use levels for all alternatives would continue an upward trend in grassland habitat.

Overall, the combined effects of the Summit Logan Valley Grazing Authorization Project with the effects of past, present, and reasonably foreseeable future activities would not be expected to adversely affect populations of grasshopper sparrow on the Forest.

Upland Sandpiper:

Alternative 2, 3 & 4

Direct and Indirect Effects

Impacts to upland sandpipers or habitat would depend on timing of cattle grazing, and concentration of animals within grassland or meadow habitat. Early season grazing may have

the greatest impact to upland sandpipers by cattle trampling eggs, or by reducing cover through grazing and increasing the exposure of nests. **"**In grazed pastures cattle should optimally be restricted from nesting fields during the egg-laying and incubation periods" (NatureServe 2011). In Logan Valley, this has typically been late May, June, into mid-July (Akenson 1993). Because upland sandpipers show a degree of nest site fidelity, monitoring of the historic nesting and use areas within Big Field and Flat Field would be required for any early season (prior to August 1) grazing proposed for these two pastures (See Design Elements). To avoid impacting habitat north and south of Forest Service road 16, both of these pastures would not be grazed at the same time (See Design Elements).

In addition, monitoring use levels and assessing impact to meadow habitat and native vegetation would be critical for determining trends in habitat improvement. Monitoring requirements and 5 and 10 year Management Objectives are found in Chapter 2 and Appendix A (part 2) respectively.

Adaptive management strategies such as reduced time spent in any given pasture, or reduced numbers of cattle, as well as additional fencing to exclude cattle use would all benefit meadow habitat. The adaptive strategy that includes fencing of the fen within the Big Field pasture, could impact upland sandpiper nesting habitat by concentrating cattle in vicinity of historic nest areas. Because upland sandpipers exhibit nest site fidelity, maintaining historically used areas is important. To avoid impacting these upland sandpiper nesting areas, the location of the fence would be determined by the district wildlife biologist working with the forest botanist, and range specialist.

Determination

No recent sightings of upland sandpiper have been documented within the project area. Because of the very low numbers of birds that may potentially be present in Logan Valley, any impact to a nest by trampling, or increased predation by crows or coyotes due to nest exposure as a result of grazing would be detrimental to the Forest population. Because young birds are precocial and mobile once hatched, later season light to moderate grazing would have minimal impacts to upland sandpipers or their young (NatureServe 2012).

Because upland sandpipers show strong site fidelity to their nesting areas (Nature Serve 2012), Design Elements requiring monitoring for the birds within known historic nesting/use areas of upland sandpipers would occur prior to any early season grazing of Big Field. If the upland sandpipers are documented during surveys, cattle turnout into these fields would be postponed until later in the season. Early season grazing of both Big Field and Flandt Field at the same time would not occur, providing habitat in one pasture or the other.

Should monitoring of the fen indicate a need for protection via fencing, layout of any fence would be determined by consulting with the district wildlife biologist, in order to avoid concentrating cattle near historic upland sandpiper nesting areas.

Late season grazing (after August 1) of Big Field would result in **No Impact (NI)** to upland sandpipers as the birds readily move and would avoid cattle. If no upland sandpipers are documented during May and June monitoring, early season grazing of Big Field would also result in No Impact (NI) to upland sandpiper populations. Monitoring would be required for any grazing of Big Field for early season turnout of cattle (see Design Elements and Monitoring Plan, Chapter 2). If upland sandpipers are documented during these surveys, turnout would be postponed in order to allow nesting and incubation of upland sandpipers to occur without risk of trampling or disturbance. Foraging habitat is available in several pastures within Logan Valley.

Cumulative Effects

Cumulative effects were analyzed at the project area level. All of the activities listed in Appendix C were considered for their cumulative effects on upland sandpiper or its habitat.

Livestock grazing earlier in the century impacted grassland and meadow habitat within the Summit Logan Valley Grazing Authorization Project. Over time and with changes in grazing management, this habitat has improved. It is expected that the current proposed use levels for all alternatives would continue an upward trend in meadow habitat. Ongoing thinning and proposed future burning projects would also have the potential for restoring meadow and grassland habitat important for upland sandpipers. Design elements associated with the proposed activities within historic sandpiper use areas would require fall burning and timming for thinning operations to eliminate disturbance to breeding and nesting upland sandpipers.

Overall, the combined effects of the Summit Logan Valley Grazing Authorization Project with the effects of past, present, and reasonably foreseeable future activities would not be expected to adversely affect populations of upland sandpipers.

Lewis's Woodpecker:

Alternative 2, 3 & 4

Direct and Indirect Effects

Within open ponderosa pine, or post fire habitat, nesting and foraging habitat for Lewis's woodpecker would not be affected by cattle grazing or associated activities.

Cattle grazing within aspen stands continues to impact recruitment of sapling and young aspen that would allow stands to persist as older mature trees die. While mature trees currently exist in many stands, over time there would be a reduced presence of large aspen trees and snags, due to this lack of replacement. Other factors impacting aspen stands include conifer encroachment and browsing by wildlife.

Determination

Cattle grazing would not generally impact snag habitat for Lewis's woodpeckers within conifer stands. However, cattle grazing has the potential to adversely affect the recruitment of young aspen in stands where old mature trees are dying and falling to the ground. In the mid- to long-term, a loss of aspen habitat, especially larger diameter trees and snags, may reduce nesting habitat for Lewis's woodpecker. Ongoing restoration projects including conifer removal within aspen stands, and protection for aspen in this area may lessen the impact.

Consequently, the proposed alternatives **May Impact Individuals or Habitat (MIIH),** but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Cumulative Effects

The area considered for cumulative effects is the project area and adjacent subwatersheds to include post-fire habitat. All of the activities in Appendix C have been considered for their cumulative effects on Lewis's woodpecker.

Past timber harvest, fire suppression, road construction, wildfire, and firewood cutting have all impacted the quality, quantity, and distribution of suitable snag habitat within the project area. The High Roberts Fire, which burned in 2002, just north Summit Logan Valley Grazing

Authorization Project area, may currently provide nesting habitat for Lewis's woodpeckers. Prescribed underburning in the Merit Timber Sale area may also provide some post-fire habitat. Cattle grazing would not cumulatively impact existing snag habitat within green or burned conifer stands.

Large diameter aspen and snags within the project area also provide Lewis's woodpecker nesting and foraging habitat. Conifer encroachment, along with grazing by domestic and wild ungulates, continues to degrade aspen stands and in the mid- to long-term may result in loss of habitat for Lewis's woodpecker. Larger aspen stands within the project area are more resilient, and would persist in the short- to mid-term. Without successful recruitment of sapling size replacement trees, some small stands may die out.

Ongoing and past aspen restoration projects (which includes conifer removal and protection) are expected to hold a percentage of aspen stands on the landscape. Monitoring is needed to assess the continued long-term impact of grazing on aspen habitat and to implement effective management strategies to lessen these impacts.

In the short-term, public firewood cutting is expected to continue along open roads. It is foreseeable that the Malheur Forest Access Travel Management Plan (ATMP) would prohibit cross country travel on the Malheur National Forest with the exception of travel from designated open roads to dispersed camp areas. It is expected that with the implementation of the ATMP there would be reduced access for firewood cutting and improved retention of large diameter snags.

Overall, the combined effects of the Summit Logan Valley Grazing Authorization Project with the effects of past, present, and reasonably foreseeable future activities would not be expected to adversely affect populations of Lewis's woodpecker on the Forest.

White-headed Woodpecker:

Alternative 2, 3 & 4

Direct and Indirect Effects

Within open ponderosa pine, or post-fire habitat, nesting and foraging habitat for white-headed woodpeckers would not be affected by cattle grazing or associated activities. Cattle and wildlife use of shrub species in the understory of ponderosa pine may impact hiding cover and foraging habitat for small mammals, reducing potential predation of white-headed woodpecker nests.

While not considered typical, large diameter aspen snags within the project area may provide white-headed woodpecker nesting habitat. Conifer encroachment, along with grazing by domestic and wild ungulates, continues to degrade aspen stands and in the mid- to long-term may result in some loss of habitat for white-headed woodpeckers. Larger aspen stands within the project area are more resilient, and would persist in the short- to mid-term. Without successful recruitment of sapling size replacement trees, some small stands may die out. Ongoing aspen restoration projects have protected some aspen within the project area by fencing or slash barriers.

Determination

Cattle grazing and the associated activities from all alternatives would not impact snag habitat for white-headed woodpeckers within ponderosa pine stands, or foraging habitat associated with open large ponderosa pine, or mixed conifer stands where ponderosa pine is dominant.

Cattle grazing has the potential to adversely affect the recruitment of young aspen in stands where old mature trees are dying and falling to the ground. Although not used to the extent that other woodpeckers use aspen stands, white-headed woodpeckers have been observed using aspen snags as nest sites (Kranich, personal observation). In the mid- to long-term, a loss of aspen habitat, especially larger diameter trees and snags, may reduce some potential nesting habitat for white-headed woodpeckers. Ongoing restoration projects including conifer removal and protection for aspen in this area may lessen the impact.

Consequently, the proposed alternatives **May Impact Individuals or Habitat (MIIH),** but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Cumulative Effects

The area considered for cumulative effects is the project area and adjacent subwatersheds to include post-fire habitat. All of the activities in Appendix C have been considered for their cumulative effects on white-headed woodpeckers.

Past timber harvest, fire suppression, road construction, wildfire, and firewood cutting have all impacted the quality, quantity, and distribution of suitable snag habitat within the project area. The High Roberts Fire, which burned in 2002, just north Summit Logan Valley Grazing Authorization Project area, may currently provide nesting habitat for white-headed woodpeckers. Prescribed underburning in the Merit Timber Sale area may also provide some post-fire habitat. Cattle grazing would not cumulatively impact existing snag habitat within green or burned ponderosa pine stands.

Conifer encroachment, along with grazing by domestic and wild ungulates, continues to degrade aspen stands and in the mid- to long-term may result in an incidental loss of nesting habitat for white-headed woodpeckers. Larger aspen stands within the project area are more resilient, and would persist in the short- to mid-term. Without successful recruitment of sapling size replacement trees, some small stands may die out.

Ongoing and past aspen restoration projects (which includes conifer removal and protection) are expected to hold a percentage of aspen stands on the landscape. Monitoring is needed to assess the continued long-term impact of grazing on aspen habitat and to implement effective management strategies to lessen these impacts.

In the short-term, public firewood cutting is expected to continue along open roads. It is foreseeable that the Malheur Forest Access Travel Management Plan (ATMP) would prohibit cross country travel on the Malheur National Forest with the exception of travel from designated open roads to dispersed camp areas. It is expected that with the implementation of the ATMP there would be reduced access for firewood cutting and improved retention of large diameter snags.

Overall, the combined effects of the Summit Logan Valley Grazing Authorization Project with the effects of past, present, and reasonably foreseeable future activities would not be expected to adversely affect populations of white-headed woodpecker on the Forest.

Townsend's Big-eared Bat:

Alternative 2, 3 & 4

Direct and Indirect Effects

No impacts to roost habitat (cliffs, rock crevices, snags, old buildings, caves) are expected from cattle grazing. However, foraging habitat and insect prey diversity and abundance may be impacted by grazing of vegetation. Impacts to vegetation would depend on location and duration of grazing. Use levels and move triggers that result in improvements to riparian vegetation would benefit diversity and abundance of insect prey species and ultimately bat species. Improvements and increases in riparian vegetation resulting in beaver recolonization of stream reaches, and resulting beaver ponds, would also increase riparian vegetation diversity, and alter insect prey diversity and abundance (Keinath 2004). Although aspen stands would continue to exist in the short to mid-term, continued impact of ungulate grazing on aspen stands, as well as conifer shading, may result in loss of smaller stands, and reduced diversity of habitat, impacting insect prey species used by Townsend's big-eared bats.

Monitoring use levels and assessing impact to riparian vegetation as well as aspen habitat would be critical for determining trends in habitat improvement.

Adaptive management strategies such as reduced time in any given pasture, or reduced numbers of cattle, as well as additional fencing to exclude use would all benefit foraging habitat. Depending on placement, barb-wire fencing in riparian areas may negatively impact individual bats if animals become impaled on wire. Stream crossings of fences in particular need to be visible to bats and birds to allow animals to avoid wires. Pond construction or spring developments may provide water sources for bats. Design elements require wildlife escape ramps placed in troughs to avoid trapping small mammals, bats and birds (See Design Elements, chapter 2). Depending on number of cattle, trampling, muddy water and manure may make ponds less palatable or useful for bats as drinking sources late season.

Determination

No surveys for Townsend's big-eared bat have occurred within the project area, however potential roost and foraging habitat does exist. Improvements to riparian vegetation would benefit Townsend's big-eared bat prey species. Lack of sapling recruitment within aspen stands continues to be an adverse impact from ungulate grazing. Conifer shading and competition with aspen compounds this problem. Depending on placement, wire fencing has potential to impale bats, directly impacting individuals. Direct impacts from fences could be minimized by making fences more visible (see Design Elements).

Consequently, the proposed alternatives **May Impact Individuals or Habitat (MIIH),** but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Cumulative Effects

Cumulative effects were analyzed at the project area level. All of the activities listed in Appendix C were considered for their cumulative effects on Townsend's big-eared bat or their habitat.

Livestock grazing earlier in the century impacted grassland and riparian habitat within the Summit Logan Valley Grazing Authorization Project. Over time, and with changes in grazing

management, habitat has improved. It is expected that the current proposed use levels for all alternatives would continue an upward trend in meadow and riparian habitat. As a result, diversity and abundance of insect prey species for Townsend's big-eared bat would be maintained, or expected to improve.

Ongoing and past aspen restoration projects (which includes conifer removal and protection) are expected to hold a percentage of aspen stands on the landscape. Monitoring is needed to assess the continued long-term impact of grazing on aspen habitat and to implement effective management strategies to lessen these impacts.

Overall, the combined effects of the Summit Logan Valley Grazing Authorization Project with the effects of past, present, and reasonably foreseeable future activities would not be expected to adversely affect populations of Townsend's big-eared bat on the Forest.

Pallid Bat:

Alternative 2, 3 & 4

Direct and Indirect Effects

No impacts to roost habitat (cliffs, rock outcrops, rock crevices, hollow trees, old buildings) are expected from cattle grazing. However, foraging habitat and insect prey diversity and abundance may be impacted by grazing of vegetation. Impacts to vegetation would depend on location and duration of grazing. Use levels and move triggers that maintain adequate cover and diversity of plant species would provide for the prey species required by pallid bats. Monitoring use levels and assessing impact to upland vegetation would be critical for determining trends in habitat.

Adaptive management strategies such as reduced time in any given pasture, or reduced numbers of cattle, would benefit foraging habitat. Depending on placement, barb-wire fencing in vicinity of rock outcrops and potential roost areas may negatively impact individual bats if animals become impaled on wire.

Stream crossings of fences in particular need to be visible to bats and birds to allow animals to avoid wires. Pond construction or spring developments may provide water sources for bats. Design elements require wildlife escape ramps placed in troughs to avoid trapping small mammals, bats and birds (See Design Elements, chapter 2). Depending on number of cattle, trampling, muddy water, manure may make ponds less palatable or useful for bats as drinking sources late season.

Determination

No surveys for pallid bat have occurred within the project area, however roost and foraging habitat does exist. Use levels and move triggers to retain adequate upland vegetation for other wildlife would also benefit prey species that pallid bats depend on. Depending on placement, barb-wire fencing has potential to impale bats, directly impacting individuals. Direct impacts from fences could be minimized by making fences more visible (see Design Elements).

Consequently, the proposed alternatives **May Impact Individuals or Habitat (MIIH),** but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Cumulative Effects

Cumulative effects were analyzed at the project area level. All of the activities listed in Appendix C were considered for their cumulative effects on pallid bats or their habitat.

Livestock grazing earlier in the century impacted grassland as well as riparian habitat within the Summit Logan Valley Grazing Authorization Project. Over time, and with changes in grazing management, habitat has improved. It is expected that the current proposed use levels for all alternatives would continue an upward trend in grassland and riparian habitat. As a result, diversity and abundance of insect prey species for pallid bat would be expected to be maintained or improved.

Overall, the combined effects of the Summit Logan Valley Grazing Authorization Project with the effects of past, present, and reasonably foreseeable future activities would not be expected to adversely affect populations of pallid bats on the Forest.

Fringed Myotis:

Alternative 2, 3 & 4

Direct and Indirect Effects

No impacts to roost habitat (cliffs, rock crevices, snags, old buildings, caves) are expected from cattle grazing. However, foraging habitat and insect prey diversity and abundance may be impacted by grazing of vegetation. Impacts to vegetation would depend on location and duration of grazing. Use levels and move triggers that result in improvements to riparian vegetation would benefit diversity and abundance of insect prey species and ultimately bat species. Improvements and increases in riparian vegetation resulting in beaver recolonization of stream reaches, and resulting beaver ponds, would also increase riparian vegetation diversity, and alter insect prey diversity and abundance (Keinath 2004). Although aspen stands continue to exist in the short to mid-term, continued impact of ungulate grazing on aspen stands, as well as conifer shading, may result in loss of smaller stands, and reduced diversity of habitat, impacting insect prey species.

Monitoring use levels and assessing impact to riparian vegetation as well as aspen habitat would be critical for determining trends in habitat improvement.

Adaptive management strategies such as reduced time in any given pasture, or reduced numbers of cattle, as well as additional fencing to exclude use would all benefit foraging habitat. Depending on placement, barb-wire fencing in riparian areas may negatively impact individual bats if animals become impaled on wire. Stream crossings of fences in particular need to be visible to bats and birds to allow animals to avoid wires. Pond construction or spring developments may provide water sources for bats. Design elements require wildlife escape ramps placed in troughs to avoid trapping small mammals, bats and birds (See Design Elements, chapter 2). Depending on number of cattle, trampling, muddy water, manure may make ponds less palatable or useful for bats as drinking sources late season.

Determination

No surveys for fringed myotis have occurred within the project area, however roost and foraging habitat does exist. Improvements to riparian vegetation would benefit fringed myotis prey species. Lack of sapling recruitment within aspen stands continues to be an adverse impact from ungulate grazing. Conifer shading and competition compounds this problem. Depending on placement, wire fencing has potential to impale bats, directly impacting individuals. Direct impacts from fences could be minimized by making fences more visible (see Design Elements).

Consequently, the proposed alternatives **May Impact Individuals or Habitat (MIIH),** but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Cumulative Effects

Cumulative effects were analyzed at the project area level. All of the activities listed in Appendix C were considered for their cumulative effects on fringed myotiss or their habitat.

Livestock grazing earlier in the century impacted grassland and riparian habitat within the Summit Logan Valley Grazing Authorization Project. Over time, and with changes in grazing management, habitat has improved. It is expected that the current proposed use levels for all alternatives would continue an upward trend in grassland and riparian habitat. As a result, diversity and abundance of insect prey species for fringed myotis would be expected to improve.

Ongoing and past aspen restoration projects (which includes conifer removal and protection) are expected to hold a percentage of aspen stands on the landscape. Monitoring is needed to assess the continued long-term impact of grazing on aspen habitat and to implement effective management strategies to lessen these impacts.

Overall, the combined effects of the Summit Logan Valley Grazing Authorization Project with the effects of past, present, and reasonably foreseeable future activities would not be expected to adversely affect populations of fringed myotis on the Forest.

Columbia Clubtail:

Alternative 2, 3 & 4

Direct and Indirect Effects

No documented occurrences of Columbia clubtail have been recorded within the project area. However, habitat suitable for Columbia clubtail may exist along the Malheur River within the Logan Valley Allotment. Impacts to this dragonfly or habitat would depend on timing of cattle grazing, and concentration of animals within pastures containing riparian habitat. Because of variations in dates of turn-out, not all areas of potential habitat would be impacted by cattle in a given grazing season.

Use levels and move triggers scheduled for all allotments within their respective riparian habitat conservation areas (RHCAs) are designed to restore riparian vegetation and shrub habitat, improving habitat for Columbia clubtails.

Monitoring use levels and assessing impact to riparian habitat and native vegetation would be critical for determining trends in habitat improvement.

Adaptive management strategies such as reduced time in any given pasture, or reduced numbers of cattle, as well as additional fencing to exclude use would all benefit riparian habitat.

Determination

Columbia clubtail dragonflies have not been documented within the project area. However, because potential habitat may exist along the Malheur River within the project area, there is potential for some direct impacts from cattle utilizing vegetation. Not all habitat would be impacted concurrently within the project area. The proposed alternatives **May Impact Individuals or Habitat (MIIH),** but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Cumulative Effects

Cumulative effects were analyzed at the project area level. All of the activities listed in Appendix C were considered for their cumulative effects on Columbia clubtail or its habitat.

Cumulatively, livestock grazing earlier in the century impacted riparian habitat within the Summit Logan Valley Grazing Authorization Project. Over time, and with changes in grazing management, riparian habitat has improved. It is expected that the current proposed use levels for all alternatives would continue an upward trend in bank stability, shrub recruitment, and herbaceous vegetation important for Columiba Clubtail.

Overall, the combined effects of the Summit Logan Valley Grazing Authorization Project with the effects of past, present, and reasonably foreseeable future activities would not be expected to adversely affect populations of Columbia clubtail drangonflies.

Johnson's Hairstreak Butterfly:

Alternative 2, 3 & 4

Direct and Indirect Effects

No documented occurrences of Johnson's hairstreak have been recorded within the project area, however, suitable habitat does exist. Dwarf mistletoe supporting caterpillar larvae occurs within mixed conifer stands found within and adjacent to the allotments. Nectar plants used by adult butterflies are generally widespread and common. Many, such as *Ceanothus*, are not usually impacted by cattle grazing.

Determination

Because dwarf mistletoe supporting Johnson's hairstreak larvae would not be impacted by cattle grazing, and because nectar plants used by adults are common, found throughout the project area, and often not utilized by cattle, there would be **No Impact (NI)** to Johnson's hairstreak populations or habitat.

Cumulative Effects

Cumulative effects were analyzed at the project area level and adjacent subwatersheds (post-fire habitat containing *Ceanothus*). All of the activities listed in Appendix C were considered for their cumulative effects on Johnson's hairstreak and potential habitat. Past activities such as timber harvest, road construction, fire suppression, grazing, and wildfire have combined to create the current condition in the analysis area. The combined effects of the Summit Logan Valley Grazing Authorization project with the effects of past, present, and reasonably foreseeable future activities would not be expected to adversely affect populations or viability of Johnson's hairstreak butterfly within the project area or at the Forest level.

Management Indicator Species

Big Game Habitat (Elk):

Alternative 1 - No Grazing

Direct, Indirect and Cumulative Effects

Under the No Action Alternative, there would be no management activities, no grazing would occur on any of the allotments. Impact to upland and riparian forage and shrubs from domestic

livestock would be eliminated. Lack of displacement or competition for forage from cattle, especially in meadow and riparian systems, could be beneficial for big game species. Competition between cattle and big game in and around water sources, both developed and undeveloped, would be eliminated. If interior fences are not removed, lack of maintenance of those fences could be detrimental if loose wire resulted in entrapped or injured animals.

Because there would be no direct or indirect effects from management activities to big game species or their habitat, there would be no additive cumulative effects.

Determination

Due to the nature of the No Action alternative, there would be **No Impact (NI),** to big game species or their habitat.

Alternative 2, 3 & 4

Direct and Indirect Effects

Forage

While forage is not considered a limiting factor in summer range (all of the project area), competition between elk and cattle for forage resources has the potential to occur in both riparian and upland areas. Cattle have grass-dominated diets but would consume forbs and shrubs if grass species have cured and thus provide less available protein and other nutrients by late summer. Likewise, elk, who normally avoid areas of cattle use during spring and early summer, may change this pattern and completely overlap with cattle in prime use areas late season, when upland forage species are dry and less palatable (Coe et al. 2005).

In several studies at the Starkey Experimental Station near La Grande, Oregon, it was shown that elk avoid cattle during the spring and summer. When cattle are moved into an area, elk move to higher elevations and steeper ground. Because optimum forage may exist within riparian and large wet meadows within the project area, elk may be negatively impacted by this displacement (Coe et al. 2005).

Forage and subsequent nutritional effects may have a substantial impact on individual animal performance. While fitness of elk and mule deer may not be affected during the summer, their ability to survive severe winters and reproduce may be negatively affected by poor summer nutrition (Cook et al. 2004).

Currently elk may move into the vacant Lake Creek Allotment when cattle are moved into the Summit Logan Valley Grazing Authorization project area. Patterns of distribution are not known, however, and the various configurations of use, non-use, deferred use make it difficult to predict how elk may react to each of the alternatives proposed.

Impacting a larger landbase (Alternatives 2 and 4) may displace elk to higher elevations and less optimum forage; however, improving overall conditions for upland and riparian habitat within all of the allotments would benefit big game as well as cattle. Reducing the landbase for the McCoy Creek Allotment (all alternatives) would require monitoring to promptly move cattle, based on use and move triggers, to allow adequate residual forage for wildlife at the end of the grazing season.

If recovery objects are not met within the defined timeframes (see Appendix A, part 2) for any allotment, adaptive strategies may be implemented further reducing cattle numbers, or season of

use, or excluding additional riparian acres from grazing resulting in beneficial impacts to habitat and ultimately big game forage.

Aspen within riparian areas may benefit from use levels and move triggers, or riparian fencing, designed to improve all riparian hardwood species. Aspen is a favorite browse species. Aspen located in upland areas, or in vicinity of the fen, continue to be negatively impacted by conifer succession, and overgrazing by both domestic and wild ungulates. Mature aspen trees continue to decline and regeneration of sapling-sized replacement trees is low to non-existent. Several of the smaller, older, and more decadent unprotected sites may die out within the next few years. This has occurred on other areas of the forest (personal observation, Kranich, 2012).

Aspen restoration in the Merit Timber Sale, and as part of the Logan Valley Meadow and Aspen Restoration project have positively impacted several aspen within the project area, by protecting stands with fencing, and within the Logan Valley project, by removing competing conifers. Additional conifer removal is needed within aspen stands fenced within the Merit Timber Sale project.

Fawning/Calving Habitat

Restoration and expansion of wet meadow habitat, whether within vicinity of the fen in Logan Valley, or riparian meadows along major stream reaches within all of the allotments would improve potential calving and fawning habitat. Displacement of elk or mule deer by cattle could negatively impact adults and their young. However, the overlap of cattle and big game during the calving/fawning season is generally the last two weeks of June and does not occur in May or early June, allowing big game to take advantage of these meadow systems during that time. Antelope fawns were seen in Logan Valley in early June 2012. The first observation of a mule deer fawn was mid-June 2012. No reports of elk fawns were obtained within the project area during this time, although animals with young were observed in adjacent subwatersheds, mid-June (OHA Volunteers, personal communication 2012).

Security

Existing road densities would remain the same within the project area for all alternatives. Consequently there would be no overall impact or change in security from the existing condition. Improvement and expansion of riparian habitat may provide additional potential forage and calving/fawning areas for big game, but disturbance from vehicle traffic may limit its effective use by elk and other wildlife. Mule deer are less disturbed by roads and consequently may benefit as riparian conditions improve.

Fences, water developments

While fences are generally easily negotiated by big game species, they can negatively impact animal movement during late season snow, when poorly placed on hillsides, or when animals are panicked by predators or humans. Spooked herds of elk may tear completely through a fence rather than go over it. Antelope panicked along roadways may hit a fence multiple times before finally locating a hole to squeeze through (Kranich, personal observation). Pregnant elk or deer may not navigate fences well. Poorly placed fences mid-slope, or near the top of cut-banks have the ability to entrap animals at any time. Poorly maintained fences and loose wire also become hazards for big game animals (Paige, 2008).

Fences impact non-game wildlife; bats, song birds, and flying squirrels can become impaled on barbs. Raptors, in particular owls, can fly into fences while pursuing prey species (Paige, 2008). Although likely incidental, these interactions have potential to cripple or kill individual animals.

To reduce the impact of fences to big game, Design Elements are in place requiring a smooth bottom wire at least 16 inches above the ground to facilitate fawn movement, with a maximum top wire height of 42 inches, and spacing of 10 inches between the top and next lower wire to reduce the potential of back legs being caught when animals jump the fence. Properly maintained fences also minimize the possibility of animals becoming caught in loose or tangled wires. Let-down fences used in areas of heavy snow-pack benefit wildlife because they are laid flat on the ground during the non-grazing season, removing the barrier to movement by big game and non-game species. Several other modifications to fences that reduce impacts to wildlife are illustrated in "A Landowner's Guide to Wildlife Friendly Fences: How to Build Fence with Wildlife in Mind" (Paige 2008).

Water developments in the form of troughs or stock ponds provide additional water for big game and non-game wildlife use. Elk may use these developments early spring or late season, but generally avoid them when cattle are present. Evaporation and lowered water tables of late summer, trampling, and manure make some ponds less useable by wildlife. Generally, lack of vegetation makes these ponds less attractive to amphibian species as breeding sites. However, Pacific chorus frog egg masses were seen in May 2012 in existing ponds in the Sage Hen unit. Tadpoles and young frogs can generally maneuver to avoid cattle at stock ponds (Bull et al 2001). However, early season turnout of livestock, when amphibian eggs are present and anchored to twigs and vegetation within 15 to 20 inches of the pond edge, may result in trampling of egg masses by cattle.

Troughs are required to have wildlife escape ramps to avoid drowning small mammals and birds. Springs providing water to troughs would have sufficient flow to maintain the existing riparian vegetation on site (see Design Elements, chapter 2). Pond clean-out or resealing would need to occur late season to avoid impacting amphibian egg masses, or tadpoles.

Cumulative Effects

Cumulative effects were analyzed at the project area level as well as the areas encompassed by the Murderer's Creek and Malheur River Big Game Management Units. All of the activities listed in Appendix C were considered for their cumulative effects on big game (elk) and potential habitat. Past activities such as timber harvest, road construction, fire suppression, grazing, and wildfire have combined to create the current condition in the analysis area.

Past historic grazing practices heavily impacted big game habitat within the Summit Logan Valley Grazing Authorization Project. Changes in livestock management have improved habitat conditions over time. Ongoing CE projects within the project area (Logan Valley Apsen and Meadow Restoration project and previous underburning within the Merit Timbersale projects) in addition to the proposed alternatives are designed to further restore existing aspen meadow and riparian habitat important for big game, and would provide sufficient forage to support both wild and domestic ungulate use within the project area.

The Malheur National Forest has analyzed changes in its travel management plan. It is foreseeable that cross country travel would be prohibited on the Malheur National Forest (where it is not already prohibited), with the exception of accessing dispersed camping sites from open

roads. This may increase security for elk and allow access to forage habitat not previously utilized because of disturbance from cross-country vehicle travel.

Conclusion

The Murderer's Creek and Malheur River Big Game Management Units are sufficiently large to provide for existing populations of big game. Elk populations have remained stable, meeting or exceeding ODFW management objectives. Elk distribution may shift depending on various configurations of the allotments and where cattle are grazing at any given time and place within the Summit Logan Valley Grazing Authorization Project area. However, the proposed alternatives would not be expected to affect elk population numbers or viability at the Forest level.

Old Growth Habitat

Alternative 1 - No Grazing

Direct, Indirect and Cumulative Effects

Under the No Action Alternative, there would be no management activities, no grazing would occur on any of the allotments. Impact to upland and riparian forage and shrubs from domestic livestock would be eliminated. Current dedicated old growth, replacement old growth, and pileated woodpecker feeding areas would be maintained. Increased growth of riparian shrubs, herbaceous cover, and aspen stands could benefit small mammal species preyed upon by American marten.

Because there would be no direct or indirect effects to old growth habitat, and the MIS species associated with this habitat, there would be no additive cumulative effects.

Alternative 2, 3 & 4

Direct and Indirect Effects

Cattle grazing would have little to no impact to Old Growth Habitat and associated MIS pileated woodpecker, American marten, and three-toed woodpecker. Because of overstory shading, existing DOGs provide limited understory forage for livestock. Large or extensive down logs can impede cattle movement and access. Grazing would not alter the character of such habitat. Changes in allotment boundaries would not change DOG, ROG, or PWFA acres or boundaries. Fence construction, water developments, riders would not be expected to impact these habitats.

Because proposed allowable use levels and move triggers are designed to improve riparian vegetation in the mid- to long-term, improvements in habitat for American marten prey species may occur.

Cumulative Effects

Cumulative effects were analyzed at the project area level. All of the activities listed in Appendix C were considered for their cumulative effects on Old Growth MIS species and habitat. Past activities such as timber harvest, road construction, fire suppression, grazing, and wildfire have combined to create the current condition in the analysis area.

There are little to no impacts expected for Old Growth Habitat from cattle grazing within the project area. Consequently, the combined effects of the Summit Logan Valley Grazing Authorization project with the effects of past, present, and reasonably foreseeable future

activities would not be expected to adversely affect populations or viability of pileated woodpecker, American marten, or three-toed woodpecker.

Conclusion

The Forest's network of Dedicated Old Growth (DOGs) and Replacement Old Growth (ROGs) would continue to maintain habitat for pileated woodpecker, American marten and three-toed woodpeckers. No loss of viability for populations of these old growth MIS would be expected from implementation of the Summit Logan Valley Grazing Authorization Project.

Primary Cavity Excavators

Alternative 1 - No Grazing

Direct, Indirect and Cumulative Effects

Under the No Action Alternative, there would be no management activities, no grazing would occur on any of the allotments. Impact to understory vegetation from domestic livestock would be eliminated. Conifer shading and wildlife use of aspen stands would continue, impact to existing aspen stands would depend on stand vigor, and extent of conifer succession, and extent of wildlife browsing. Some species of woodpecker could be negatively impacted if aspen continued to decline.

However, since there would be no activities occurring with this alternative, there would be no direct or indirect, or cumulative effects to the primary cavity excavators or their habitat.

Alternative 2, 3 & 4

Direct and Indirect Effects

Current Forest Plan direction, as amended, is to maintain snag and down log levels at 100% of the potential population of all woodpecker species that exist on the Forest. This means that availability of snags and down logs would not limit the numbers of woodpeckers that could live in an area.

Cattle grazing would have little to no impact to snag and down wood habitat in ponderosa pine, lodgepole pine, or mixed conifer stands. Grazing would not alter the character of such habitat. Consequently, for woodpeckers utilizing these habitats for nesting or foraging, the proposed alternatives would have little to no impact. Fence clearing and construction, or placement of water developments may impact snag or down wood habitat. Avoiding snags during layout would minimize these impacts (see Design Elements).

Use levels and move triggers designed to improve riparian shrub recruitment and growth would benefit woodpecker species dependent on that habitat (primarily downy woodpeckers, and red-naped sapsuckers). Aspen stands found within riparian areas, or protected by proposed exclosures or riparian pastures would also receive some measure of protection and monitoring.

However, unprotected aspen stands may continue decline. Conifer shading and competition, along with grazing pressure from cattle as well as wildlife are adversely impacting these stands. Currently aspen snags and large mature aspen exist within the project area, but as these stands continue to age, lack of replacement trees would result in a reduction and eventual loss of aspen stands in the long-term. This would directly impact downy woodpeckers, and red-naped sapsuckers, species which use aspen stands extensively for nesting and foraging. Other primary

cavity excavators using aspen habitat include Lewis's and white-headed woodpeckers, Williamson's sapsucker, northern flicker, and hairy woodpecker. Secondary cavity nesters would be impacted by loss of aspen stands. Approximately 71 bird species have been recorded within these stands1(Cobb 1997). Aspen restoration projects (Logan Valley Meadow and Aspen Restoration project, and Merit Timbersale project) have protected some aspen within the project area by removing conifers, and fencing or creating slash barriers around the stands. The Logan Valley project is ongoing. Several aspen stands have received some measure of conifer removal or protection and would maintain aspen within the project area.

Cumulative Effects

The area considered for cumulative effects is the project area and adjacent subwatersheds to include post-fire habitat. All of the activities in Appendix C have been considered for their cumulative effects on primary cavity excavators.

Past timber harvest, fire suppression, road construction, wildfire, and firewood cutting have all impacted the quality, quantity, and distribution of suitable snag habitat within the project area. The High Roberts Fire, which burned in 2002, just north Summit Logan Valley Grazing Authorization Project area, may currently provide nesting habitat for several primary cavity excavators. Prescribed underburning in the Merit Timber Sale area may also provide some post-fire habitat. Cattle grazing would not add cumulatively to existing snag habitat within green or burned conifer stands.

Large diameter aspen and snags within the project area also provide nesting and foraging habitat for woodpeckers, specifically downy woodpeckers, and red-naped sapsuckers. Conifer encroachment, along with grazing by domestic and wild ungulates, continues to degrade aspen stands and in the long-term may result in loss of habitat for these species. Larger aspen stands within the project area are more resilient, and would persist in the short- to mid-term. Without successful recruitment of sapling size replacement trees, some small stands may die out. Ongoing aspen restoration projects have protected some aspen within the project area by fencing or slash barriers.

In the short-term, public firewood cutting is expected to continue along open roads. It is foreseeable that the Malheur Forest Access Travel Management Plan (ATMP) would prohibit cross country travel on the Malheur National Forest with the exception of travel from designated open roads to dispersed camp areas. It is expected that with the implementation of the ATMP there would be reduced access for firewood cutting and improved retention of large diameter snags.

Overall, the combined effects of the Summit Logan Valley Grazing Authorization Project with the effects of past, present, and reasonably foreseeable future activities would not be expected to adversely affect populations of primary cavity excavators on the Forest.

Conclusion

While there may be impacts to individuals or habitat, populations of primary cavity excavators and other species associated with dead wood habitats within conifer stands would be expected to be maintained at the Forest level.

Nesting habitat associated with aspen stands (live trees as well as snags) may continue to be adversely impacted in the long term, possibly impacting individual downy woodpeckers or red-

naped sapsuckers, and other woodpeckers. Retention of aspen by fencing or creating slash barriers as part of ongoing and future restoration projects would maintain a level of aspen stands within the project area.

Featured Species

Alternative 1 - No Grazing

Direct, Indirect and Cumulative Effects

Under the No Action Alternative, there would be no management activities, no grazing would occur on any of the allotments. Impact to upland and riparian forage and shrubs from domestic livestock would be eliminated. Depending on wildlife browse and use, the potential for riparian recovery could be faster with this alternative. Lack of competition for forage from cattle could be beneficial for featured species such as pronghorn antelope and beaver. Re-establishment of beaver along more stream reaches within the project area could accelerate riparian recovery (see discussion below). Improvements in riparian habitat may benefit foraging for blue grouse, as well as improve the prey base of small mammals for northern goshawk, or fish abundance for osprey.

Since there would be no activities occurring with this alternative there would be no direct or indirect, or cumulative effects to featured species or their habitat.

Alternative 2, 3 & 4

Direct and Indirect Effects

Impacts to featured species or habitat would depend on timing of cattle grazing, and concentration of animals within pastures containing riparian habitat. Because of variations in dates of turn-out, not all areas of potential habitat would be impacted by cattle in a given grazing season. Use levels and move triggers scheduled for all allotments within their respective riparian habitat conservation areas (RHCAs) are designed to restore riparian vegetation and shrub habitat.

There would be no impacts to goshawk nesting habitat, osprey nesting habitat (snags), or blue grouse winter roosts. Impacts for these species would stem from impacts to their respective prey base or foraging areas. Improvements in riparian shrub density and age classes, as well as herbaceous cover, would improve habitat for small mammals, birds (northern goshawk prey), fisheries (osprey prey), or blue grouse foraging areas.

Cattle grazing may displace female pronghorns. Because turn-out dates would be in mid- June or later, this would not impact newly born fawns. Most antelope have had their young by June. Because these animals are mobile, they may simply move to other areas along the forest edge to avoid competition and disturbance. Pond construction or spring development may provide water sources for pronghorn. Depending on number of cattle trampling, mudding water and manure may make ponds less palatable as drinking sources late season.

Monitoring use levels and assessing impact to upland, meadow habitat, riparian habitat and native vegetation would be critical for determining trends in habitat improvement.

Adaptive management strategies such as reduced time in any given pasture, or reduced numbers of cattle, as well as additional fencing to exclude use would all benefit riparian habitat.

During project operations (fence maintenance, new fence or catch-pen construction, water developments) a degree of disturbance and displacement of wildlife are likely.

Goshawks are highly sensitive to disturbance during the breeding season. Seasonal restrictions on activities occurring within ½ mile of occupied nests have been regularly used to reduce impacts to nesting birds. If a new northern goshawk nest were discovered during fence or water development layout, these timing and distance restrictions would be implemented (See Design Elements, chapter 2).

There may be some incidental loss of smaller snags during layout and construction of proposed fences, catch pen, or water developments. Any layout design should avoid impacting large snags potentially used by osprey, particularly if within 1/2 mile of the Malheur River, Summit Creek, Big Creek or Lake Creek, or in vicinity of known nests. (LRMP #54, IV-31).

In addition, the District wildlife biologist would be contacted if new raptor nests or roost trees are discovered during project layout of fences or water developments. Appropriate buffers and timing restrictions would be implemented (See Design Elements, chapter 2).

Timing restrictions limiting motorized vehicle use in calving and fawning areas would minimize disturbance to antelope using meadow and open ponderosa pine areas within the Summit Logan Valley Grazing Authorization Project area. Fences may impact pronghorn antelope. Fence designs with minimum lower wire height and smooth bottom wire would help facilitate antelope movement (See Design Elements, chapter 2).

Beaver

Grazing management that allows for recovery of herbaceous vegetation and riparian hardwoods could increase the expansion of beaver within the project area. Even if riparian hardwoods are not fully reestablished, beaver may expand their range by using herbaceous vegetation for summer forage, and conifers and other materials for dam construction (Kranich, personal observation).

Beaver dams have the potential to raise water tables, store water for late season flow, trap sediment, reduce channel erosion, enhance and expand establishment and production of aquatic herbaceous vegetation, as well as expand willow and other riparian hardwoods at the edges or along suitable substrate within these saturated wetlands (Baker 2003, Carex Working Group 2012). Saturated soils often deter cattle and wild ungulates, providing some protection for riparian hardwoods within these sites. Even when dams deteriorate or fail, either due to flood events, or loss of beaver by predation, trapping, or movement to other areas, downstream deposition of material from behind the dams may provide sites for willow and other riparian hardwood establishment (Hall 2005, Demmer and Beschta 2008).

Increased abundance and diversity of herbaceous as well as riparian hardwood species could increase overall species richness of insect populations, as well as that of small mammal, bird, and bat species.

Once beaver become established in an area, grazing management may become more critical. Beaver cut willows at the base, which stimulates suckering and growth, while tip browsing by both wild and domestic animals can arrest growth (Kindschy 1985). Heavy browsing by ungulates, in addition to riparian hardwood use by beaver, can be detrimental for shrub recovery (Baker 2003). However, beaver currently exist on both Lake Creek and Big Creek within Logan

Valley, and their activities appear to be compatible with some level of cattle grazing. Willows and other hardwoods are present in both areas.

Alder and willow within the exclosure on Summit Creek also appear to be healthy. This exclosure has existed since the 1980's and photo points have documented shrub development since the area was fenced (District Range Photo points, 1986 to 2010). Elk and deer are able to negotiate the fence to access this exclosure, the fence only restricts cattle access. Freshly cut lodgepole pine and peeled sticks from beaver activity were noted in the exclosure in May 2012 (Kranich, personal observation).

Cumulative Effects

The area considered for cumulative effects to featured species and their habitat is the project area. All of the activities in Appendix C have been considered for their cumulative effects on these species. Past activities, actions, and events in the analysis area have contributed to create the existing condition in the project area.

Past historic grazing practices heavily impacted big game habitat within the Summit Logan Valley Grazing Authorization Project. Changes in livestock management have improved habitat conditions over time. Livestock grazing is expected to continue. Livestock turned out later in the spring are not expected to conflict with antelope fawning periods. Forest Plan grazing standards are established to provide sufficient forage to support both wildlife and domestic ungulates. Improvements to riparian habitat would benefit all of the above featured species, either directly, or indirectly by improving forage for their prey species. Upland water developments may provide sources of water for big game depending on season of use, number of cattle and their impacts to the water source.

Past commercial harvest and thinning, fire suppression, wildfire, and personal use firewood cutting have affected the quality and quantity of large nest tree habitat, snag habitat, and winter roost habitat. There may be some incidental loss of smaller snags during layout and construction of proposed fences, catch pen, or water developments. Design Elements are in place to limit losses of larger snags.

Conclusion

Cumulatively, and with Design Elements in place, any impacts to featured species or their habitat from the action alternatives is expected to be minimal. Although individual animals may be disturbed, any of the above activities would not be expected to adversely impact featured species populations.

Landbirds including Neotropical Migratory Birds

Alternative 1 - No Grazing

Direct, Indirect and Cumulative Effects

Under the No Action Alternative, there would be no management activities, no grazing would occur on any of the allotments. Impact to upland and riparian forage and shrubs from domestic livestock would be eliminated.

Habitats and associated species that would benefit from no grazing include Riparian Shrub, Steppe Shrubland, Montane Meadow, and Aspen. Habitats and associated species less impacted by the No Action Alternative include Dry Forest Old Growth and Mesic Mixed Conifer.

Because there are no direct or indirect effects to neotropical migratory birds, landbirds, or their habitat, as a result of No Action, there would be no additive cumulative effects.

Alternative 2, 3 & 4

Direct and Indirect Effects

Dry Forest Old Growth Habitat and Dependent Species and Mesic Mixed Conifer Old Forest and Dependent Species

Depending on canopy cover and overstory shading, Dry Forest Old Growth and Mesic Mixed Conifer Old Forest habitat may have less available forage, or less palatable forage, and consequently may be less impacted by cattle grazing. Depending on season of use, some ground nesting birds within this habitat could be impacted by trampling or loss of cover and exposure of nests. Early season grazing would have the greatest impact. Not all areas of potential habitat would be affected by cattle in a given grazing season.

Montane Meadow, Shrub Steppe Habitats

Impacts to montane meadow or shrub steppe habitats would depend on timing of cattle grazing, and concentration of livestock within these pastures. Early season grazing may have the greatest impact to ground nesting birds by cattle trampling eggs, or by reducing cover through grazing and increasing the exposure of nests. Because of variations in dates of turn-out, not all areas of potential habitat would be impacted by cattle in a given grazing season.

Monitoring use levels and assessing impact to native vegetation with these grassland, meadow, and shrub steppe habitats would be critical for determining trends in habitat improvement.

Adaptive management strategies such as reduced time in any given pasture, or reduced numbers of cattle, as well as additional fencing to exclude use would all benefit these habitats.

Primary species to benefit from montane meadow include savannah sparrow, long-billed curlew, Wilson's phalarope, Wilson's snipe (common snipe), and sandhill crane (Altman 2000). All of these species have been documented in the project area.

Primary species to benefit from shrub steppe habitat include vesper sparrow, Brewer's sparrow, lark sparrow and long-billed curlew (Altman 2000). All of these species have been documented in the project area.

Riparian Shrublands

Impacts to riparian shrublands would also depend on timing of cattle grazing, and concentration of livestock within these pastures. Use levels and move triggers designed to improve riparian conditions for fisheries would also improve these areas for neotropical migratory birds.

Early season grazing may have the greatest impact to ground nesting birds by cattle trampling eggs, or by reducing cover through grazing and increasing the exposure of nests. Because of variations in dates of turn-out, not all areas of potential habitat would be impacted by cattle in a given grazing season.

Monitoring use levels and assessing impact to native vegetation within these riparian habitats would be critical for determining trends in habitat improvement.

Adaptive management strategies such as reduced time in any given pasture, or reduced numbers of cattle, as well as additional fencing to exclude use would all benefit these habitats.

Fences, especially those in riparian areas, may impact non-game wildlife; bats, song birds, and flying squirrels can become impaled on barbs. Raptors, in particular owls, can fly into fences while pursuing prey species (Paige, 2008). Although likely incidental, these interactions have potential to cripple or kill individual animals.

Properly maintained fences minimize the possibility of animals becoming caught in loose or tangled wires. Let-down fences used in areas of heavy snow-pack benefit wildlife because they are laid flat on the ground during the non-grazing season, removing the barrier. Several other modifications to fences that reduce impacts to wildlife are illustrated in "A Landowner's Guide to Wildlife Friendly Fences: How to Build Fence with Wildlife in Mind" (Paige 2008). Water developments such as troughs are required to have wildlife escape ramps installed to prevent drowning of small mammals or birds.

Aspen

Where aspen occur within riparian areas, use levels and move triggers designed to improve riparian shrub recruitment and growth may also provide a level of protection and monitoring for those stands.

However, unprotected aspen stands may continue decline. Conifer shading and competition, along with grazing pressure from cattle as well as wildlife are adversely impacting these stands. Currently aspen snags and large mature aspen exist within the project area. As these stands continue to age, lack of saplings as replacements for older trees would result in a reduction and eventual loss of aspen stands in the long-term. This would directly impact downy woodpeckers, and red-naped sapsuckers, species which use aspen stands extensively for nesting and foraging. Other primary cavity excavators using aspen habitat include Lewis's and white-headed woodpeckers, Williamson's sapsucker, northern flicker, and hairy woodpecker. Numerous secondary cavity nesters as well as small mammals and bats would be impacted by loss of aspen stands.

Aspen restoration projects (Logan Valley Meadow and Aspen Restoration project, and Merit Timbersale project) have protected some aspen within the project area by removing conifers, and fencing or creating slash barriers around the stands. The Logan Valley project is ongoing. Stands that have received some measure of conifer removal or protection would maintain aspen within the project area. Monitoring would determine if appropriate use levels by cattel are allowing aspen suckers to develop the sapling stage (see Chapter 2 Monitoring).

Effects Common to All (above listed landbird habitat)

During project implementation (cattle off-loading, cattle grazing, fence maintenance, fence construction, water development construction) a degree of disturbance and displacement of wildlife is likely. Disturbance and displacement of wildlife depends on the season of the year and the tolerance of the species and individuals. Overall, disturbance from activities would be limited in time and place, and therefore, would not be expected to impact populations of species at the landscape level.

Cumulative Effects

Cumulative effects were analyzed at the project area level. All of the activities listed in Appendix C were considered for their cumulative effects on neotropical migratory birds or their habitat.

Livestock grazing earlier in the century impacted grassland and riparian habitat within the Summit Logan Valley Grazing Authorization Project. Over time, and with changes in grazing management, habitat has improved. It is expected that the current proposed use levels for all alternatives would continue an upward trend in grassland and riparian habitat. As a result, diversity and abundance of prey species for neotropical migratory birds and landbirds would be expected to improve.

Ongoing aspen restoration (which includes conifer removal and protection) is expected to hold a percentage of aspen stands on the landscape. Monitoring is needed to assess the continued long-term impact of grazing on aspen habitat and to implement effective management strategies to lessen these impacts.

Overall, the combined effects of the Summit Logan Valley Grazing Authorization Project with the effects of past, present, and reasonably foreseeable future activities would not be expected to adversely affect populations of neotropical migratory birds (NTMB) and landbirds on the Forest.

Conclusion
Overall, while there may some impacts to individuals or habitat, the proposed actions are not expected to adversely impact NTMB species and landbird populations at the Forest level.

Consistency with Direction and Regulations

Threatened, Endangered and Sensitive Species

A Biological Evaluation (BE) and Wildlife Specialist Report has been prepared and evaluates the potential effects of livestock grazing on wildlife species and their associated habitat within the Summit Logan Valley Grazing Authorization Project. The Proposed Action is consistent with the Endangered Species Act. The proposed action would be expected to have **No Effect (NE)** to threatened Canada lynx and **No Impact (NI)** to the sensitive gray wolf, bald eagle, California wolverine, and Johnson's hairstreak butterfly. Contingent on monitoring, there would be No Impact (NI) to upland sandpipers.

The proposed action **May Impact Individuals or Habitat (MIIH)** of sensitive greater sage-grouse, silver-bordered fritillary, bobolink, grasshopper sparrow, Lewis's woodpecker, white-headed woodpecker, Townsend's big-eared bat, pallid bat, fringed myotis, Columbia clubtail dragonfly, and Columbia spotted frog, but would not likely contribute to a trend towards federal listing.

Old Growth

Management Area 13 – Old Growth – The goals of this management area are to provide "suitable" habitat for old growth dependent wildlife species, ecosystem diversity, and preservation of aesthetic qualities. Within the Summit Logan Valley Grazing Authorization Project area, the acres mapped as MA-13 would stay the same.

<u>Connectivity</u>

For all alternatives, existing connectivity is expected to remain the same.

<u>Summer Range Cover</u>

For all alternatives, summer range cover is expected to remain the same.

<u>Snags and Down Logs</u>

For all alternatives, snags and down logs are not targeted for removal. Cattle grazing would not impact these structures. Overall snag and down log quantities are expected to stay about the same, with only incidental impacts to this habitat from clearing right-of-way for new fence construction, or water developments.

Featured Species

Goshawk

If nest sites are active, management activities would be prohibited within ½ mile of the nest sites from April 1 to September 30 to avoid disturbing goshawks during the breeding season.

Blue Grouse

For blue grouse, the action alternatives are not expected to impact winter roost habitat.

Osprey

The action alternatives include Design Elements to maintain osprey nest trees and snags on the landscape and minimize disturbance to nesting birds. These measures meet Forest Plan direction.

Antelope

Design elements including timing restrictions in fawning areas and fence designs to facilitate antelope movement, would minimize disturbance to antelope using meadow and open ponderosa pine areas within the Summit Logan Valley Grazing Authorization Project area. These measures meet Forest Plan direction.

Landbirds

The Proposed Action is consistent with the 1918 Migratory Bird Treaty Act (MBTA) and the Migratory Bird Executive Order 13186. The Proposed Action was designed under current Forest Service policy for landbirds. The Northern Rocky Mountains Bird Conservation Plan (Altman 2000) and the U.S. Fish and Wildlife Service's Birds of Conservation Concern (USFWS 2008) were reviewed for effects disclosure. The Proposed Action alternative was designed to protect or enhance priority habitats for landbird species, including neotropical migratory species.

Irreversible and Irretrievable Commitments

The project as described would not result in any irreversible or irretrievable effects to the wildlife resource. The project moves habitat conditions towards the historic condition. Therefore there are no irreversible or irretrievable commitments.

Other Laws, Regulations and Policies

National Historic Preservation, Treaty Rights, Executive Order 12875, Executive Order 13287 and American Antiquities Act of 1906

See Heritage under Consistency with Direction and Regulations.

Environmental Justice, Executive Order 12898

See Social and Economic Effects Section under Consistency with Direction and Regulations.

Migratory Bird Treaty Act (MBTA)

See Wildlife Effects Section under Consistency with Direction and Regulations.

Clean Water Act

See Hydrology and Aquatics effects under Consistency with Direction and Regulations.

Floodplains, Executive Order 11988

See Hydrology and Aquatics effects under Consistency with Direction and Regulations.

Wetlands (Executive Order 11990)

See Hydrology and Aquatics effects under Consistency with Direction and Regulations.

Endangered Species Act

See Wildlife, Hydrology and Aquatics, and Botany Sections.

Climate Change

The effects of proposed livestock grazing on climate change, aren't measurable and are likely insignificant at the global scale.

National Forest management Act (NFMA)

The analysis and proposed activities are consistent with the direction in the Forest Plan. The Forest Plan was developed and amended per guidance from NFMA.

Multiple-Use Sustained Yield Act of 1960

The four alternatives considered in detail meet the intent of the Multiple-Use Sustained Yield Act. They ensure that recreation, fish and wildlife, water, timber resources are available for current and future generations, however only the three action alternatives ensure that grazing resources are available for both current and future generations in the project area.

Municipal Watersheds

There are no designated municipal watersheds in the Summit Logan Analysis area.

Consumers, Civil rights, Women, and Minorities

Consumers, the civil rights of individuals and groups, including minorities and women, and the rights of American Indians indentified by the American Indian Religious Freedom Act of 1978 would not be adversely affected by implementation of any alternative under consideration. Indirect affects on these groups my result from job opportunities created or maintained by authorizing grazing on allotments and pastures in the projected area with Alternatives 2, 3, and 4. Such employment opportunities would not be provided with implementation of Alternative 1 (No Grazing).

Unavoidable Adverse Effects

There would be no unavoidable adverse effects to resources with implementation of the Grazing Alternatives under consideration. Implementation of Alternative 1 (No Grazing) would have an adverse economic effect upon permittees and their employees.

Chapter 4

Consultation and Coordination

The Forest Service consulted the following individuals, tribes, Federal, state and local agencies, and non-forest Service persons during the development of this environmental impact statement:

List of Preparers

Interdisciplinary Team

Name	Expertise	Years	Education
Shannon Britt	Rangeland Vegetation & Invasive Species	24 years	Bachelor of Science, Rangeland Resource Management
Joseph Rausch	Botany/Ecology	11 years	Doctor of Philosophy, Botany
Robert "Hersh" McNeil	Soil Science	22 years	Doctor of Philosophy, Forestry
Bob Hassmiller	Hydrology	5 years	Bachelor of Science, Resource Conservation
Dan Armichardy	Fisheries	6 years	Masters of Science, Biology (emphasis on Fish Migration)
Shannon Winegar	Recreation & Visual Quality	27 years	Bachelor of Nursing
Mary Robertson	Archaeology	20 years	Masters of Science (emphasis on Archaeology)
Susan Burton	Social & Economics	30 years	Bachelor of Science, Rangeland Management
Cindy Kranich	Wildlife Biology	29 years	Bachelor of Science, Wildlife Biology
Ryan Falk	Environmental Coordinator	28 years	Bachelor of Science, Forest Management
Lisa Weigum	Writer/Editor	9 years	Bachelor of Social Science, Philosophy, Politics & Economics (emphasis on Public Administration)

Contributors

Tribes

Confederated Tribes of the Warm Springs Reservation

Confederated Tribes of the Umatilla Indian Reservation

Burns Paiute Tribe

Federal, State and Local Agencies

Bureau of Land Management (BLM), John Day

Oregon State Historic Preservation Office (SHPO)

Oregon Department of Fish and Wildlife

Oregon Department of Forestry

Grant County Court

Persons who Responded During the Scoping Process

Linda Driskill

Blue Mountains Biodiversity Project

Oregon Wild

Oregon Natural Desert Association

Chapter 5

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Index

A

Allowable Use: 4, 10, 15, 14, 29, 33, 46, 48, 49, 50, 51, 53, 54, 56, 57, 60, 62, 63, 76, 78, 93, 98, 99, 105, 120, 140, 141, 143, 179, 196, 201, 203, 204, 205, 207, 208, 209, 210, 212, 213, 214, 234, 272, 290, 330, 331, 379
Anadromous Fish: 23, 25, 143, 293, 319
Animal Unit Months (AUMs): 9, 12, 13, 14, 16, 18, 37, 40, 42, 43, 46, 48, 50, 53, 54, 56, 60, 62, 66, 67, 68, 69, 85, 99, 101, 102, 110, 114, 239, 240, 365
Aquatic Habitat: 1, 8, 9, 10, 23, 30, 31, 35, 40, 43, 44, 45, 48, 57, 59, 104, 108, 111, 153, 156, 166, 169, 177, 179, 180, 184, 187, 188

B

Bull Trout, 1, 3, 8, 9, 10, 12, 15, 18, 20, 25, 26, 28, 30, 31, 32, 37, 38, 40, 42, 43, 44, 46, 48, 50, 51, 53, 57, 58, 60, 76, 83, 85, 97, 98, 99, 102, 112, 143, 147, 148, 149, 150, 152, 155, 158, 159, 160, 161, 162, 163, 164, 165, 166, 168, 169, 170, 171, 174, 175, 177, 180, 182, 183, 186, 187, 188, 189, 190, 191, 193, 194, 195, 196, 197, 199, 200, 201, 202, 203, 204, 206, 207, 208, 209, 210, 211, 212, 213, 214, 290, 291, 292, 293, 294, 335

C

Capability: 40, 79, 94, 95, 99, 100, 142, 143, 174, 199, 206, 375, 376
Carex Working Group: 5, 6, 7, 62, 63, 64, 65, 80, 149, 150, 151, 153, 165, 166, 169, 171, 196, 203, 214, 276, 288, 291, 307, 308, 309, 310, 311, 312, 314, 315, 316, 317, 319, 321, 322, 323, 324, 325, 326, 328

D

Dedicated Old Growth: 25, 273, 366

Deferment: 2, 3, 4, 9, 11, 14, 32, 33, 43, 45, 46, 47, 48, 50, 59, 60, 66, 69, 86, 87, 88, 89, 90, 108, 109, 110, 113, 114, 190, 200, 366
Deferred Rotation : 3, 10, 11, 13, 14, 33, 44, 47, 48, 51, 54, 56, 57, 62, 68, 86, 88, 89, 106, 107, 109, 110, 113, 114, 366
Designated Critical Habitat: 10, 25, 51, 213
Desired Conditions: 2, 30, 31, 39, 40, 78, 79, 120, 125, 144, 145, 151, 153, 169, 172, 173, 175, 177, 178, 179, 183, 186, 187, 188, 189, 191, 192, 193, 196, 198, 199, 202, 203, 204, 205, 206, 208, 210, 211, 212, 379
Downward Trend: 26, 171, 187, 210, 376

E

Economic: 1, 31, 34, 36, 40, 100, 115, 116, 120, 150, 231, 235, 236, 237, 238, 239, 241, 242, 243, 244, 245, 283, 373, 376
Endpoint Indicators: 4, 33, 46, 48, 50, 53, 56, 60, 62, 177, 198, 211, 212
Existing Condition: 10, 30, 40, 51, 57, 129, 133, 149, 150, 151, 152, 153, 154, 155, 165, 166, 169, 171, 175, 176, 177, 179, 184, 186, 187, 188, 198, 205, 227, 270, 277

F

Functioning-at-Risk (FAR): 2, 8, 26, 30, 31, 37, 41, 151, 154, 155, 168, 171, 172, 179, 187, 190, 191, 194, 195, 196, 197, 198, 199, 210, 211, 307, 308, 312, 313, 314, 368
Fence Maintenance: 8, 37, 110, 111, 112, 218, 221, 276, 279
Forage Production: 40, 93, 95, 101, 116, 119, 365, 366, 368, 371, 376, 380

G

Grazing: iii, 1, 2, 3, 4, 7, 8, 9, 10, 10, 14, 15, *19*, *21*, 23, 25, 26, 27, 29, 30, 31, 32, 33, 34, 35, 37, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 59, 60, 61, 62, 66, 68, 69, 73, 75, 76, 77, 78, 79, 80, 82, 85, 86, 87, 88, 89, 92, 93, 94, 95, 96, 97, 98, 99, 100, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 125, 130, 131, 132, 133, 136, 137, 138, 139, 140, 141, 142, 143, 145, 147, 148, 149, 152, 153, 155, 161, 162, 165, 166, 167, 169, 170, 172, 173, 175, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 208, 209, 211, 216, 217, 220, 221, 222, 223, 224, 225, 229, 230, 231, 232, 233, 234, 236, 237, 238, 239, 240, 242, 243, 244, 245, 253, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 286, 287, 288, 291, 292, 293, 294, 332, 360, 361, 362, 363, 365, 366, 367, 368, 369, 371, 372, 374, 376, 377, 379, 380
Grazing System: 2, 3, 4, 10, 11, 13, 14, 31, 32, 33, 44, 45, 46, 47, 48, 50, 52, 54, 56, 58, 59, 60, 61, 62, 66, 68, 69, 107, 110

I

INFISH: 1, 2, 18, 23, 24, 25, 31, 78, 79, 144, 149, 151, 153, 157, 165, 167, 169, 170, 171, 174, 185, 187, 194, 214, 293, 307, 308, 309, 310, 311, 320

M

Monitoring: 9, 15, 22, 29, 35, 41, 42, 45, 49, 73, 75, 77, 78, 79, 80, 81, 82, 94, 95, 97, 106, 108, 128, 146, 148, 149, 150, 151, 152, 153, 165, 166, 167, 168, 169, 170, 171, 178, 179, 183, 196, 203, 204, 205, 210, 214, 233, 237, 244, 252, 256, 257, 258, 259, 260, 262, 263, 264, 265, 266, 267, 269, 273, 275, 278, 279, 280, 285, 286, 287, 288, 289, 291, 293, 294, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 335, 365, 366, 367, 379
Move Triggers: 4, 10, 11, 12, 13, 14, 15, 33, 38, 46, 48, 49, 50, 51, 53, 56, 57, 60, 62, 84, 86, 88, 89, 99, 108, 111, 117, 120, 264, 265, 266, 267, 269, 270, 272, 273, 275, 278, 279, 379, 380

P

Proper Function Condition (PFC): 6, 9, 16, 26, 30, 37, 40, 43, 65, 78, 81, 83, 149, 151, 152, 153, 154, 155, 165, 166, 167, 168, 169, 170, 171, 172, 175, 176, 177, 179, 181, 182, 183, 184, 186, 187, 189, 191, 194, 195, 196, 197, 198, 199, 200, 202, 203, 204, 205, 206, 207, 209, 210, 211, 212, 213, 286, 287, 288, 289, 291, 293, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 319, 320, 325, 326, 327, 328, 329, 332, 333, 372

R

Recovery: v, 2, 5, 8, 9, 10, 15, 16, 17, 18, 21, 28, 29, 31, 35, 37, 38, 39, 40, 41, 42, 43, 45, 48, 49, 51, 55, 57, 58, 59, 61, 62, 63, 69, 78, 79, 80, 83, 84, 85, 86, 88, 89, 98, 103, 104, 106, 107, 108, 109, 110, 111, 112, 113, 115, 116, 117, 118, 119, 120, 121, 125, 137, 138, 139, 140, 141, 142, 143, 146, 147, 148, 149, 151, 152, 153, 154, 155, 160, 161, 165, 166, 169, 171, 172, 174, 175, 177, 178, 183, 185, 186, 187, 188, 191, 193, 195, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 234, 245, 254, 269, 275, 276, 291, 294, 303, 312, 325, 332, 379, 380, 381, 382, 383
Replacement Old Growth: 25, 273, 373

Rest: 2, 4, 9, 10, 11, 14, 16, 17, 32, 33, 37, 40, 41, 43, 45, 46, 47, 48, 49, 50, 51, 53, 54, 55, 57, 59, 60, 61, 62, 63, 66, 69, 83, 86, 87, 89, 106, 108, 109, 111, 113, 114, 115, 116, 117, 118, 119, 121, 133, 136, 139, 140, 141, 148, 154, 156, 163, 177, 183, 187, 188, 189, 190, 191, 192, 193, 194, 195, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 210, 211, 212, 214, 234, 330, 331, 332, 333, 374, 380
Riparian Areas: 2, 8, 9, 10, 30, 31, 37, 39, 40, 42, 44, 51, 57, 71, 78,79, 80, 98, 103, 104, 106, 107, 108, 110, 111, 113, 114, 115, 117, 119, 120, 121, 128, 129, 135, 137, 138, 139, 140, 142, 143, 144, 145, 147, 148, 149, 151, 152, 153, 154, 155, 159, 171, 177, 178, 181, 182, 184, 187, 188, 191, 192, 193, 199, 200, 204, 205, 207, 211, 213, 217, 219, 250, 264, 266, 270, 273, 279, 286, 290, 291, 294, 360, 361, 363, 364, 366, 375, 380
Riparian Exclosures: 8, 9, 16, 37, 54, 61, 83, 118, 172
Riparian Habitat Conservation Areas (RHCAs): 24, 25, 145, 157, 185, 187, 214, 267, 275, 361 373
Riparian Management Objectives: 1, 2, 25, 31, 78, 185, 187, 192, 194
Riparian Pastures: 8, 17, 37, 40, 43, 54, 108, 109, 111, 115, 117, 118, 119, 120, 121, 141, 147, 162, 182, 183, 195, 196, 198, 201, 202, 203, 205, 206, 207, 208, 209, 210, 234, 242, 273, 330
Riparian Vegetation: 1, 9, 10, 30, 31, 34, 43, 51, 58, 75, 80, 104, 106, 107, 109, 117, 121, 142, 143, 146, 150, 152, 153, 154, 155, 163, 175, 177, 180, 181, 182, 183, 185, 186, 187, 198, 199, 201, 208, 213, 233, 251, 257, 264, 266, 267, 271, 272, 275, 286, 287, 290, 291, 292, 373, 375

S

Suitability: 40, 95, 99, 100

T

Total Maximum Daily Load (TMDL): 5, 63, 146, 292, 320

U

Uplands: 4, 10, 15, 26, 27, 28, 29, 34, 43, 50, 56, 58, 61, 62, 69, 81, 93, 96, 99, 103, 104, 107, 110, 111, 113, 114, 117, 120, 121, 137, 139, 141, 148, 192, 199, 201, 208, 363, 373
Uard Trend: 2, 31, 42, 104, 143, 188, 191, 194, 202, 203, 209, 214, 257, 258, 259, 261, 265, 266, 267, 268, 280, 321, 322, 323, 324, 325

V

Visual Corridors: 24, 25, 224

W

Water Temperature: 1, 30, 31, 144, 146, 149, 154, 165, 166, 167, 169, 170, 172, 175, 177, 179, 180, 181, 182, 183, 184, 188, 191, 195, 196, 198, 201, 203, 204, 205, 208, 209, 210, 214
Wild and Scenic River*: 19*, 24, 25, 225, 228

Appendix A
Part 1: Existing and Desired Condition

Stream/Reach	Vegetation Community Potential	Existing Condition	Long-Term Desired Condition
Summit Creek Reach 1 ▪ Functional At Risk (FAR), No Apparent Trend (2007) ▪ Summit Prairie allotment ▪ Sagehen unit	Constrained, rocky reached that are dominated by alder thickets and conifers with occasional scattered willows (Carex Working Group 2012, PFC 2007).	**Stream Shade:** Ranges from 23% (Wall 2009) to 45% (Carex Working Group 2012).	Increase hardwood shade component. Shade 65% or greater (TMDL 2010).
		Shrub Development: The vast majority of shrubs are alders less that 6 ft. tall (average height of 3 ft.) and are moderately browsed with an average utilization of 55%; shrub density is 63 shrubs per 100 m of streambank (Carex Working Group 2012, Rausch 2012).	Increase shrub development: ≤ 30% shrub utilization (INFISH 1995); majority of shrubs > 6 ft. tall (Carex Working Group 2012); ≥ 80 shrubs per 100 m of streambank (Carex Working Group 2012, Rausch 2012).
		Undercut Banks: Undercut banks is not an appropriate measure for this reach because of the type of vegetation does not develop a root mass and the scour line width will be wider than a herbaceous site, the streambank soil texture and stream gradient attributes are also not conducive towards developing these features.	
		Stabilizing Plant Cover: Stabilizing plant cover is estimated at 60% (PFC 2007).	Greater than 80-95% stabilizing cover (Winward 2000, PFC 2007).
		Stable Banks: N/D	
Summit Creek Reach 2 ▪ FAR, Downward, No Apparent Trend (PFC 2007) ▪ Summit Prairie allotment ▪ Sagehen unit	Broad valleys with mesic terraces comprised of a mosaic of extensive willow thickets, alder, grasslands, and sedge wetlands in old meanders; occasional areas of sedge-dominated wetlands where lateral flows promote deep anoxic soils; also potential habitat for aspen and cottonwood groves (Carex Working Group 2012, PFC 2007).	**Stream Shade:** Ranges from 6-45% with an average of 24%; shade in sedge dominated portion is 8% (Carex Working Group 2012).	Increase hardwood shade component; shade ≥ 60% (CWG 2012) or ≥ 25% native floodplain grasses (TMDL 2010).
		Shrub Development: Alders and willows are the dominant shrubs, the majority of which are less than 3 ft. tall; all shrubs less than 6 ft. are heavily browsed with an average utilization 78%; floodplain shrub density is 81 shrubs per acre; shrub density of the > 6 ft. height class is 13 shrubs per acre (Carex Working Group 2012, Rausch 2012).	Increase shrubland development: ≤ 30% shrub utilization (INFISH 1995); majority of shrubs > 6 ft. tall (CWG 2012); ≥ 200 shrubs per acre of floodplain (Carex Working Group 2012; Rausch 2012).
		Undercut Banks: N/D	Undercut banks should be greater than 75%

Stream/Reach	Vegetation Community Potential	Existing Condition	Long-Term Desired Condition
			for non-forested systems.
		Stabilizing Plant Cover: Reach species present have a greenline stability rating of Mid (4.4), ecological status rating of Early Seral (35) and hydric plants at 49% (DMA 2010).	Greater than High (8.0 to 9.5) greenline stability rating (Winward 2000).
		Stable Banks: The reach currently has 60% stable banks (DMA 2010).	Greater than 90% stable banks (Amendment 29 % USFWS Properly Functioning criteria).
Summit Creek Reach 3 ▪ At Proper Functioning Condition (PFC 2007) ▪ Summit Prairie allotment ▪ Sagehen unit	Constrained, rocky reaches that are dominated by alder thickets, with occasional scattered willows (Carex Working Group 2012, PFC 2007).	**Stream Shade:** Ranges from 43% (Wall 2009) to 98% (Carex Working Group 2012).	Increased hardwood shade component; shade ≥ 80% (Amendment #29, TMDL 2011).
		Shrub Development: Alders are the dominant shrub with some willows also present; the vast majority of shrubs are greater than 6 ft. tall and shrubs less than 6 ft. are either not browsed or lightly browsed with average utilization less than 25%; shrub density is 97 shrubs per 100 m of streambank (Carex Working Group 2012, Rausch 2012).	Maintain shrub development: continue shrub utilization ≤ 25% (INFISH 1995); maintain abundance of shrubs > 6 ft. tall (CWG 2012); maintain existing density of shrubs at ≥ 80 shrubs per 100 m of streambank (Carex Working Group 2012; Rausch 2012).
		Undercut Banks: Undercut banks is not an appropriate measure for this reach because the type of vegetation does not develop a root mass and the scour line width will be wider than a herbaceous site, the streambank soil texture and stream gradient attributes are also not conducive towards developing these features.	
		Stabilizing Plant Cover: Stabilizing plant cover is estimated at 70% (PFC 2007).	Greater than 80-95% stabilizing cover (Winward 2000).
		Stable Banks: N/D	Greater than 90% stable banks (Amendment 29, USFWS Properly Functioning criteria).
Summit Creek Reach 4 ▪ FAR, Upward Trend	Broad valleys with mesic terraces comprised of a mosaic of extensive willow thickets, aspen, alder, grasslands, and sedge wetlands in old meanders;	**Stream Shade:** Ranges from 10-57% with an average of 32% (Wall 2009, Carex Working Group 2012).	Increased hardwood shade component: shade ≥ 60% (Carex Working Group 2012) or ≥ 25% for native floodplain grasses (TMDL 2010).
		Shrub Development: The vast majority of	Increase shrubland development: ≤ 30%

Stream/Reach	Vegetation Community Potential	Existing Condition	Long-Term Desired Condition
(2007) ▪ Summit Prairie allotment ▪ Sagehen unit	occasional areas of sedge-dominated wetlands where lateral flows promote deep anoxic soils; there is also potential habitat for cottonwood groves (Carex Working Group 2012, PFC 2007).	shrubs are willows with a fairly even distribution of shrub height classes; willows under 6 ft. are moderately browsed with an average utilization of 26%; however some areas within upper portions of the reach are primarily composed of willows less than 2 ft. tall with utilization that approaches 90%; overall floodplain shrub density is 49 shrubs per acre; shrub density of the > 6 ft. height class is 5 shrubs per acre (Carex Working Group 2012, Rausch 2012).	shrub utilization (INFISH 1995); majority of shrubs > 6 ft. tall (Carex Working Group 2012); ≥ 200 shrubs per acre of floodplain (Carex Working Group 2012; Rausch 2012).
		Undercut Banks: Undercut bank is estimated to be 22% (Wall 2009).	Undercut banks should be greater than 75% for non-forested systems.
		Stabilizing Plant Cover: Stabilizing plant cover is estimated at 75% (PFC 2007).	Greater than 80-95% stabilizing cover (Winward 2000).
		Stable Banks: N/D	Greater than 90% stable banks (Amendment 29 % USFWS Properly Functioning criteria).
Summit Creek Reach 5 ▪ At Proper Functioning Condition (PFC 2007) ▪ Summit Creek allotment ▪ Little Logan unit	Broad valleys with mesic terraces comprised of a mosaic of extensive willow thickets, aspen, grasslands, and sedge wetlands in old meanders; occasional areas of sedge-dominated wetlands where lateral flows promote deep anoxic soils; there is also potential habitat for cottonwood groves (Carex Working Group 2012, PFC 2007).	**Stream Shade:** Ranges from 8-51% with an average of 23% (Wall 2009, Carex Working Group 2012).	Increase hardwood shade component; shade ≥ 60% (Carex Working Group 2012).
		Shrub Development: The vast majority of shrubs are willows; no alders are present; willows are either over 6 ft. tall and caged or less than 2 ft. tall and heavily browsed with an average utilization of 97%; floodplain shrub density is 8 shrubs per acre; shrub density of the 3-6 ft. height class is 0.3 shrubs per acre (Carex Working Group 2012, Rausch 2012).	Increase shrubland development: ≤ 30% shrub utilization (INFISH 1995); majority of shrubs > 6 ft. tall (Carex Working Group 2012); ≥ 200 shrubs per acre of floodplain (Carex Working Group 2012; Rausch 2012).
		Undercut Banks: Present undercut bank was measured at 31% (site id: 952, PIBO 2011) and 29% (site id: 954, PIBO 2011).	Undercut banks should be greater than 75% for non-forested systems.

Stream/Reach	Vegetation Community Potential	Existing Condition	Long-Term Desired Condition
		Stabilizing Plant Cover: Stabilizing plant cover is estimated to be 55-60% (PFC 2007).	Greater than 80-95% stabilizing cover (Winward 2000).
		Stable Banks: The reach currently has 96% stable banks (site id: 952, PIBO 2011) and 100% stable banks (site id: 954, PIBO 2011).	Greater than 90% stable banks (Amendment 29, USFWS Properly Functioning criteria).
Summit Creek Reach 6 ▪ At Proper Functioning Condition (PFC 2007) ▪ Summit Prairie allotment ▪ Summit Rock unit	Sedge-dominated meadows and wetlands with lateral flow and deep anoxic soils, willows or alders along the stream bank (Carex Working Group 2012, PFC 2007).	**Stream Shade:** Ranges from 5-32% with an average of 18% (Wall 2009, Carex Working Group 2012).	≥ 25% for native floodplain grasses (TMDL 2010).
		Shrub Development: The majority of the reach is composed of sedge wetlands with occasional shrubs; the majority of shrubs are less than 2 ft. tall, and all shrubs are heavily browsed with average utilization greater than 90%; shrub density is 5 shrubs per 100 meters of streambank; shrub density of the > 3 ft. height class is 0.8 shrubs per 100 meters of streambank (Carex Working Group 2012, Rausch 2012).	Increase shrub development along streambank: ≤ 30% shrub utilization (INFISH 1995); majority of shrubs > 6 ft. tall (Carex Working Group 2012); ≥ 25 shrubs per 100 m of streambank (Carex Working Group 2012; Rausch 2012)
		Undercut Banks: Undercut bank is estimated to be 10% (Wall 2009).	Undercut banks should be greater than 75% for non-forested systems.
		Stabilizing Plant Cover: Stabilizing plant cover is estimated to be 77% (PFC 2007)	Greater than 80-95% stabilizing cover (Winward 2000).
		Stable Banks: N/D	Greater than 90% stable banks (Amendment 29 % USFWS Properly Functioning criteria).
Summit Creek Reach 7 ▪ At Proper Functioning Condition (PFC 2007)	Broad valleys with mesic terraces comprised of a mosaic of extensive willow and alder thickets, aspen groves, grasslands, and sedge wetlands in old meanders; occasional areas of sedge-dominated	**Stream Shade:** Ranges from 51-84% with an average of 64% (Carex Working Group 2012).	Increase hardwood shade component; shade ≥ 80% for alder-dominated areas (Amendment #29), ≥ 60% for mixed shrub areas (Carex Working Group 2012), or ≥ 25% native floodplain grasses (TMDL 2010).
		Shrub Development: Primarily a mixed shrub community; the majority of willows	Increase shrubland development: ≤ 30% shrub utilization (INFISH 1995); majority of

Stream/Reach	Vegetation Community Potential	Existing Condition	Long-Term Desired Condition
▪ Summit Prairie allotment ▪ North Summit unit	wetlands where lateral flows promote peat formation and deep anoxic soils; there is also potential habitat for cottonwood groves (Carex Working Group 2012, PFC 2007).	and alders are less that 3 ft. tall; Alders under 6 ft. are lightly browsed and willows under 6 ft. are heavily browsed with average utilizations of 26% and 100%, respectively; floodplain shrub density is 190 shrubs per acre; shrub density of the > 6 ft. height class is 9 shrubs per acre (Carex Work Group 2012, Rausch 2012).	shrubs > 6 ft. tall (Carex Work Group 2012); ≥ 200 shrubs per acre of floodplain (Carex Working Group 2012; Rausch 2012).
		Undercut Banks: N/D	Undercut banks should be greater than 75% for non-forested systems.
		Stabilizing Plant Cover: Reach species present have a greenline stability rating of High (6.7), ecological status rating of Later Seral (77) and hydric plants at 71% (DMA 2009).	Greater than High (8.0-9.5) greenline stability rating (Winward 2000).
		Stable Banks: The reach currently has 89% stable banks (DMA 2009).	Greater than 90% stable banks (Amendment 29, USFWS Properly Functioning criteria).
Summit Creek Reach 8 ▪ At Proper Functioning Condition (PFC 2007) ▪ Summit Prairie allotment ▪ Summit Rock unit	Headwater reaches dominated by conifers, alder, and aspen that also support shade-tolerant vegetation (Carex Working Group 2012, PFC 2007).	**Stream Shade:** Ranges from 55-83% with an average of 70% (Carex Working Group 2012).	Increase hardwood shade component; shade ≥ 80% (Amendment #29).
		Shrub Development: The vast majority of shrubs are alders with a fairly even distribution of height classes; alders under 6 ft. are lightly browsed with an average utilization of 24%, shrub density is 35 alder per 100 m of streambank; small aspen shoots are also present in some locations (Carex Working Group 2012, Rausch 2012)	Maintain and/or increase shrub development: continue shrub utilization ≤ 25% (INFISH 1995); increase proportion of shrubs > 6 ft. tall (Cared Working Group 2012); increase alder density to ≥ 80 shrubs per 100 m of streambank (Carex Working Group 2012; Rausch 2012).
		Undercut Banks: Undercut banks is not an appropriate measure for this reach because the vegetation type does not develop root mass. The scour line width will be wider than a herbaceous site, steambank soil texture and stream gradient attributes are not conductive towards developing these features.	

Stream/Reach	Vegetation Community Potential	Existing Condition	Long-Term Desired Condition
		Stabilizing Plant Cover: Stabilizing plant cover is estimated to be 75% (PFC 2007)	Greater than 80-95% stabilizing cover (Winward 2000).
		Stable Banks: N/D	Greater than 90% stable banks (Amendment 29, USFWS Properly Functioning criteria).
West Fork of Summit Creek Reach 1 ▪ FAR, Downward Trend (2007) ▪ Summit Prairie allotment ▪ West Summit Recovery unit	Vegetation potential is sedge/rush/grass with some alder There still are many of those plants present but Kentucky bluegrass is dominant and the site continues to dry out due to a lowering water table (PFC 2007).	**Stream Shade:** N/D	≥ 25% for native floodplain grasses (TMDL 2010).
		Shrub Development: The reach is primarily a sedge/rush grass meadow. A small areas of alder is present at the upper end of the reach (PFC 2007).	Greater than 25% sapling and young shrubs (Winward 2000, UI Stubble Height Study Results 2004).
		Undercut Banks: N/D	Undercut banks should be greater than 75% for non-forested systems.
		Stabilizing Plant Cover: Stabilizing plant cover is estimated to be 20% (PFC 2007)	Greater than 80-95% stabilizing cover (Winward 2000).
		Stable Banks: N/D	Greater than 90% stable banks (Amendment 29 % USFWS Properly Functioning criteria).
West Fork of Summit Creek Reach 2 ▪ FAR, Downward Trend (2007) ▪ Summit Prairie allotment ▪ Summit Rock unit	Potential vegetation is sedge/rush/grass with alder. Potential vegetation in the upper end is conifer story with an alder overstory (PFC 2007).	**Stream Shade:** N/D	Increase hardwood shade component; shade ≥ 80% for alder-dominated areas (Amendment #29), ≥ 60% for mixed shrub areas (Carex Working Group 2012), or ≥ 25% for native floodplain grasses (TMDL 2010).
		Shrub Development: The reach currently contains 20% seedlings and young age class shrubs (alder). Present mature age class is 80% (DMA 2008).	Greater than 25% sapling and young shrubs (Winward 2000, UI Stubble Height Study Results 2004).
		Undercut Banks: N/D	Undercut banks should be greater than 75% for non-forested systems.
		Stabilizing Plant Cover: Reach species present have a greenline stability rating of	Greater than High (8.0-9.5) greenline stability rating (Winward 2000).

Stream/Reach	Vegetation Community Potential	Existing Condition	Long-Term Desired Condition
		Mid (5.2), ecological status rating of Early Seral (30.5) and hydric plants at 31% (DMA 2008).	Greater than 64-78% hydrophytic vegetation (Winward 2000).
		Stable Banks: The reach currently has 47% stable banks (DMA 2008).	Greater than 90% stable banks (Amendment 29 % USFWS Properly Functioning criteria).
Crooked Creek Reach 1 ▪ FAR, Downward Trend (2007) ▪ McCoy Creek allotment ▪ Starvation unit	Vegetation potential is sedge/rush with some willows (PFC 2007).	**Stream Shade:** N/D	≥ 25% for native floodplain grasses (TMDL 2010)
		Shrub Development: Some willows are present but are not a dominate part of the reach. Three willow species were noted. Woody plants are released older plants (PFC 2007).	Greater than 25% sapling and young shrubs (Winward 2000, UI Stubble Height Study Results 2004).
		Undercut Banks: Undercut bank is estimated to be 73% (Wall 2009).	Undercut banks should be greater than 75% for non-forested systems.
		Stabilizing Plant Cover: Stabilizing plant cover is estimated to be 75% (PFC 2007).	Greater than 80-95% stabilizing cover (Winward 2000).
		Stable Banks: The reach currently has 97% stable banks (Stream Survey 1999).	Greater than 90% stable banks (Amendment 29, USFWS Properly Functioning criteria).
Lake Creek Reach 1 ▪ FAR, Upward Trend (2007) ▪ McCoy Creek allotment ▪ Starvation unit	Vegetation is dominated by sedge/rush/grass with willows (PFC 2007).	**Stream Shade:** N/D	Increase hardwood shade component; shade ≥ 60% (CWG 2012) or ≥ 25% for native floodplain grasses (TMDL 20 10).
		Shrub Development: Two willow species were noted. Due to recent changes in management, willows are more prevalent and vigorous. As the reach continues to recover there will be an increase in willow cover. Diverse age-class distribution of riparian-wetland vegetation is present (PFC 2007).	Greater than 25% sapling and young shrubs (Winward 2000, UI Stubble Height Study Results 2004).
		Undercut Banks: Undercut bank is estimated to be 85% (Wall 2009).	Undercut banks should be greater than 75% for non-forested systems.

Stream/Reach	Vegetation Community Potential	Existing Condition	Long-Term Desired Condition
		Stabilizing Plant Cover: Stabilizing plant cover is estimated to be 60% (PFC 2007).	Greater than 80-95% stabilizing cover (Winward 2000).
		Stable Banks: This reach currently has 91% stable banks (DMA 2008).	Greater than 90% stable banks (Amendment 29 % USFWS Properly Functioning criteria).
Lake Creek Reach 2 ▪ At Proper Functioning Condition (PFC 2007) ▪ McCoy Creek allotment ▪ Cow Camp unit	Potential vegetation is willow, sedge/rush communities (PFC 2007).	**Stream Shade:**	Increased hardwood shade component: shade ≥ 60% (Carex Working Group 2012) or ≥ 25% for native floodplain grasses (TMDL 2010).
		Shrub Development: Several willow species and mountain alder present. Diverse age-class distribution of riparian-wetland vegetation is present. Beaver colony activity present (PFC 2007).	Greater than 25% sapling and young shrubs (Winward 2000, UI Stubble Height Study Results 2004).
		Undercut Banks: Undercut bank is estimated to be 16% (Wall 2009).	Undercut banks should be greater than 75% for non-forested systems.
		Stabilizing Plant Cover: Stabilizing plant cover is estimated to be 80% (PFC 2007).	Greater than 80-95% stabilizing cover (Winward 2000). Greater than 64-78% hydrophytic vegetation (Winward 2000).
		Stable Banks: N/D	Greater than 90% stable banks (Amendment 29, USFWS Properly Functioning criteria).
Lake Creek Reach 3 ▪ FAR, Downward Trend (2007) ▪ Logan Valley allotment	Primary potential vegetation being conifer overstory with alder, willow and mesic Graminiods in the open areas while the lower end of the reach has little or no conifer overstory (PFC 2007).	**Stream Shade:** Shade average is 39% (Wall 2009).	Shade 60-80% in mixed shrub and conifer (Carex Working Group 2012) or ≥ 25% for native floodplain grasses (TMDL 2010).
		Shrub Development: The reach currently contains 15% seedlings and young age class shrubs (alder with some willows). Present mature age class is 83% (DMA 2008).	Greater than 25% sapling and young shrubs (Winward 2000, UI Stubble Height Study Results 2004).
		Undercut Banks: Present undercut banks was measured at different sites along the	Undercut banks should be greater than 75% for non-forested systems.

Stream/Reach	Vegetation Community Potential	Existing Condition	Long-Term Desired Condition
▪ West Lake Creek Riparian pasture		reach. PIBO site ID 1884 was 37% and site ID 2037 was 43% (PIBO 2011).	
		Stabilizing Plant Cover: Reach species presently have a greenline stability rating of Mid (4.4), ecological status rating of Very Early Seral (13.6) and hydric plants at 50% (DMA 2008).	Greater than High (8.0-9.5) greenline stability rating (Winward 2000).
		Stable Banks: The reach currently has 55% stable banks (DMA 2008).	Greater than 90% stable banks (Amendment 29, USFWS Properly Functioning criteria).
Lake Creek (No PFC Assessment) ▪ Lake Creek allotment ▪ McCoy Creek unit	Primary potential vegetation being conifer overstory alder (IDT Review 2012)	**Stream Shade:** Shade average is 70% (Wall 2009).	Shade 60-80% in mixed shrub (Carex Working Group 2012) or ≥ 25% for native floodplain grasses (TMDL 2010).
		Shrub Development: N/D	Greater than 25% sapling and young shrubs (Winward 2000, UI Stubble Height Study Results 2004).
		Undercut Banks: Undercut bank is estimated to be 25% (Wall 2009).	Undercut banks should be greater than 75% for non-forested systems.
		Stabilizing Plant Cover: N/D	Greater than 80-95% stabilizing cover (Winward 2000).
		Stable Banks: N/D	Greater than 90% stable banks (Amendment 29, USFWS Properly Functioning criteria).
Big Creek (No PFC Assessment, s. side of FS rd 16 for 0.15 miles.) ▪ Logan Valley allotment	Potential vegetation is willow, sedge/rush communities (IDT Review 2012)	**Stream Shade:** Shade average is 7% (Wall 2009).	Shade 60-80% in mixed shrub (Carex Working Group 2012) or ≥ 25% for native floodplain grasses (TMDL 2010).
		Shrub Development: N/D	Greater than 25% sapling and young shrubs (Winward 2000, UI Stubble Height Study Results 2004).
		Undercut Banks: Undercut bank is estimated to be 62% (Wall 2009).	Undercut banks should be greater than 75% for non-forested systems.
		Stabilizing Plant Cover: N/D	Greater than 80-95% stabilizing cover

Stream/Reach	Vegetation Community Potential	Existing Condition	Long-Term Desired Condition
▪ West Bosenberg Riparian Pasture			(Winward 2000).
		Stable Banks: N/D	Greater than 90% stable banks (Amendment 29, USFWS Properly Functioning criteria).
Big Creek Reach 1 ▪ At Proper Functioning Condition (PFC 2007) ▪ Logan Valley allotment ▪ South Big Creek unit	Potential vegetation is a conifer overstory with willow and alder and mesic Graminoids (PFC 2007).	**Stream Shade:** Shade average is 26% (Wall 2009).	Shade 60-80% in mixed shrub and conifer (Carex Working Group 2012) or ≥ 25% for native floodplain grasses (TMDL 2010).
		Shrub Development: Several willow species present. Beaver activity on main and side channels. Several age classes for herbaceous and woody species present. Young willow is heavily browsed (PFC 2007).	Greater than 25% sapling and young shrubs (Winward 2000, UI Stubble Height Study Results 2004).
		Undercut Banks: Undercut bank is estimated to be 36% (Wall 2009).	Undercut banks should be greater than 75% for non-forested systems.
		Stabilizing Plant Cover: Stabilizing plant cover is estimated to be 75% (PFC 2007).	Greater than 80-95% stabilizing cover (Winward 2000).
		Stable Banks: N/D	Greater than 90% stable banks (Amendment 29, USFWS Properly Functioning criteria).
Big Creek Reach 2 ▪ At Proper Functioning Condition (PFC 2007) ▪ Logan Valley allotment ▪ North Big Creek unit	Potential vegetation in the upper end is a conifer overstory with a mesic Graminiod understory. The lower 1/3 transitions to an alder, willow, mesic Graminoid (PFC 2007).	**Stream Shade:** Shade average is 26% (Wall 2009).	Shade 60-80% in mixed shrub and conifer (Carex Working Group 2012) or ≥ 25% for native floodplain grasses (TMDL 2010).
		Shrub Development: Several willow species present. Young willows are heavily browsed, like by deer, elk and some livestock. Diverse age-class distribution of riparian-wetland vegetation is present. Willow and alder provide a bigger role in the lower part of the reach (PFC 2007).	Greater than 25% sapling and young shrubs (Winward 2000, UI Stubble Height Study Results 2004).
		Undercut Banks: Undercut bank is estimated to be 36% (Wall 2009).	Undercut banks should be greater than 75% for non-forested systems.
		Stabilizing Plant Cover: Stabilizing plant	Greater than 80-95% stabilizing cover

Stream/Reach	Vegetation Community Potential	Existing Condition	Long-Term Desired Condition
		cover is estimated to be 75% (PFC 2007).	(Winward 2000).
		Stable Banks: N/D	Greater than 90% stable banks (Amendment 29, USFWS Properly Functioning criteria).
Big Creek Reach 3 ▪ At Proper Functioning Condition (PFC 2007) ▪ Logan Valley allotment ▪ East Lake Creek unit	Potential vegetation is conifer with alder with mesic Graminoid (IDT Review 2012).	**Stream Shade:** Shade average is 26% (Wall 2009).	Shade 60-80% in mixed shrub and conifer (Carex Working Group 2012).
		Shrub Development: The reach currently contains 17% seedlings and young age class shrubs (alder). Present mature age class is 83% (DMA 2008).	Greater than 25% sapling and young shrubs (Winward 2000, UI Stubble Height Study Results 2004).
		Undercut Banks: Undercut bank is estimated to be 36% (Wall 2009).	Undercut banks should be greater than 75% for non-forested systems.
		Stabilizing Plant Cover: Reach species present have a greenline stability rating of Low (2.8), ecological status rating of Mid Serial (41) and hydric plants at 8% (DMA 2011).	Greater than High (8.0-9.5) stability rating (Winward 2000). Greater than 64-78% hydrophytic vegetation (Winward 2000).
		Stable Banks: The reach currently has 98% stable banks (DMA 2011).	Greater than 90% stable banks (Amendment 29, USFWS Properly Functioning criteria).
Big Creek (No PFC Assessment) ▪ Lake Creek allotment ▪ Big Creek unit (above FS rd 1648)	Potential vegetation is a conifer overstory with willow and alder and mesic Graminoids (IDT Review 2012)	**Stream Shade:** Shade average is 20% (Wall 2009).	Shade 60-80% in mixed shrub and conifer (Carex Working Group 2012).
		Shrub Development: N/D	Greater than 25% sapling and young shrubs (Winward 2000, UI Stubble Height Study Results 2004).
		Undercut Banks: Undercut bank is estimated to be 42% (Wall 2009).	Undercut banks should be greater than 75% for non-forested systems.
		Stabilizing Plant Cover: N/D	Greater than 80-95% stabilizing cover (Winward 2000).
		Stable Banks: N/D	Greater than 90% stable banks (Amendment 29, USFWS Properly Functioning criteria).
Big Creek	Primary potential vegetation	**Stream Shade:** Shade average is 7% (Wall	Shade 60-80% in mixed shrub (Carex

Stream/Reach	Vegetation Community Potential	Existing Condition	Long-Term Desired Condition
(No PFC Assessment) ▪ Logan Valley allotment ▪ West Bosenberg Riparian Pasture	being conifer overstory with alder, willow and mesic Graminiods in the open areas (IDT Review 2012)	2009)	Working Group 2012) or ≥ 25% for native floodplain grasses (TMDL 2010).
		Shrub Development: N/D	Greater than 25% sapling and young shrubs (Winward 2000, UI Stubble Height Study Results 2004).
		Undercut Banks: Undercut bank is estimated to be at 62% (Wall 2009).	Undercut banks should be greater than 75% for non-forested systems.
		Stabilizing Plant Cover: N/D	Greater than 80-95% stabilizing cover (Winward 2000).
		Stable Banks: The reach currently has 95% stable banks (Stream Survey 1998).	Greater than 90% stable banks (Amendment 29, USFWS Properly Functioning criteria).
Logan Valley Fen Complex ▪ Logan Valley allotment ▪ Big Field unit and associated components of West Lake Creek, North Big Creek & South Big Creek units	The fen complex can be described as a broad helocrene spring system with a mosaic of peatlands (= fen), fen pools, wet and moist meadows, mesic shrublands, aspen stands, lodgpole pine swamps, and occasional mixed conifer stands. Fen and wetland systems are primarily dominated by wetland moss, graminoid, and willow species. (FPFC 2009, Rausch 2009, GDE 2010).	**Hydrologic Function:** Overall, hydrologic processes are in proper functioning condition. Natural surface or subsurface flow patterns are largely unaltered and hydrologic alterations are not substantially contributing to degradation. However, some livestock trails are diverting early season flow patterns in isolated areas (FPFC 2009, Rausch 2009, GDE 2010).	Livestock trails are not diverting flow patterns anywhere in the fen complex (Weixelman & Cooper 2007).
		Peat Development: The majority of peatlands have exposed peat ≤ 10%; however, there are specific areas where exposed peat is 40% (FPFC 2009, GDE 2010). On average, 96% of plant species are peat forming, 91% are wetland obligates, and 3% are non-native.	Exposed peat is ≤ 10% throughout the entire fen complex (FPFC 2009, Weixelman & Cooper 2007). The proportion of peat forming species and obligate wetland species are maintained at 96% and 91% or greater, respectively. Non-native species are absent or are not expanding (FSM 2900).
		Sensitive Animals: The Columbia spotted frog occurs in three different locations (FPFC 2009, Rausch 2009); these fen pools serve as spawning, rearing and over-wintering grounds (Bull 2005, USFWS 2011). At least	Expansion of sensitive animal populations and/or their respective habitats (FSM 2670).

Stream/Reach	Vegetation Community Potential	Existing Condition	Long-Term Desired Condition
		one other location has potential habitat, but the current condition is not suitable for occupation (FPFC 2009, GDE 2010).	
		Sensitive Plants: Five sensitive plant species are documented in various locations throughout the fen complex (NRIS 2012), and unoccupied habitat exists for numerous other sensitive plants (ISSSSP 2012). Isolated areas (where exposed peat is >10%) have the potential for sensitive species habitat, but the current condition is not suitable.	Expansion of sensitive plant populations and/or their respective habitats (FSM 2670).

NOTE: All surveys only include portions of reaches located on National Forest lands. Private land pieces are not included in the summary.
N/D: Existing Condition information not available. MIM DMA has greenline stability and ecological status indicators that are ratings. The rating system for greenline stability rating is as follows: <4 is Low, 4-6 is Mid and >6 is High. The ecological status rating system is as follows: 0-15 is Very Early Seral, 16-40 is Early Seral, 41-60 is Mid Serial, 61-85 is Late Seral and 86-100 is Potential natural community.

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Appendix A
Part 2: Management Objective

Stream/Reach	Indicator (Measure of Appendix A, Part 1)	Indicator	Target Time Period	Management Objective (Measure)	Monitoring Type
Summit Creek Reach 2 ▪ Summit Prairie allotment ▪ Sagehen unit Note: Reaches 2 and 4 would be used as representive reaches for the Sagehen unit as a whole.	Undercut Banks, Shade and Bank Stability, Stabilizing Plant Communities	Greenling to Greenline Width	5 year	Greenline to greenline width would decrease by 25% from 12.7 to 9.5 feet.	Multiple indicator monitoring at DMA site
		Greenline Stability Rating	5 year	Increase greenline stability rating from Mid (4.4) to high (6.3).	Multiple indicator monitoring at DMA site
		Stable Banks	5 year	Increase bank stability from 60 % to 80%.	Multiple indicator monitoring at DMA site
	Shrub Development	Shrub Density and Height Class	5 year	Expand alder and willow species shrub density of the > 6 ft. height class from 13 shrubs per acre to 32 shrubs per acre of floodplain (average across the reach).	Monitoring at Carex Working Group plots
	Channel Characteristics and Aquatic Habitat	Average Bankfull Width (feet)	10 years	Decrease in average bankfull width on an upward trend towards exclosure reference condition (establish cross section in exclosure).	Channel characteristics monitoring at DMA site
		Average Bankfull Width/Depth (ratio)	10 years	Decrease in average bankfull W/D on upward trend towards exclosure reference conditions (establish cross section in exclosure).	Channel characteristics monitoring at DMA site
		Residual Pool Depth	10 year	Increase residual pool depth from 0.63 ft to an upward trend towards exclosure	Channel characteristics monitoring at DMA site

Stream/Reach	Indicator (Measure of Appendix A, Part 1)	Indicator	Target Time Period	Management Objective (Measure)	Monitoring Type
				reference condition (establish cross section in exclosure).	
		Pool Quality (# of pools > 3.3 ft)	10 years	Increase in numbers of pools > 3.3 ft depth on upward trend towards exclosure reference condition (establish cross section in exclosure).	Channel characteristics monitoring at DMA site
	Water Temperate, Shade, Shade Development and Channel Characteristics	Shade	10 years	Increase shade at DMA towards reference condition, site potential values of 60% in hardwood areas and 25% for native floodplain grass sites (Carex Working Group 2012, TMLD 2010).	SolarPathfinder at DMA
Summit Creek Reach 4 ▪ Summit Prairie allotment ▪ Sagehen unit Note: Reaches 2 and 4 would be used as representive reaches for the Sagehen unit as a whole.	Shrub Development and Shade	Shrub Density and Height Class	5 year	Expand alder and willow species shrub density of the > 6 ft. height class from 5 shrubs per acre to 29 shrubs per acre of the floodplain (average across the reach).	Monitor at Carex Working Group plots
Summit Creek	Undercut Banks,	Greenline Wetland	5 year	Increase the greenline	PIBO monitoring at DMA

Stream/Reach	Indicator (Measure of Appendix A, Part 1)	Indicator	Target Time Period	Management Objective (Measure)	Monitoring Type
Reach 5 ▪ Summit Prairie allotment ▪ Little Logan unit	Shade and Bank Stability, Stabilizing Plant Communities	Rating		wetland rating value by 10 percent from 73.9 to 81.3 (PIBO site id 952) and from 76 to 83.6 (PIBO site id 954).	sites
		Cross Section Vegetative Wetland Rating	5 year	Increase the cross section wetland rating value by 10 percent from 57.9 to 63.7 (PIBO site id 952) and from 62.3 to 68.5 (PIBO site id 954).	PIBO monitoring at DMA sites
	Shrub Development and Shade	Shrub Density and Height Class	5 year	Expand willow species shrub density of the 3-6 ft. height class from 0.3 shrubs per acre to 4 shrubs per acre of floodplain (average across the reach).	Monitoring at Carex Working Group plots
	Channel Characteristics and Aquatic Habitat	Average Bankfull Width (feet)	10 years	Decrease in average bankfull width on an upward trend towards exclosure reference condition (establish cross section in ¼ miles buck-n-pole exclosure).	PIBO monitoring at DMA sites. Channel characteristics monitoring at DMA site in ¼ mile new exclosure
		Average Bankfull Width/Depth (ratio)	10 years	Decrease in average bankfull W/D on upward trend towards exclosure reference conditions (establish cross section in ¼ miles buck-n-pole exclosure).	PIBO monitoring at DMA sites. Channel characteristics monitoring at DMA site in ¼ mile new exclosure
		Residual Pool Depth	10 year	Increase residual pool depth from 0.63 ft to an upward trend towards exclosure reference condition (establish cross section in ¼ miles buck-n-pole exclosure).	PIBO monitoring at DMA sites. Channel characteristics monitoring at DMA site in ¼ mile new exclosure

Stream/Reach	Indicator (Measure of Appendix A, Part 1)	Indicator	Target Time Period	Management Objective (Measure)	Monitoring Type
		Pool Quality (# of pools > 3.3 ft)	10 years	Increase in numbers of pools > 3.3 ft depth on upward trend towards exclosure reference condition (establish cross section in ¼ miles buck-n-pole exclosure).	PIBO monitoring at DMA sites. Channel characteristics monitoring at DMA site in ¼ mile new exclosure
	Water Temperate, Shade, Shade Development and Channel Characteristics	Shade	10 years	Increase effective shade at DMA towards reference condition, site potential values of 60% in hardwood areas (Carex Working Group 2012).	SolarPathfinder at DMA
	Shrub Development and Water Quality	Macroinvertebrate	10 years	Increased abundance of species in the shredder function group. Decreased number of intolerant taxa and taxa richness.	PIBO monitoring at DMA sites
Summit Creek Reach 6 ▪ Summit Prairie allotment ▪ Summit Rock unit	Shrub Development and Shade	Shrub Density and Height Class	5 years	Expand willow species shrub density of the > 3 ft. height class from 0.8 shrubs per 100 meters of streambank to 6 shrubs per 100 meters of streambank (average across the reach).	Monitoring at Carex Working Group plots
Summit Creek Reach 7 ▪ Summit Prairie allotment ▪ North Summit unit	Undercut Banks, Shade and Bank Stability	Greenline to Greenline Width	5 years	Greenline to greenline width would decrease by 25% from 4 to 3 feet.	Muliple indicator monitoring at DMA site
	Shrub Development and Shade	Shrub Density and Height Class	5 years	Expand alder and willow species shrub density of the > 6 ft. height class from 9 shrubs per acre to 40 shrubs per acre of floodplain (average across the reach).	Monitoring at Carex Working Group plots

Stream/Reach	Indicator (Measure of Appendix A, Part 1)	Indicator	Target Time Period	Management Objective (Measure)	Monitoring Type
	Channel Characteristics and Aquatic Habitat	Average Bankfull Width (feet)	10 years	Decrease in average bankfull width	Channel characteristics monitoring at DMA site
		Average Bankfull Width/Depth (ratio)	10 years	Decrease in average bankfull W/D toward a Rosgen E channel type of 12 (PFC 2007).	Channel characteristics monitoring at DMA site
		Residual Pool Depth	10 year	Increase residual pool depth	Channel characteristics monitoring at DMA site
		Pool Quality (# of pools > 3.3 ft)	10 years	Increase in numbers of pools > 3.3 ft depth on upward trend towards exclosure reference condition.	Channel characteristics monitoring at DMA site
	Water temperate	Shade	10 years	Increase effective shade at DMA towards reference condition, site potential values of 60% in hardwood areas (Carex Working Group 2012).	SolarPathfinder at new DMA site
West Fork of Summit Creek Reach 1 ▪ Summit Prairie allotment ▪ West Summit Recovery Unit	Stabilizing Plant Cover	Photopoint	5 years	Expand wetland obligate plant communities.	Establish photo monitoring at DMA site
West Fork of Summit Creek Reach 2 ▪ Summit	Undercut Banks, Shade and Bank Stability, Stabilizing Plant Communities	Greenline Stability Rating	5 years	Increase greenline stability rating from Mid (5.2) to High (6.5).	Muliple indicator monitoring at DMA site
		Stable Banks	5 years	Increase bank stability from 47% to 80%.	Muliple indicator monitoring at DMA site

Stream/Reach	Indicator (Measure of Appendix A, Part 1)	Indicator	Target Time Period	Management Objective (Measure)	Monitoring Type
▪ Prairie allotment ▪ Summit Rock unit	Shrub Development and Shade	Shrub Density and Height Class	5 years	Expand alder shrub density along greenline (3 to 6 foot height class) by 10%.	Muliple indicator monitoring at DMA site
Lake Creek Reach 3 ▪ Logan Valley allotment ▪ West Lake Creek Riparian Pasture	Undercut Banks, Shade and Bank Stability, Stabilizing Plant Communities, and Shrub Development	Greenline to Greenline Width	5 years	Greenline to greenline width would decrease by 25% from 24.8 to 18.6 feet.	Muliple indicator monitoring at DMA site
		Greenline Stability Rating	5 years	Increase greenline stability rating from Mid (4.4) to High (6.3).	Muliple indicator monitoring at DMA site
		Stable Banks	5 years	Increase bank stability from 55% to 80%.	Muliple indicator monitoring at DMA site
		BankfullWidth/Depth	5 years	Decrease the bankfull width/depth ratio at riffles by 15 percent from 23.8 to 27.4 (PIBO site id 1884) and 33.8 to 38.9 (PIBO site id 2037).	PIBO monitoring at DMA sites
	Channel Characteristics and Aquatic Habitat	Average Bankfull Width (feet)	10 years	Decrease in average bankfull width	PIBO monitoring at DMA sites
		Average Bankfull Width/Depth (ratio)	10 years	Decrease the bankfull W/D ratio at riffles by 15% (from 23.8 to 18.8) towards a Rosgen E channel type of 12 (PIBO Site ID 1884, PFC 2007).	PIBO monitoring at DMA sites
		Residual Pool Depth	10 year	Increase residual pool depth	PIBO monitoring at DMA sites
		Pool Quality (# of pools > 3.3 ft)	10 years	Increase number of pools > 3.3 ft depth	PIBO monitoring at DMA sites
	Water Temperature	Shade	10 years	Increase effective shade at DMA towards reference condition, site potential values of 80% in hardwood areas (Carex Working Group	SolarPathfinder at new DMA site

Stream/Reach	Indicator (Measure of Appendix A, Part 1)	Indicator	Target Time Period	Management Objective (Measure)	Monitoring Type
				2012).	
	Shrub Development and Water Quality	Macroinvertebrate	10 years	Increased abundance of species in the shredder function group. Decreased number of intolerant taxa and taxa richness.	PIBO monitoring at DMA sites
Big Creek (No PFC, S. side of FS rd 1600 for 0.15 miles) ▪ Logan Valley allotment ▪ West Bosenberg Riparian pasture	Shrub Development and Stabilizing Plant Cover	Photopoint	5 years	Increase of shrubs and wetland obligate plant communities.	Establish photo monitoring at DMA stie
Big Creek Reaches 1, 2 & 3 ▪ Logan Valley allotment ▪ South Big Creek unit (reach 1) ▪ North Big Creek unit (reach 2) ▪ East Big	Undercut Banks, Shade and Bank Stability, Stabilizing Pant Communities, and Shrub Development	Site Visits	5 years	Continued maintenance and improvements in riparian conditions.	Muliple indicator monitoring at DMA site
	Channel Characteristics and Aquatic Habitat	Average Bankfull Width (feet)	10 years	Decrease in average bankfull width	Channel characteristics monitoring at new DMA site
		Average Bankfull Width/Depth (ratio)	10 years	Decrease the bankfull W/D ratio at riffles	Channel characteristics monitoring at new DMA site
		Residual Pool Depth	10 year	Increase residual pool depth	Channel characteristics monitoring at new DMA site
		Pool Quality (# of pools > 3.3 ft)	10 years	Increase number of pools > 3.3 ft depth	Channel characteristics monitoring at new DMA site

Stream/Reach	Indicator (Measure of Appendix A, Part 1)	Indicator	Target Time Period	Management Objective (Measure)	Monitoring Type
Creek unit (reach 3)	Water Temperate, Shade, Shade Development and Channel Characteristics	Shade	10 years	Increase effective shade at DMA towards reference condition, site potential values of 60% in hardwood areas and 25% for native floodplain grass site (Carex Working Group, 2012, TMDL 2010).	SolarPathfinder at new DMA site
Bosenberg Creek (No PFC Assessment) ▪ Lake Creek allotment ▪ Bosenberg unit (above FS rd 1648)	Undercut Banks, Shade and Bank Stability, Stabilizing Pant Communities, and Shrub Development	MIM Attributes	5 years	Establish a designated monitoring area and collect baseline information immediately. Follow up five years post implementation of boundary changes with repeat monitoring.	Establish multiple indicator monitoring at new DMA site
	Channel Characteristics and Aquatic Habitat	Average Bankfull Width (feet)	10 years	Decrease in average bankfullwidth	Channel characteristics monitoring at new DMA site
		Average Bankfull Width/Depth (ratio)	10 years	Decrease the bankfullW/D ratio at riffles	Channel characteristics monitoring at new DMA site
		Residual Pool Depth	10 year	Increase residual pool depth	Channel characteristics monitoring at new DMA site
		Pool Quality (# of pools > 3.3 ft)	10 years	Increase number of pools > 3.3 ft depth	Channel characteristics monitoring at new DMA site
	Water Temperate, Shade, Shade Development and Channel Characteristics	Shade	10 years	Increase effective shade at DMA towards reference condition, site potential values of 60% in hardwood areas and 25% for native floodplain grass sites (Carex Working Group 2012, TMDL 2012).	SolarPathfinder at new DMA site
Fen Area ▪ Logan Valley	Hydrologic Function	Early Season Flow Diversion	5 years	Livestock trails are revegetating and are diverting less flow	Fen PFC, GDE Level 2 and photopoints

Stream/Reach	Indicator (Measure of Appendix A, Part 1)	Indicator	Target Time Period	Management Objective (Measure)	Monitoring Type
▪ allotment Big Field unit				(Weixelman & Cooper 2007).	
	Peat Development	Exposed Peat	5 years	Exposed peat is ≤ 15% (Weixelman & Cooper 2007).	Fen PFC and GDE Level 2
		Peat Forming Species	5 years	The proportion of peat forming species is ≥ 90%.	
		Obligate Wetland Species	5 years	The proportion of obligate wetland species is ≥ 90%.	
		Non-Native Species	5 years	Non-native species are absent or are not expanding (FSM 2900).	
	Sensitive Species	Population Abundance	5 years	Sensitive species populations are maintained at current extent or are expanding (FSM 2670).	Modified GDE Level 2 and Threatened, Endangered and Sensitive Plant module of the USFS Natural Resource Information System
		Habitat Abundance	5 year	Sensitive species habitats are maintained at current extent or are expanding (FSM 2670).	Modified GDE Level 2 and photopoints

Appendix A
Part 3: Adaptive Management Strategies

Stream/Reach	Alternative 2		Alternative 3		Alternative 4	
	Proposed Action	Adaptive Strategy	Proposed Action	Adaptive Strategy	Proposed Action	Adaptive Strategy
Summit Creek Reaches 1, 2, 3 & 4 ▪ Summit Prairie allotment ▪ Sagehen Unit	Entire pasture would be rested 3 years out of a 10 year period (season long rest). Entire allowable use levels (see Appendix I).	Scheduled rest or additional rest.	Construction of the Sagehen Riparian exclosure and Sagehen Riparian pasture along Summit Creek in Reach 2. The riparian exclosure would not be grazed. The riparian pasture would be rested for 3-5 years after the pasture fence is constructed. Grazing would resume after resource objectives have been achieved. Reach 1, 3, and 4 of Summit Creek would be grazed annually to allowable use levels (see Appendix I).	Additionally rest within the riparian pasture (Reach 2) and change allowable use levels (Reaches 1, 3, and 4).	Daily riding by permittee to move livestock away from Summit Creek. Construction of cages and small exclosure (20x50 ft). Exclosures would be approximately 10% of the total riparian length.	Construct exclosures around a higher percentage of Summit Creek.
Summit Creek Reach 5 ▪ Summit Prairie allotment ▪ Little Logan	Entire pasture rested 3 years out of a 10 year period (season long rest).	Scheduled rest or additional rest.	Construction of two riparian pastures (Lower Little Logan and Upper Little Logan Riparian pastures) along	Additionally rest within the riparian pasture	Daily riding by permittee to move livestock away from Summit Creek. Construction of cages and small	Construct exclosures around a higher percentage of Summit Creek.

Stream/Reach	Alternative 2		Alternative 3		Alternative 4	
	Proposed Action	Adaptive Strategy	Proposed Action	Adaptive Strategy	Proposed Action	Adaptive Strategy
unit			Summit Creek. The riparian pastures would be rested for 3-5 years after the pasture fences are constructed. Grazing would resume after resource objectives have been achieved		exclosures (20x50 ft). Exclosures would be approximately 10% of the total riparian length.	
Summit Creek Reach 6 and West Fork Summit Creek Reach 2 ▪ Summit Prairie allotment ▪ Summit Rock unit	Entire pasture would be grazed annually to allowable use level (see Appendix I).	Change allowable use levels.	Entire pasture would be grazed annually to allowable use level (see Appendix I).	Change allowable use levels.	The area outside of the Prairie Riparian pasture would be grazed annually to allowable use level (see Appendix I). See below for Prairie Riparian pasture proposed action.	Change allowable use levels outside of the Prairie Riparian pasture. See below for Riparian Pasture Adaptive Strategy.
Summit Creek Reach 7 ▪ Summit Prairie allotment ▪ North Summit unit	Entire pasture would be grazed annually to allowable use level (See Appendix I).	Change allowable use levels.	Construct North Summit Riparian pasture (Summit Creek Reach 7). The riparian pasture would be rested for 3-5 years after the pasture fence is constructed. Grazing would resume after resource objectives	Additionally rest within the riparian pasture.	Construct Prairie Riparian pasture along (Summit Creek Reach 7 and West Fork of Summit Creek Reach 2). The riparian pasture would be rested for 3-5 years after the pasture fence is constructed.	Additionally rest within the riparian pasture.

Stream/Reach	Alternative 2		Alternative 3		Alternative 4	
	Proposed Action	Adaptive Strategy	Proposed Action	Adaptive Strategy	Proposed Action	Adaptive Strategy
			have been achieved (see Appendix I).		Grazing would resume after resource objectives have been achieved (see Appendix I).	
West Fork of Summit Creek Reach 1 ▪ Summit Prairie allotment ▪ West Summit Recovery unit	The West Summit Recovery unit (constructed in 2011) would be rested 3-5 immediate grazing season (season long rest).	Additional rest within the West Summit Recovery unit.	The West Summit Recovery unit (constructed in 2011) would be rested 3-5 immediate grazing season (season long rest).	Additional rest within the West Summit Recovery unit.	The West Summit Recovery unit (constructed in 2011) would be rested 3-5 immediate grazing season (season long rest).	Additional rest within the West Summit Recovery unit.
Bosenberg Creek No PFC Assessment ▪ Lake Creek allotment ▪ Bosenberg unit (above FS rd 1648)	Entire pasture rested 3 years out of a 10 year period (season long rest).	Scheduled rest or additional rest.	None (Bosenberg remains vacant)	None	None (Bosenberg remains vacant)	None
Lake Creek Reach 3 ▪ Logan Valley allotment ▪ West Lake Creek Riparian Pasture (existing authorized	Rest would occur for 3-5 years after the fence is constructed and willows are planted. Grazing would resume after willows have established.	Additional rest within the West Summit Recovery unit.	Rest would occur for 3-5 years after the fence is constructed and willows are planted. Grazing would resume after willows have established.	Additional rest within the West Summit Recovery unit	Rest would occur for 3-5 years after the fence is constructed and willows are planted. Grazing would resume after willows have established.	Additional rest within the West Summit Recovery unit

Stream/Reach	Alternative 2		Alternative 3		Alternative 4	
	Proposed Action	Adaptive Strategy	Proposed Action	Adaptive Strategy	Proposed Action	Adaptive Strategy
project to be constructed in 2012 or 2013)						
Big Creek (No PFC Assessment, located s. side of FS rd 16 for 0.15 miles) ▪ Logan Valley allotment ▪ West Bosenberg Riparian Pasture (existing authorized project to be constructed in 2012 or 2013)	Rest would occur for 3-5 years after the fence is constructed and willows are planted. Grazing would resume after willows have established.	Additional rest within the West Bosenberg Riparian pasture.	Rest would occur for 3-5 years after the fence is constructed and willows are planted. Grazing would resume after willows have established.	Additional rest within the West Bosenberg Riparian pasture.	Rest would occur for 3-5 years after the fence is constructed and willows are planted. Grazing would resume after willows have established.	Additional rest within the West Bosenberg Riparian pasture.
Big Creek Reach 1, 2, & 3 ▪ Logan Valley allotment ▪ South Big Creek unit (reach 1) ▪ North Big Creek unit (reach 2) ▪ East Big Creek unit	The South Big Creek, North Big Creek and East Big Creek units would be combined into a single unit identified as the Big Creek Riparian pasture. The entire Riparian pasture rested 3 years out of a 10 year period (season long rest).	Scheduled rest or additional rest.	The South Big Creek, North Big Creek and East Big Creek units would be combined into a single unit identified as the Big Creek Riparian pasture. The entire Riparian pasture rested 3 years out of a 10 year period (season long rest).	Scheduled rest or additional rest	The South Big Creek, North Big Creek and East Big Creek units would be combined into a single unit identified as the Big Creek Riparian pasture. The entire Riparian pasture rested 3 years out of a 10 year period (season long rest).	Scheduled rest or additional rest

Stream/Reach	Alternative 2		Alternative 3		Alternative 4	
	Proposed Action	Adaptive Strategy	Proposed Action	Adaptive Strategy	Proposed Action	Adaptive Strategy
(reach 3)						
Fen Area ▪ Logan Valley allotment ▪ Big Field Creek unit	Graze annually and monitor Fen area.	Construct riparian pasture fence around Fen area	Graze annually and monitor Fen area.	Construct riparian pasture fence around Fen area	Graze annually and monitor Fen area.	Construct riparian pasture fence around Fen area

Appendix B
Summit Logan Valley Grazing Authoization Project Maps

Vicinity Map

Alternative 1 – No Grazing:

- Lake Creek Allotment
- Logan Valley Allotment
- McCoy Creek Allotment
- Summit Prairie Allotment

Alternative 2 – Proposed Action:

- Lake Creek Allotment
- Logan Valley Allotment
- McCoy Creek Allotment
- Summit Prairie Allotment

Alternative 3:

- Lake Creek Allotment
- Logan Valley Allotment
- McCoy Creek Allotment
- Summit Prairie Allotment

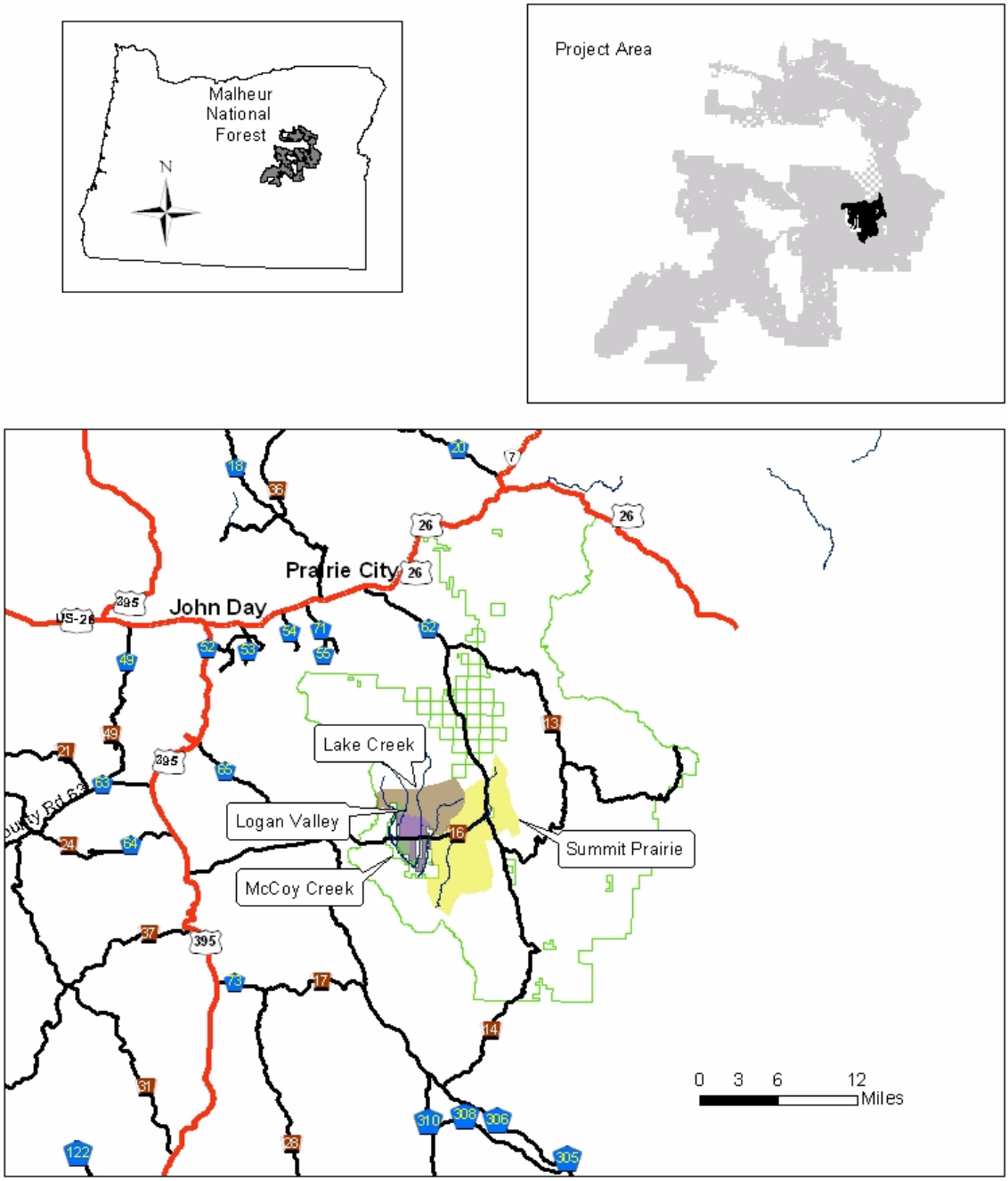
Alternative 4:

- Lake Creek Allotment
- Logan Valley Allotment
- McCoy Creek Allotment
- Summit Prairie Allotment

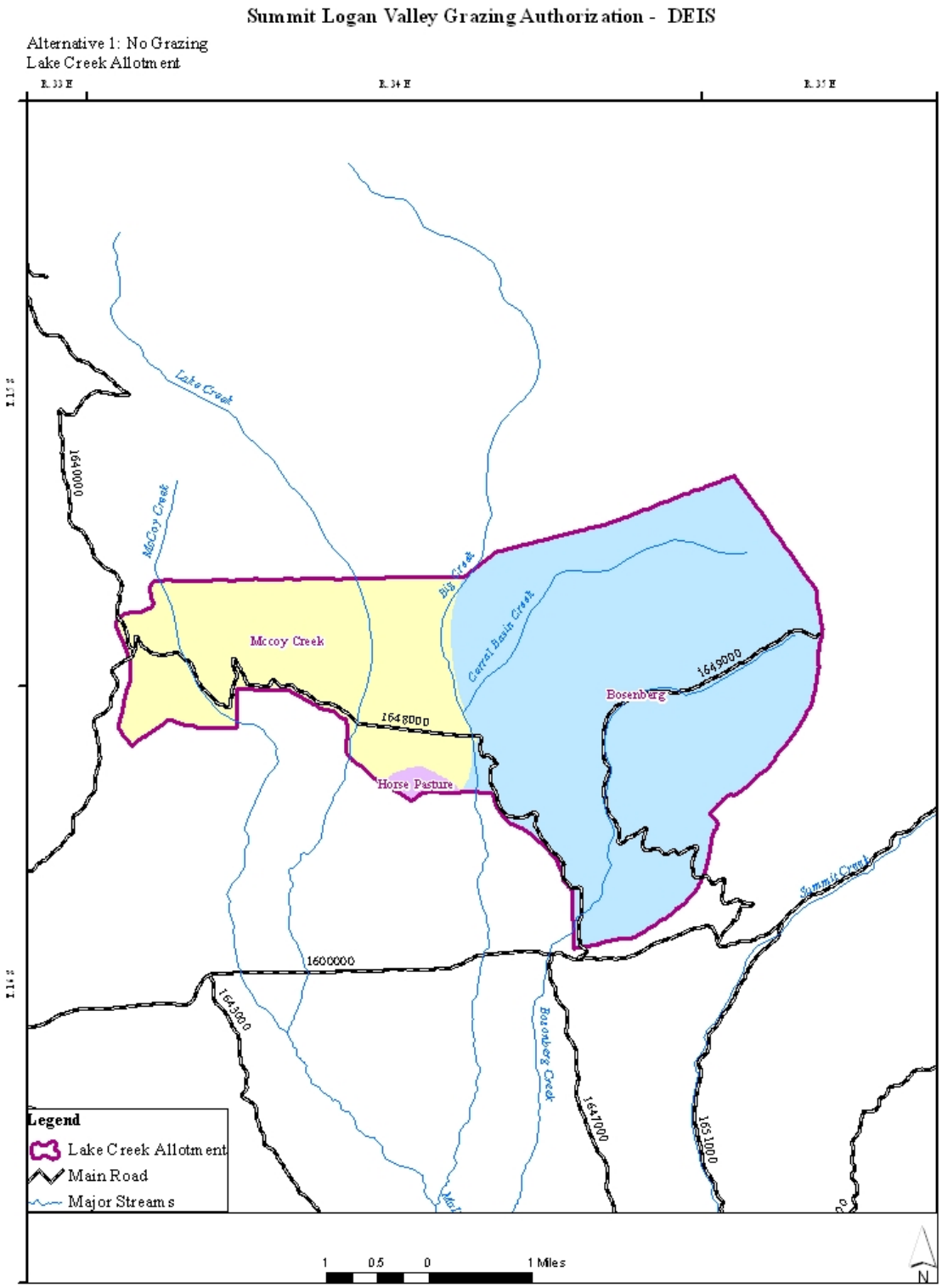
Bull Trout Critical Habitat within the Project Area

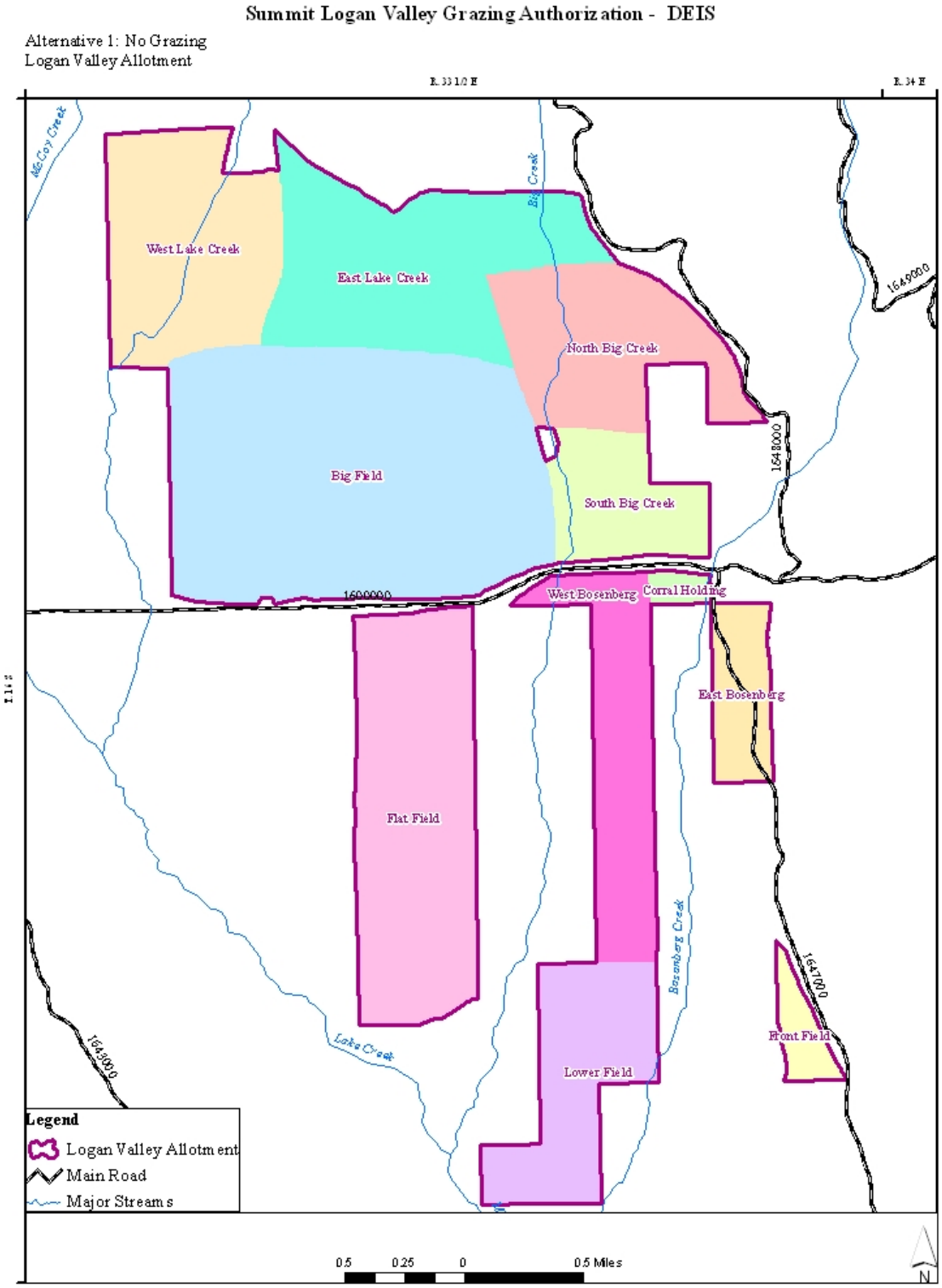
Monitoring Sites and Stream Reaches within the Project Area

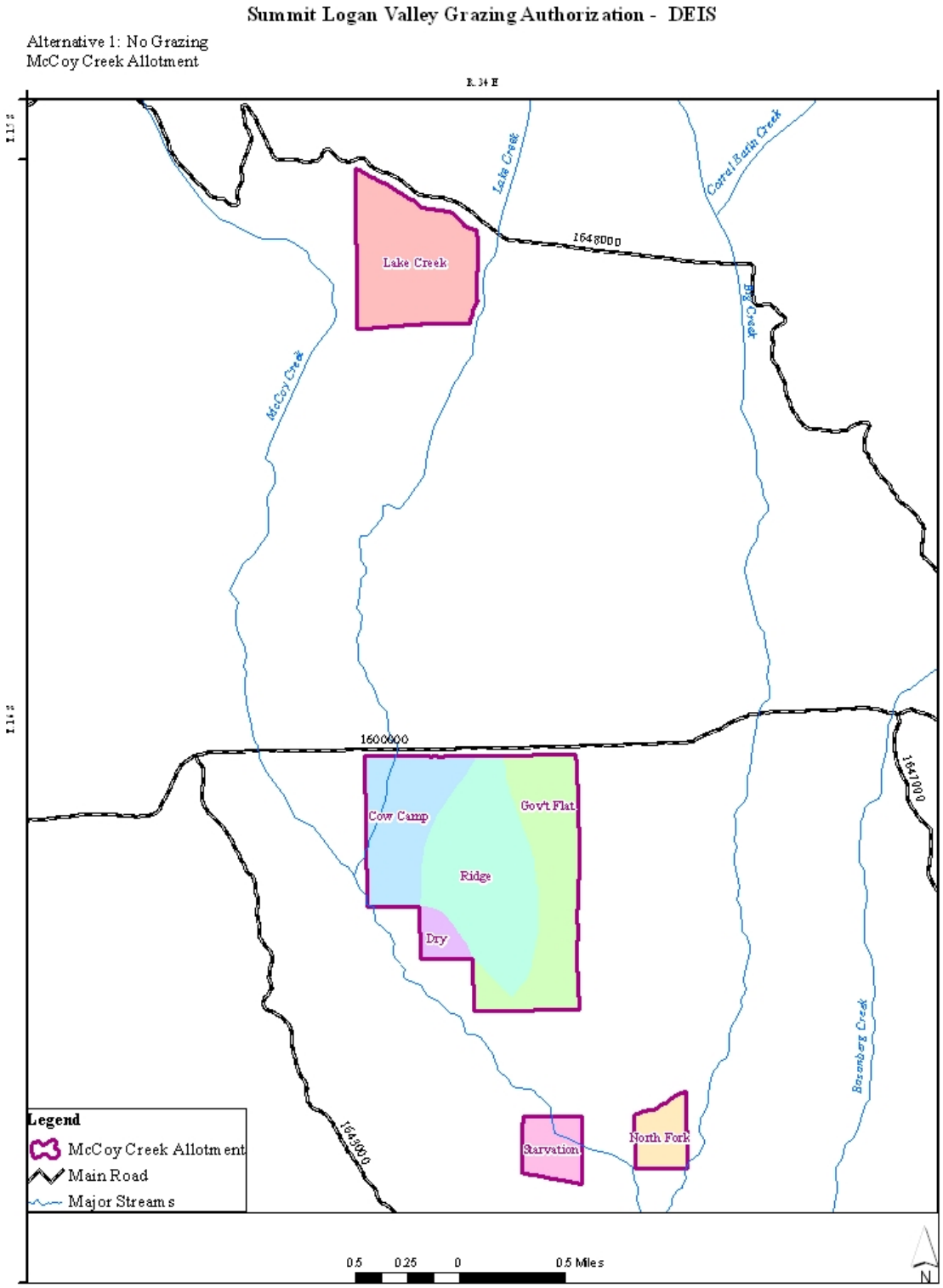
Vicinity Map

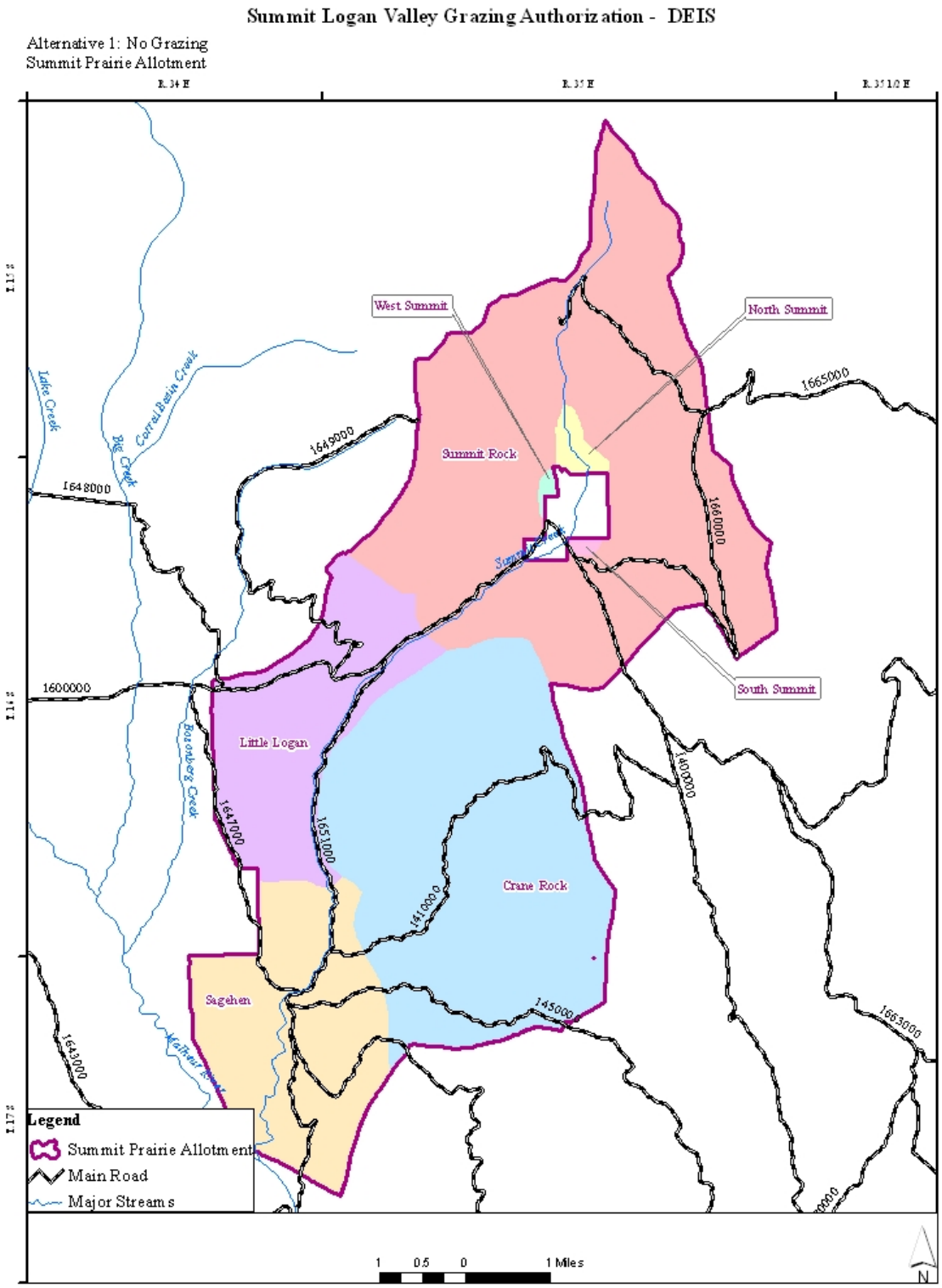


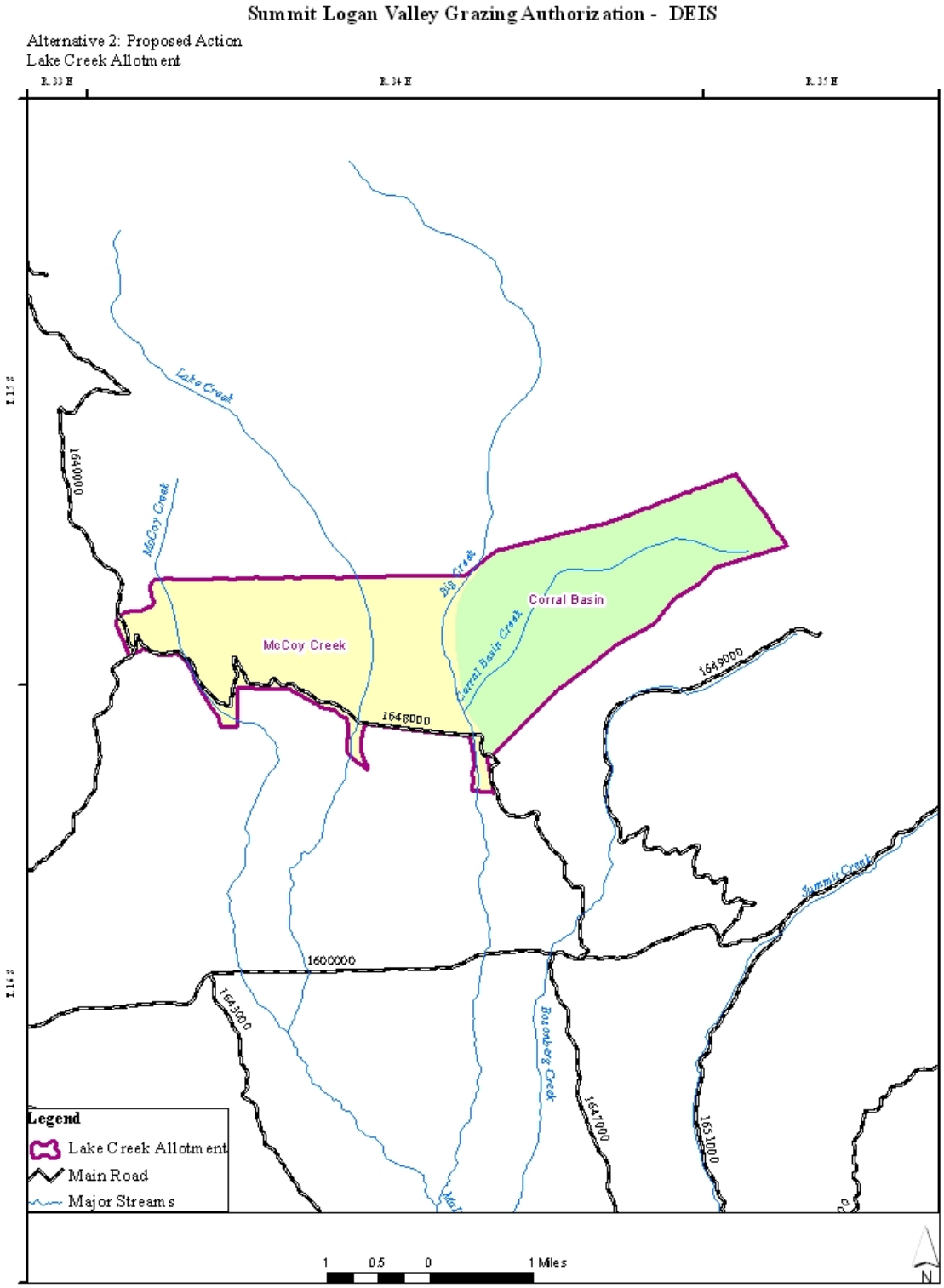
Map 1. Vicinity Map of the Four Allotments

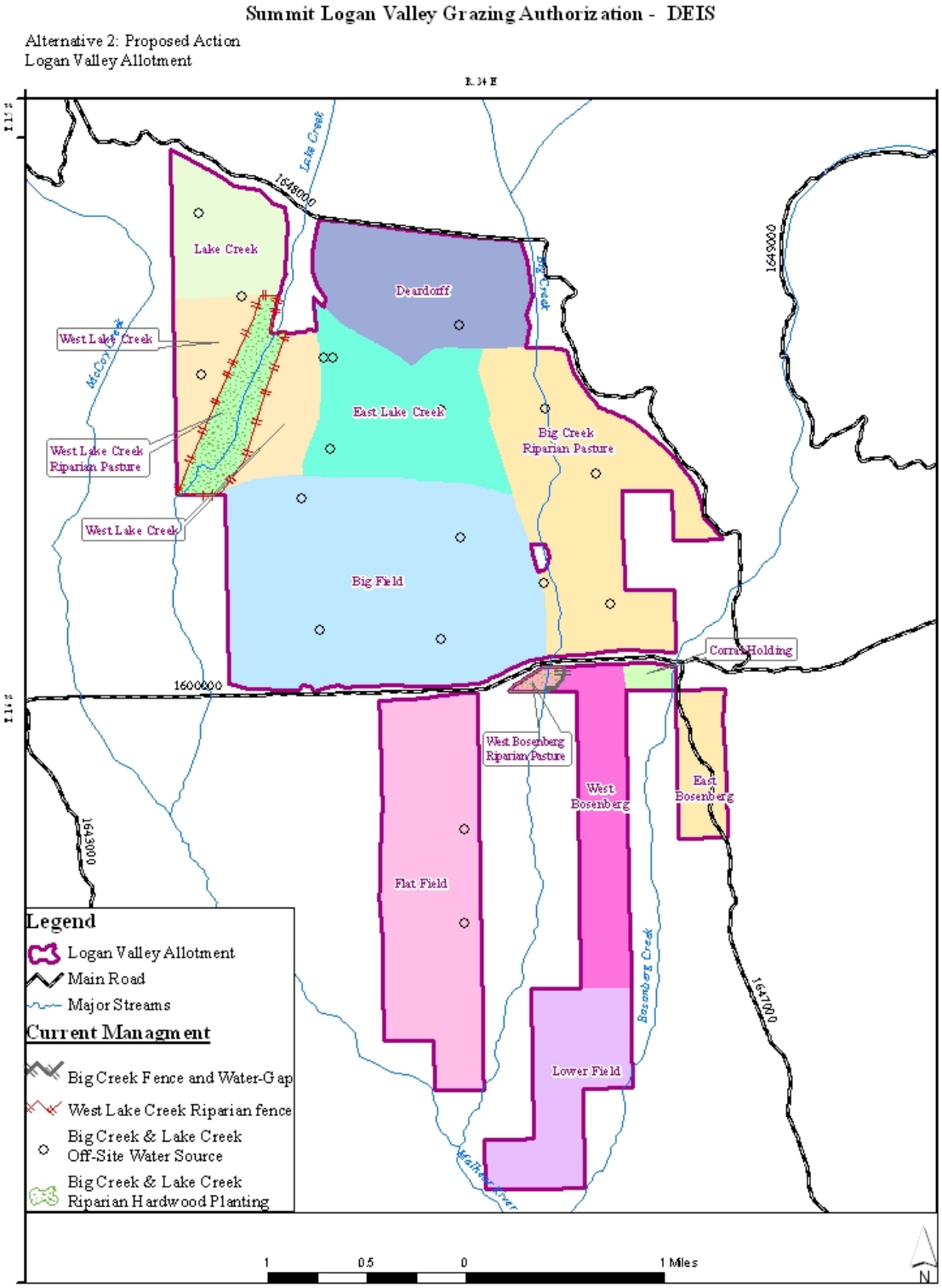

Summit Logan Valley Grazing Authorization - DEIS
Alternative 1: No Grazing
Lake Creek Allotment
R. 33 E
R. 34 E
R. 35 E
Lake Creek
McCoy Creek
Big Creek
Corral Basin Creek
Mccoy Creek
Bosenberg
Horse Pasture
Summit Creek
Bosenberg Creek
1644000
1648000
1649000
1600000
1643000
1647000
1651000
Legend
Lake Creek Allotment
Main Road
Major Streams
1 0.5 0 1 Miles
N

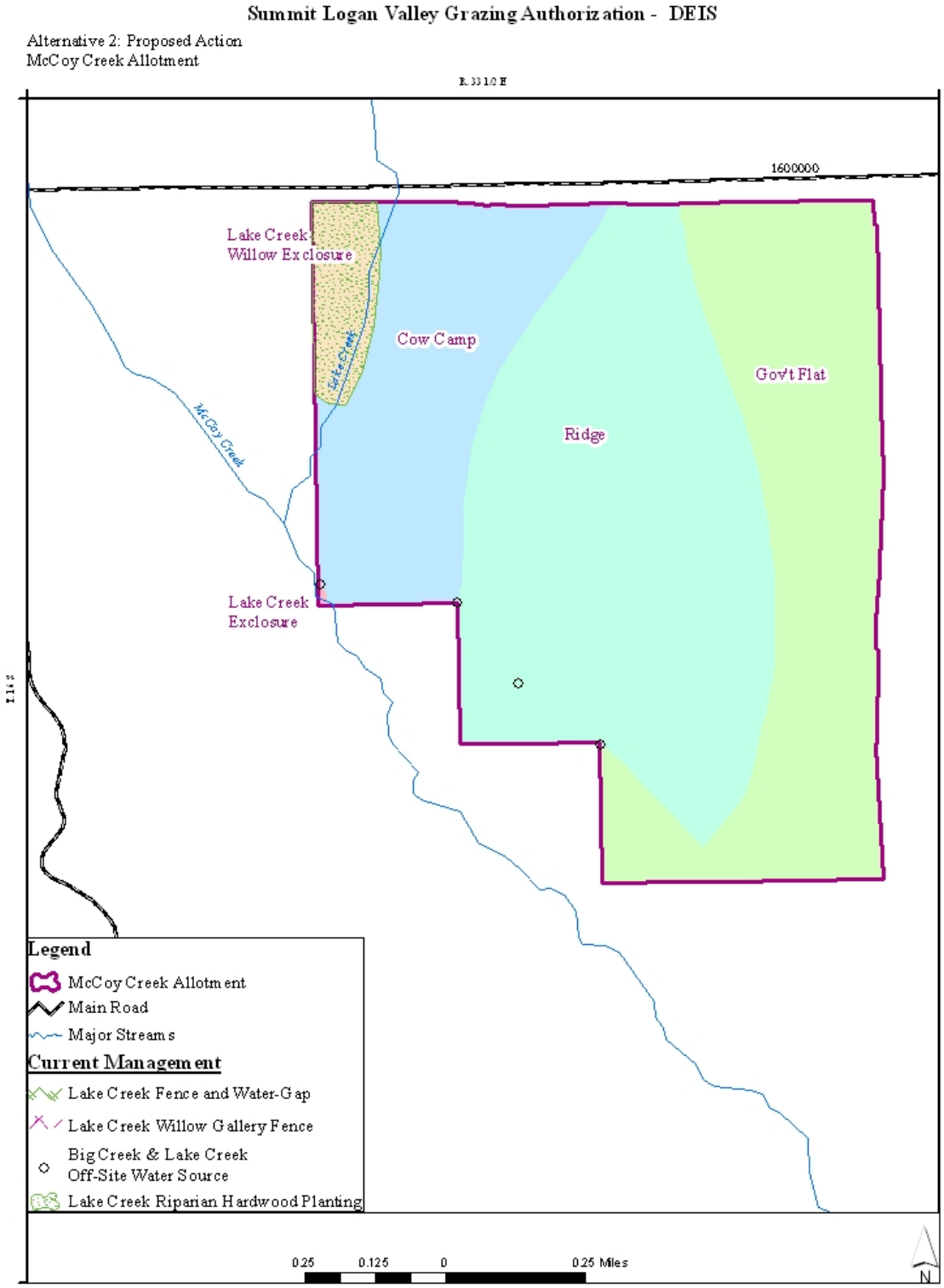

Summit Logan Valley Grazing Authorization - DEIS
Alternative 1: No Grazing
Logan Valley Allotment
McCoy Creek
Big Creek
West Lake Creek
East Lake Creek
North Big Creek
Big Field
South Big Creek
West Bosenberg
Corral Holding
East Bosenberg
Flat Field
Bosenberg Creek
Front Field
Lower Field
Lake Creek
1649000
1648000
1647000
1643000
Legend
Logan Valley Allotment
Main Road
Major Streams
0.5
0.25
0
0.5 Miles
N


Summit Logan Valley Grazing Authorization - DEIS
Alternative 1: No Grazing
McCoy Creek Allotment
Lake Creek
Corral Basin Creek
McCoy Creek
Big Creek
Basomberg Creek
Lake Creek
Cow Camp
Gov't Flat
Ridge
Dry
Starvation
North Fork
Legend
McCoy Creek Allotment
Main Road
Major Streams
0.5 0.25 0 0.5 Miles
N


Summit Logan Valley Grazing Authorization - DEIS
Alternative 1: No Grazing
Summit Prairie Allotment
West Summit
North Summit
South Summit
Summit Rock
Little Logan
Crane Rock
Sagehen
Lake Creek
Big Creek
Corral Basin Creek
Boxelder Creek
1649000
1648000
1665000
1660000
1600000
1647000
1651000
1410000
1400000
1645000
1643000
1663000
Legend
Summit Prairie Allotment
Main Road
Major Streams
1 0.5 0 1 Miles
N


Summit Logan Valley Grazing Authorization - DEIS
Alternative 2: Proposed Action
Lake Creek Allotment
R. 33 E
R. 34 E
R. 35 E
T. 15 S
T. 16 S
Lake Creek
McCoy Creek
Big Creek
Corral Basin Creek
Corral Basin
McCoy Creek
Bacon Creek
Summit Creek
1644000
1648000
1649000
1600000
1643000
1647000
1651000
Legend
Lake Creek Allotment
Main Road
Major Streams
1 0.5 0 1 Miles
N


Summit Logan Valley Grazing Authorization - DEIS
Alternative 2: Proposed Action
Logan Valley Allotment
Lake Creek
Deardorff
West Lake Creek
East Lake Creek
Big Creek Riparian Pasture
West Lake Creek Riparian Pasture
West Lake Creek
Big Field
Corral Holding
West Bosenberg Riparian Pasture
West Bosenberg
East Bosenberg
Flat Field
Lower Field
Bosenberg Creek
Legend
Logan Valley Allotment
Main Road
Major Streams
Current Managment
Big Creek Fence and Water-Gap
West Lake Creek Riparian fence
Big Creek & Lake Creek Off-Site Water Source
Big Creek & Lake Creek Riparian Hardwood Planting
1 0.5 0 1 Miles
N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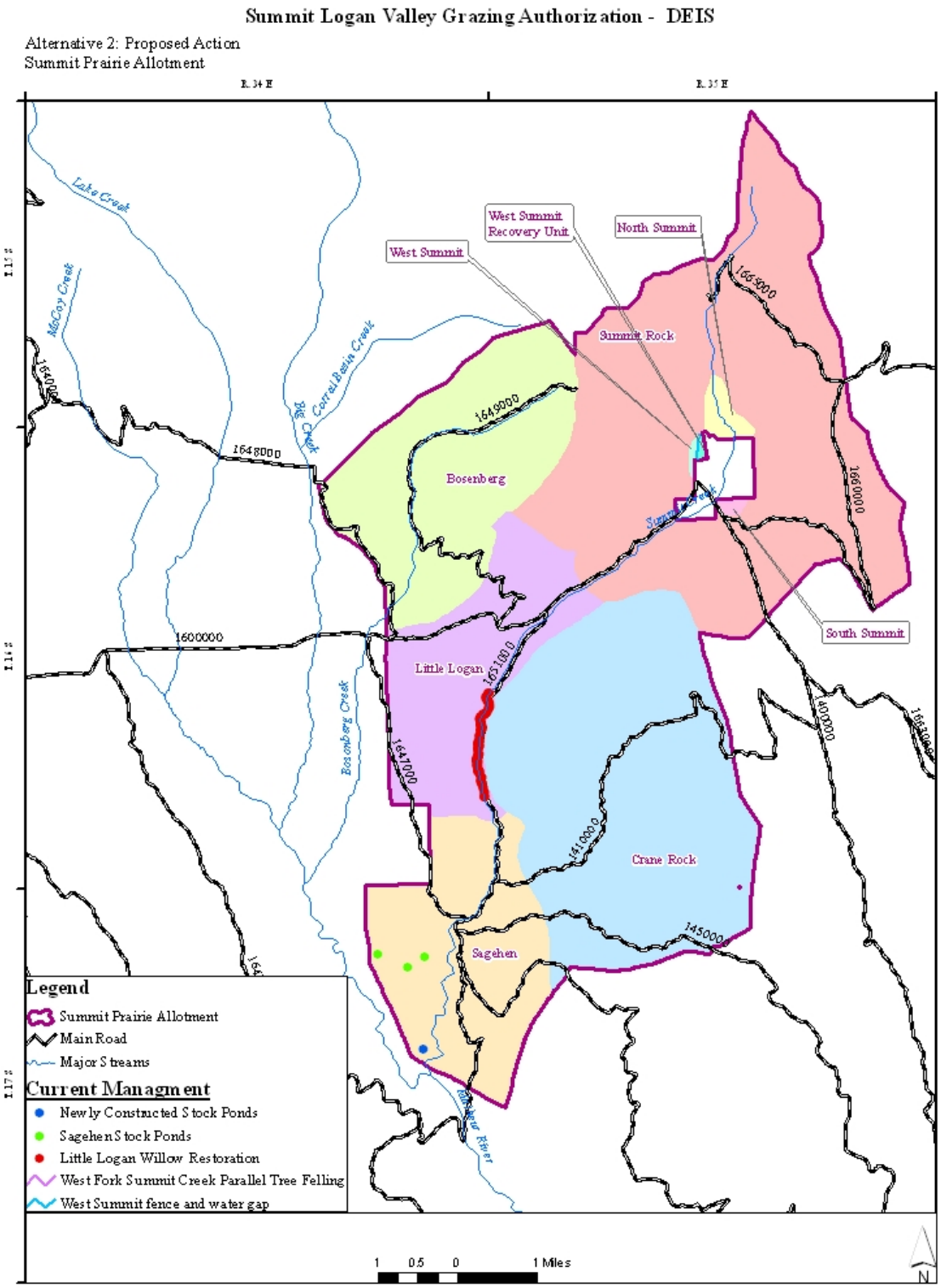
Alternative 2: Proposed Action
McCoy Creek Allotment
1600000
Lake Creek
Willow Exclosure
Cow Camp
Gov't Flat
Ridge
McCoy Creek
Lake Creek
Exclosure
Legend
McCoy Creek Allotment
Main Road
Major Streams
Current Management
Lake Creek Fence and Water-Gap
Lake Creek Willow Gallery Fence
Big Creek & Lake Creek
Off-Site Water Source
Lake Creek Riparian Hardwood Planting
0.25
0.125
0
0.25 Miles
N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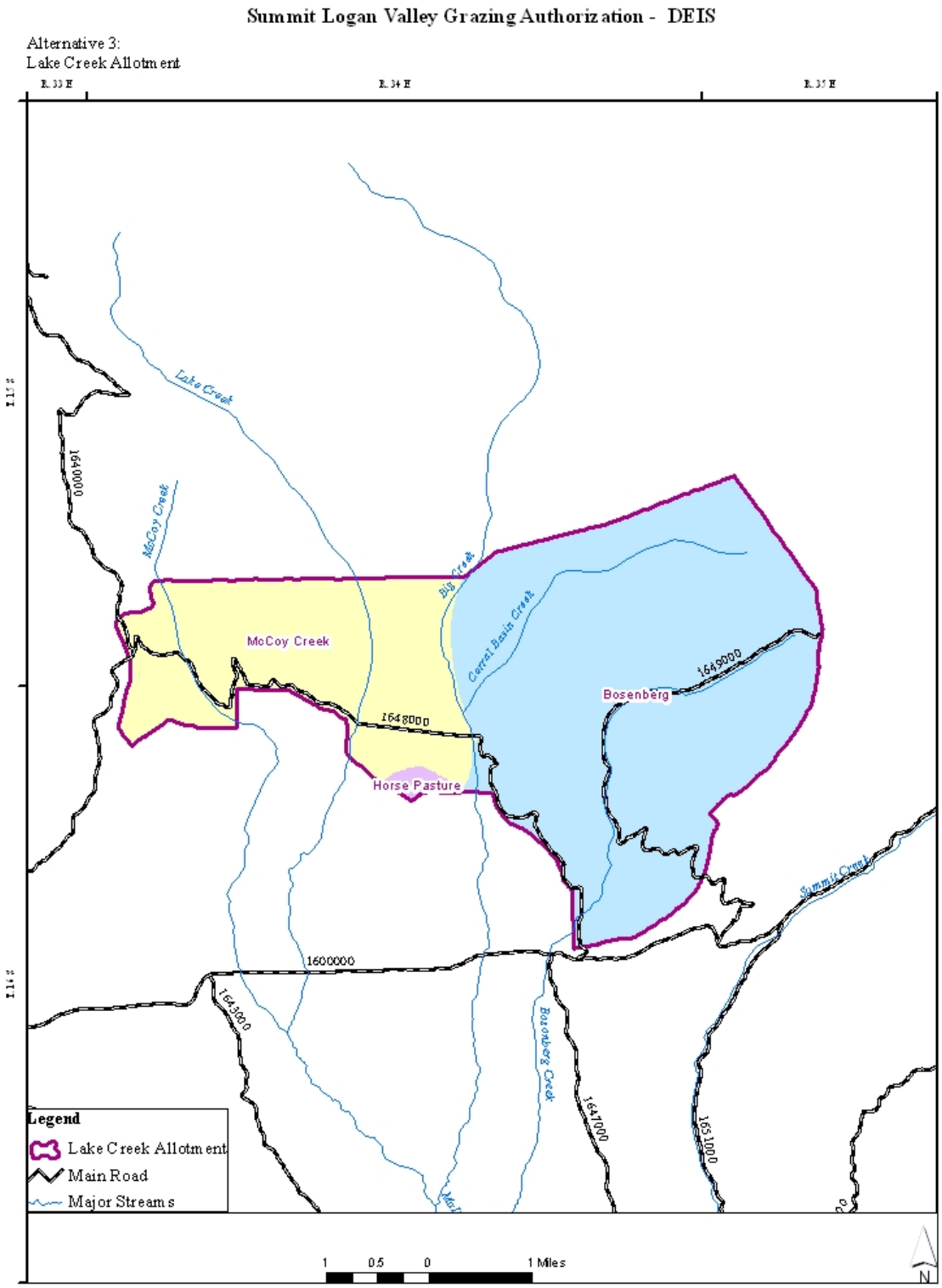
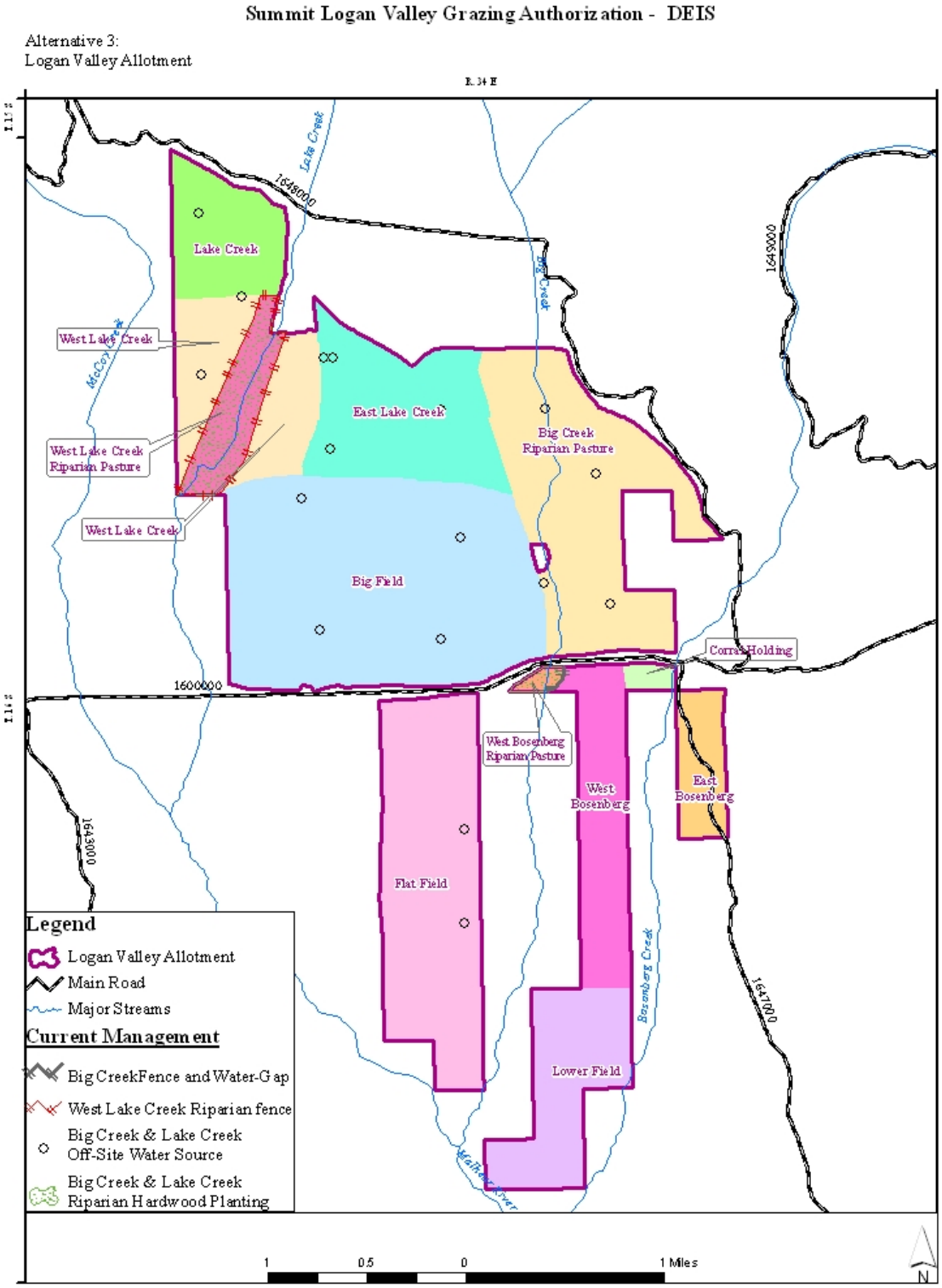
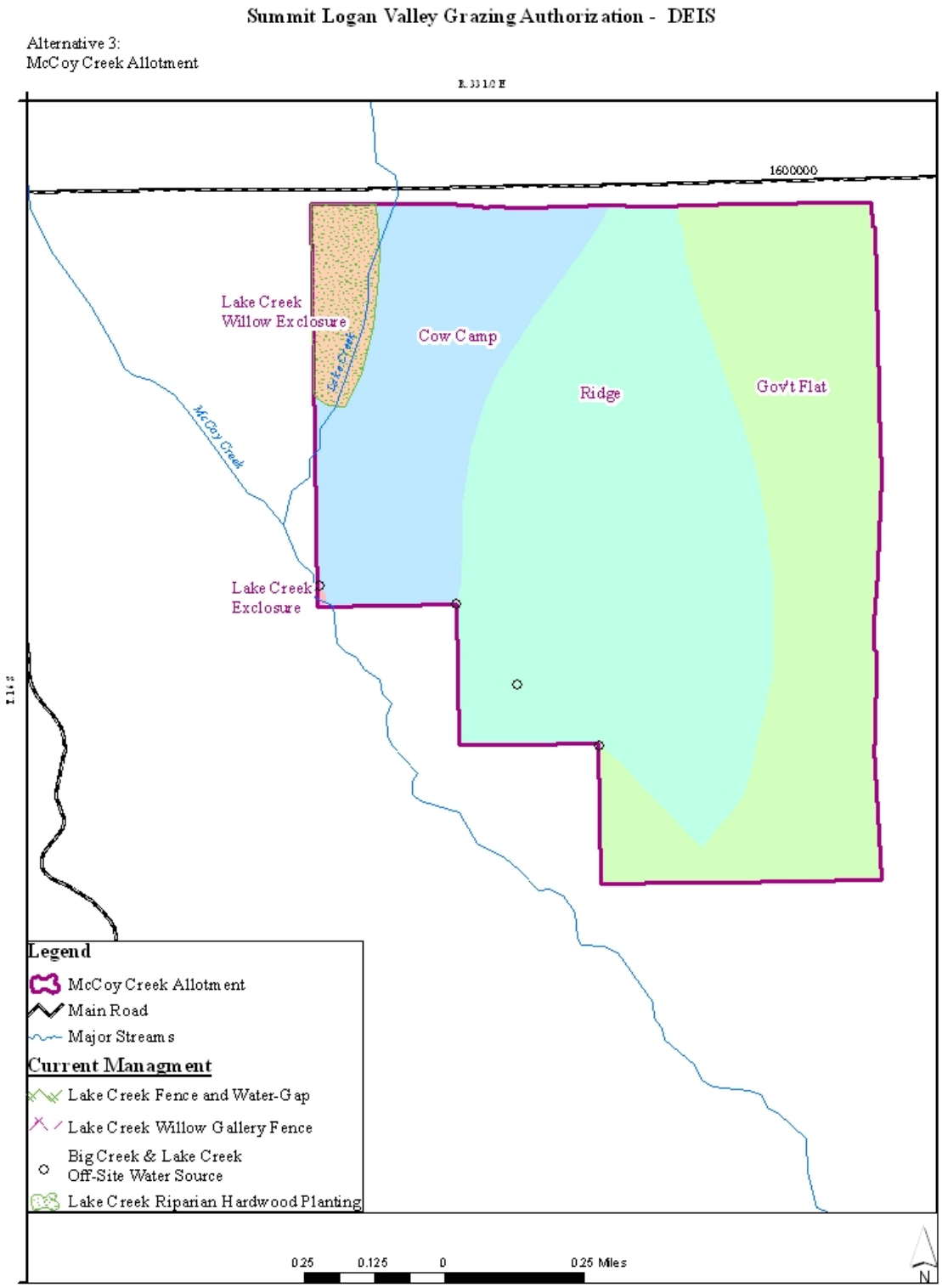
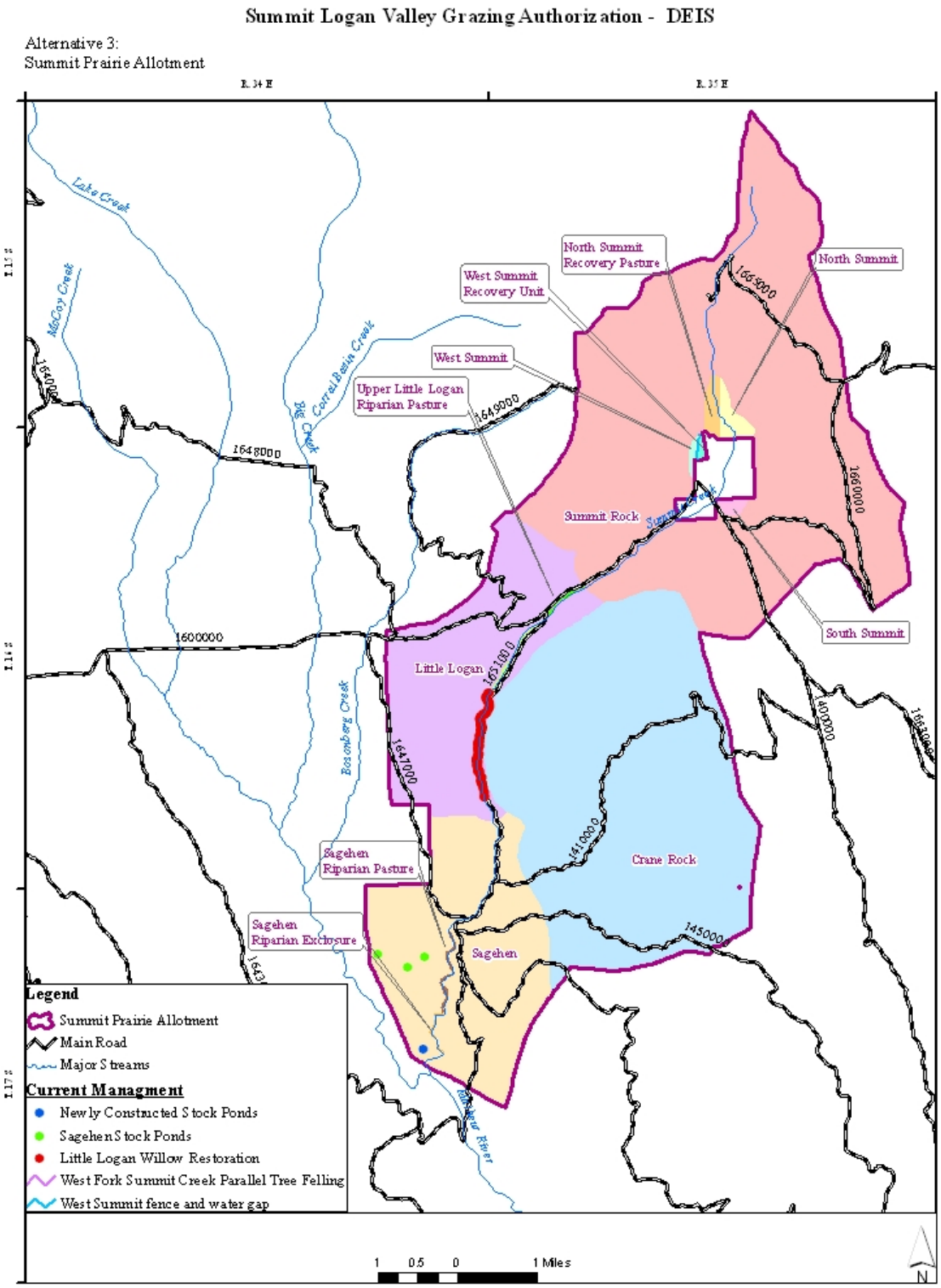
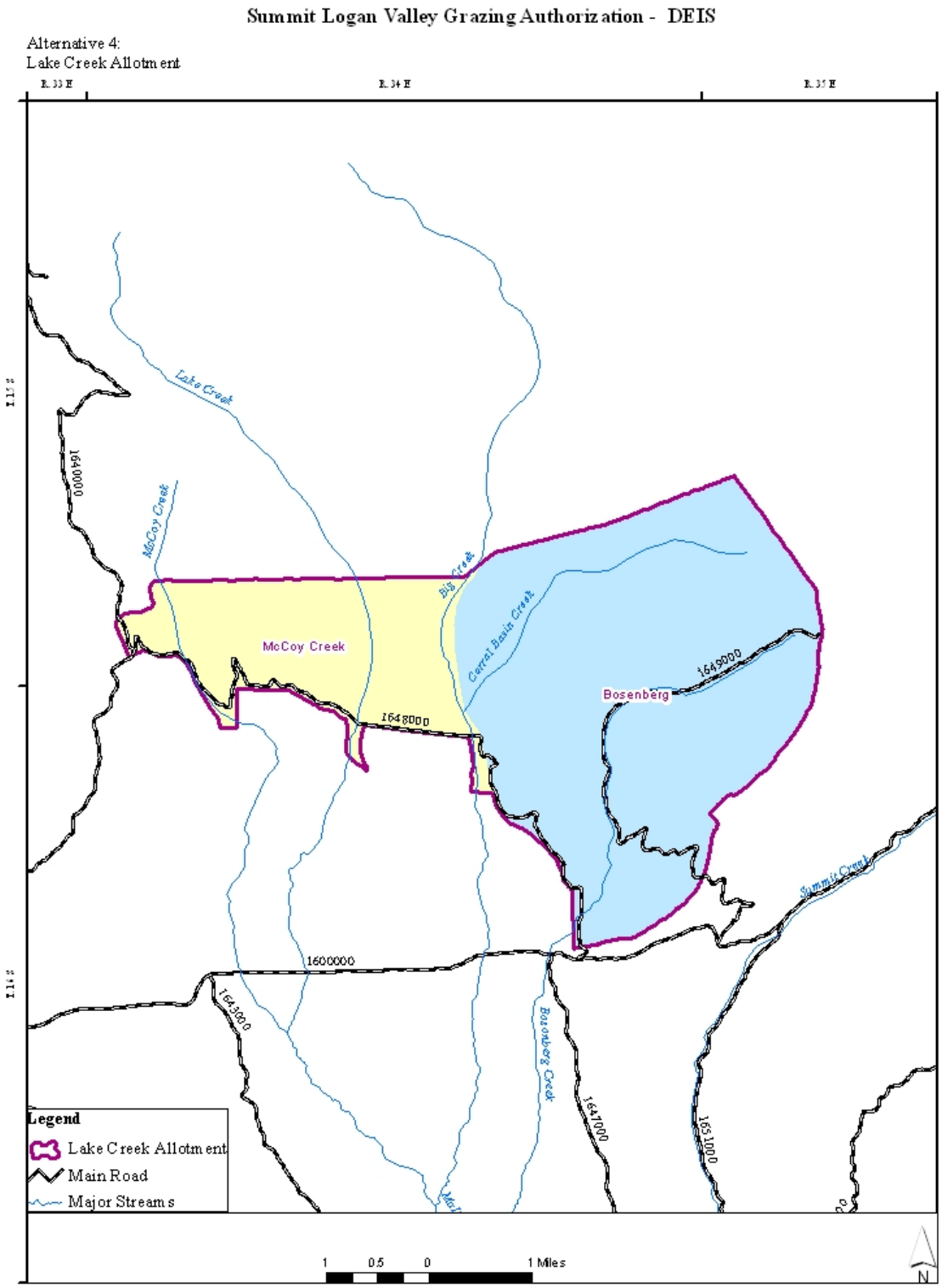
Alternative 2: Proposed Action
Summit Prairie Allotment
West Summit Recovery Unit
North Summit
West Summit
Summit Rock
Bosenberg
Little Logan
Crane Rock
Sagehen
South Summit
Lake Creek
McCoy Creek
Big Creek
Corral Basin Creek
Bosenberg Creek
Rattlesnake River
1648000
1649000
1600000
1651000
1647000
1410000
1450000
1400000
1660000
Legend
Summit Prairie Allotment
Main Road
Major Streams
Current Managment
Newly Constructed Stock Ponds
Sagehen Stock Ponds
Little Logan Willow Restoration
West Fork Summit Creek Parallel Tree Felling
West Summit fence and water gap
1 0.5 0 1 Miles
N

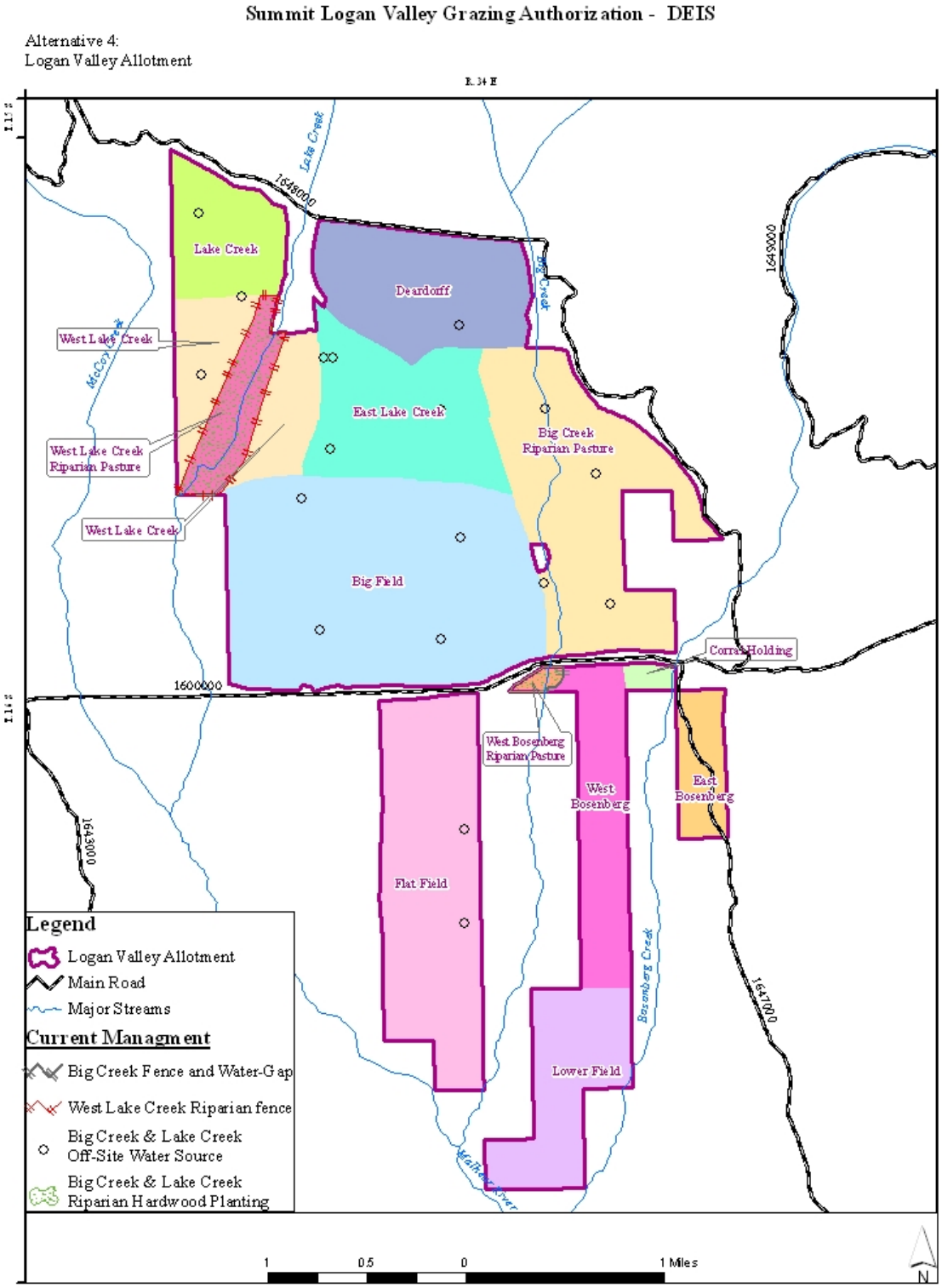

Summit Logan Valley Grazing Authorization - DEIS
Alternative 3:
Lake Creek Allotment
R. 33 E
R. 34 E
R. 35 E
T. 15 S
T. 16 S
Lake Creek
McCoy Creek
Big Creek
Corral Basin Creek
McCoy Creek
Bosenberg
Horse Pasture
Summit Creek
Bosenberg Creek
1644000
1648000
1649000
1600000
1643000
1647000
1651000
Legend
Lake Creek Allotment
Main Road
Major Streams
1 0.5 0 1 Miles
N

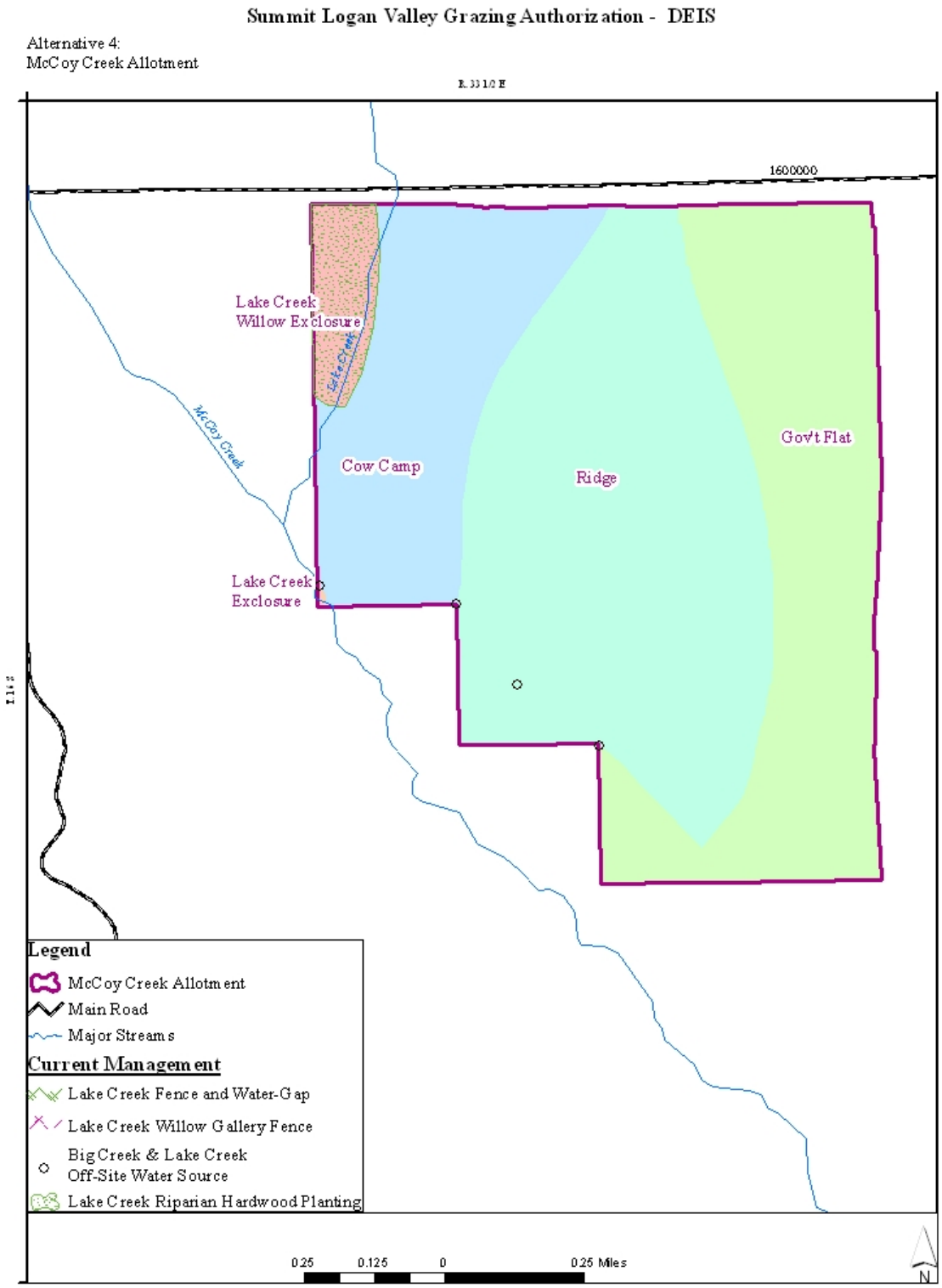

Summit Logan Valley Grazing Authorization - DEIS
Alternative 3:
Logan Valley Allotment
Lake Creek
West Lake Creek
West Lake Creek Riparian Pasture
East Lake Creek
Big Creek Riparian Pasture
Big Field
Corrals Holding
West Bosenberg Riparian Pasture
West Bosenberg
East Bosenberg
Flat Field
Lower Field
Bosenberg Creek
Legend
Logan Valley Allotment
Main Road
Major Streams
Current Management
Big CreekFence and Water-Gap
West Lake Creek Riparian fence
Big Creek & Lake Creek Off-Site Water Source
Big Creek & Lake Creek Riparian Hardwood Planting
1 0.5 0 1 Miles
N

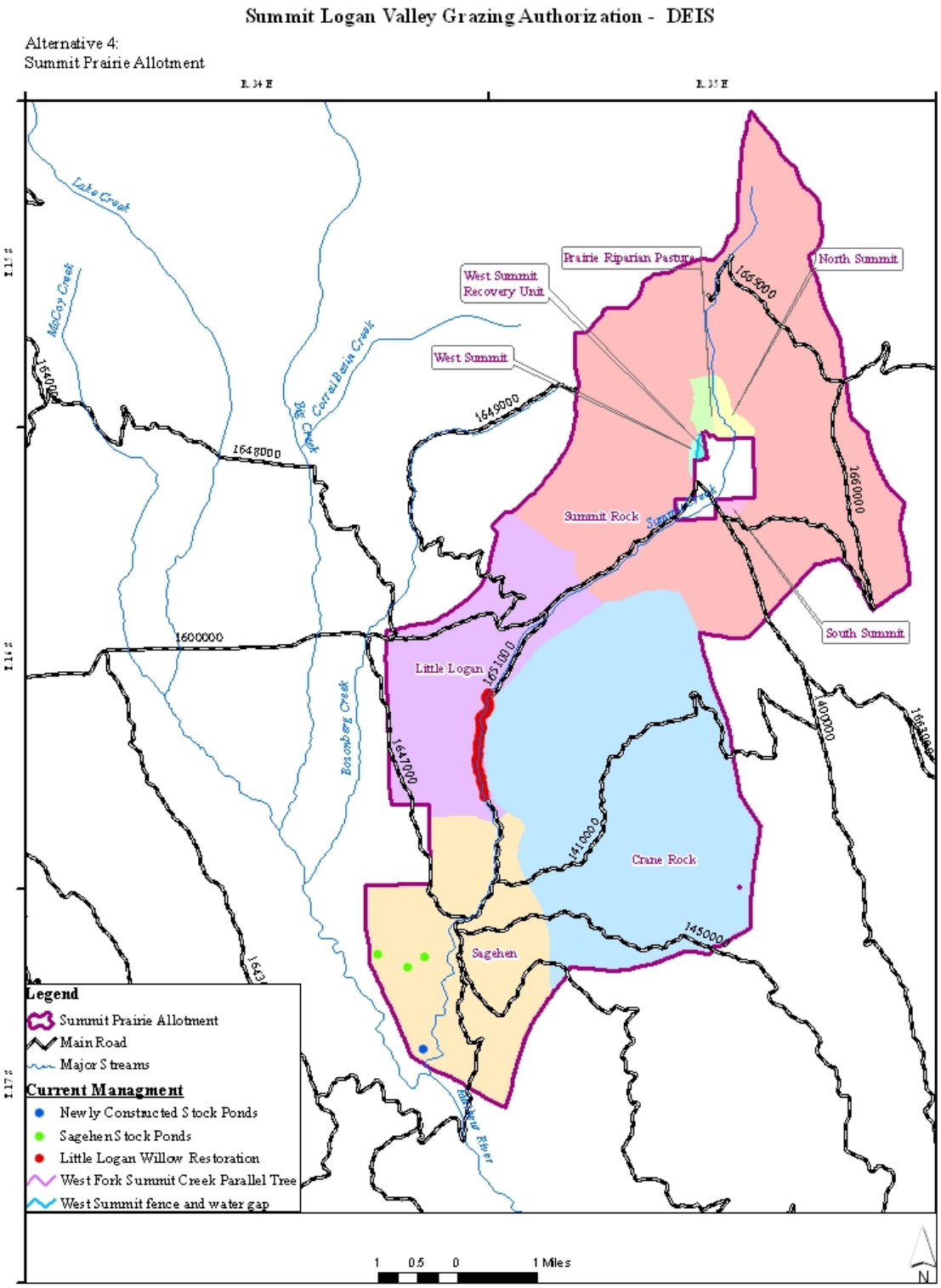

Summit Logan Valley Grazing Authorization - DEIS
Alternative 3:
McCoy Creek Allotment
1600000
Lake Creek
Willow Exclosure
Cow Camp
Ridge
Gov't Flat
McCoy Creek
Lake Creek
Exclosure
Legend
McCoy Creek Allotment
Main Road
Major Streams
Current Managment
Lake Creek Fence and Water-Gap
Lake Creek Willow Gallery Fence
Big Creek & Lake Creek
Off-Site Water Source
Lake Creek Riparian Hardwood Planting
0.25
0.125
0
0.25 Miles
N

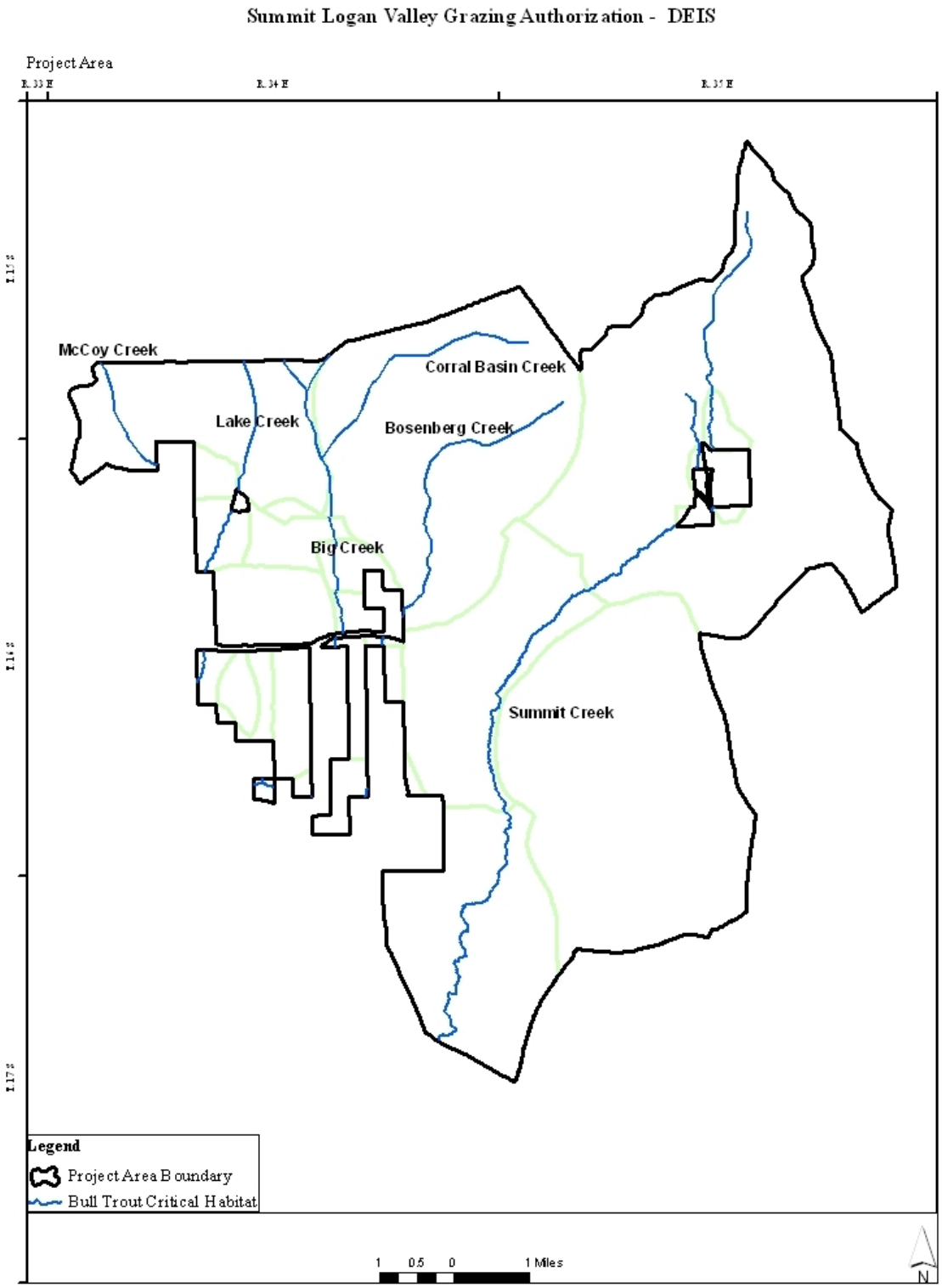

Summit Logan Valley Grazing Authorization - DEIS
Alternative 3:
Summit Prairie Allotment
R. 34 E
R. 35 E
Lake Creek
McCoy Creek
Big Creek
Corral Basin Creek
Bosonberg Creek
Rattlesnake River
North Summit Recovery Pasture
North Summit
West Summit Recovery Unit
West Summit
Upper Little Logan Riparian Pasture
Summit Rock
South Summit
Little Logan
Crane Rock
Sagehen Riparian Pasture
Sagehen Riparian Exclosure
Sagehen
1654000
1648000
1649000
1600000
1651000
1647000
1410000
1400000
1445000
1665000
1660000
Legend
Summit Prairie Allotment
Main Road
Major Streams
Current Managment
Newly Constructed Stock Ponds
Sagehen Stock Ponds
Little Logan Willow Restoration
West Fork Summit Creek Parallel Tree Felling
West Summit fence and water gap
1 0.5 0 1 Miles
N

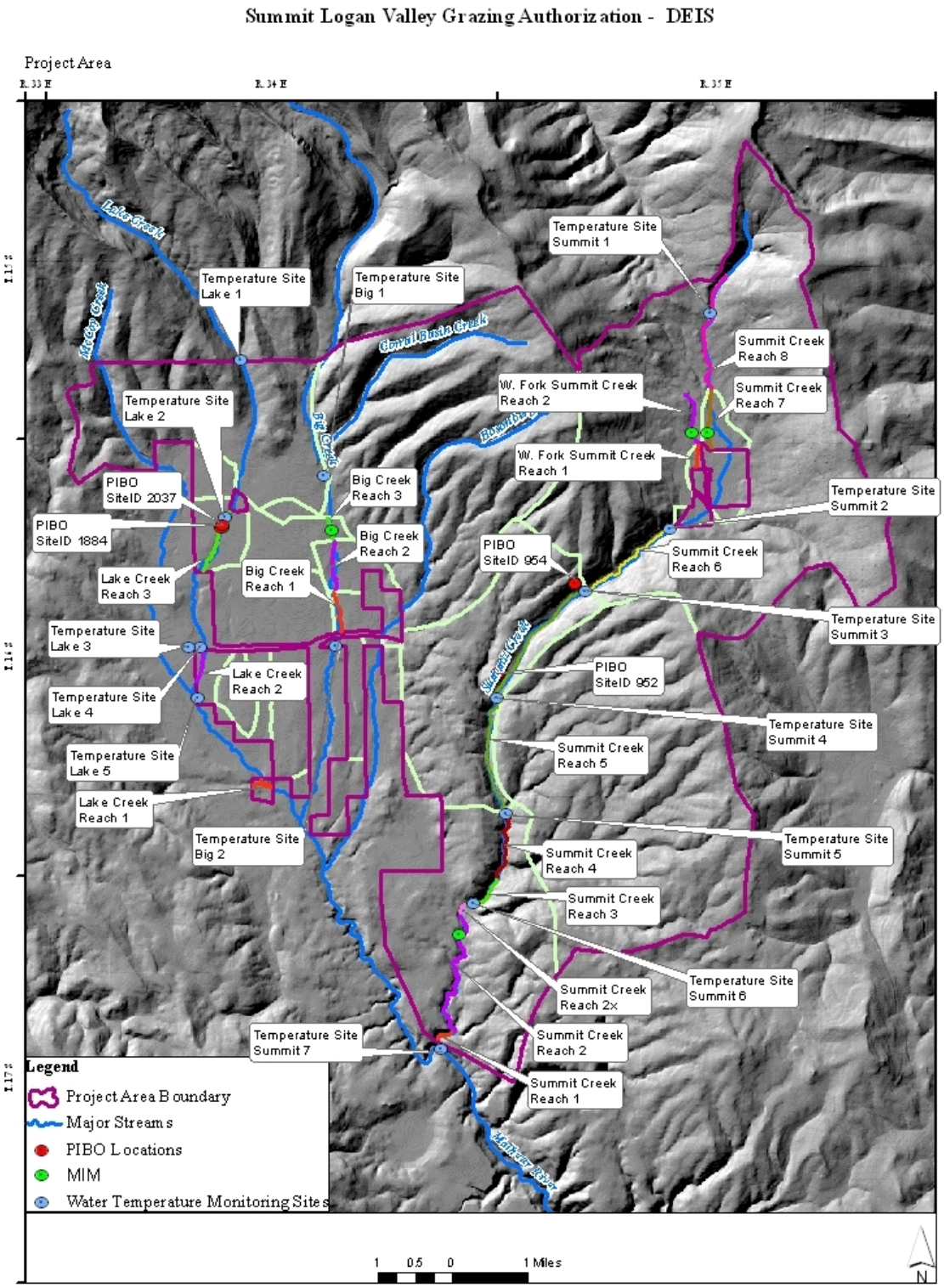

Summit Logan Valley Grazing Authorization - DEIS
Alternative 4:
Lake Creek Allotment
R. 33 E
R. 34 E
R. 35 E
Lake Creek
McCoy Creek
Big Creek
Corral Basin Creek
McCoy Creek
Bosenberg
Bosenberg Creek
Summit Creek
1644000
1648000
1649000
1600000
1643000
1647000
1651000
Legend
Lake Creek Allotment
Main Road
Major Streams
1 0.5 0 1 Miles
N


Summit Logan Valley Grazing Authorization - DEIS
Alternative 4:
Logan Valley Allotment
Lake Creek
Deardorff
West Lake Creek
West Lake Creek Riparian Pasture
East Lake Creek
Big Creek Riparian Pasture
Big Field
Corral Holding
West Bosenberg Riparian Pasture
West Bosenberg
East Bosenberg
Flat Field
Lower Field
Bosenberg Creek
Legend
Logan Valley Allotment
Main Road
Major Streams
Current Managment
Big Creek Fence and Water-Gap
West Lake Creek Riparian fence
Big Creek & Lake Creek Off-Site Water Source
Big Creek & Lake Creek Riparian Hardwood Planting
1 0.5 0 1 Miles
N


Summit Logan Valley Grazing Authorization - DEIS
Alternative 4:
McCoy Creek Allotment
1600000
Lake Creek
Willow Exclosure
Lake Creek
McCoy Creek
Cow Camp
Ridge
Gov't Flat
Lake Creek
Exclosure
Legend
McCoy Creek Allotment
Main Road
Major Streams
Current Management
Lake Creek Fence and Water-Gap
Lake Creek Willow Gallery Fence
Big Creek & Lake Creek
Off-Site Water Source
Lake Creek Riparian Hardwood Planting
0.25
0.125
0
0.25 Miles
N


Summit Logan Valley Grazing Authorization - DEIS
Alternative 4:
Summit Prairie Allotment
R. 34 E
R. 35 E
Lake Creek
McCoy Creek
Big Creek
Corral Basin Creek
Bosonberg Creek
Prairie Riparian Pasture
North Summit
West Summit Recovery Unit
West Summit
Summit Rock
South Summit
Little Logan
Crane Rock
Sagehen
1654000
1649000
1648000
1600000
1651000
1647000
1410000
1400000
1445000
1665000
Legend
Summit Prairie Allotment
Main Road
Major Streams
Current Managment
Newly Constructed Stock Ponds
Sagehen Stock Ponds
Little Logan Willow Restoration
West Fork Summit Creek Parallel Tree
West Summit fence and water gap
1 0.5 0 1 Miles
N


Summit Logan Valley Grazing Authorization - DEIS
Project Area
R.33 E
R.34 E
R.35 E
T.15 S
T.16 S
T.17 S
McCoy Creek
Corral Basin Creek
Lake Creek
Bosenberg Creek
Big Creek
Summit Creek
Legend
Project Area Boundary
Bull Trout Critical Habitat
1 0.5 0 1 Miles
N


Summit Logan Valley Grazing Authorization - DEIS
Project Area
R. 33 E
R. 34 E
R. 35 E
Lake Creek
Mercy Creek
Big Creek
Carroll Basin Creek
Burnett Creek
Summit Creek
Temperature Site Lake 1
Temperature Site Big 1
Temperature Site Summit 1
Temperature Site Lake 2
Summit Creek Reach 8
Summit Creek Reach 7
W. Fork Summit Creek Reach 2
W. Fork Summit Creek Reach 1
PIBO SiteID 2037
PIBO SiteID 1884
Big Creek Reach 3
Big Creek Reach 2
Big Creek Reach 1
Temperature Site Summit 2
PIBO SiteID 954
Summit Creek Reach 6
Lake Creek Reach 3
Temperature Site Summit 3
Temperature Site Lake 3
Lake Creek Reach 2
PIBO SiteID 952
Temperature Site Lake 4
Temperature Site Summit 4
Summit Creek Reach 5
Temperature Site Lake 5
Lake Creek Reach 1
Temperature Site Big 2
Temperature Site Summit 5
Summit Creek Reach 4
Summit Creek Reach 3
Temperature Site Summit 6
Summit Creek Reach 2x
Temperature Site Summit 7
Summit Creek Reach 2
Summit Creek Reach 1
Legend
Project Area Boundary
Major Streams
PIBO Locations
MIM
Water Temperature Monitoring Sites
1 0.5 0 1 Miles
N

Appendix C

Cumulative Activities Considered

The following listed activities will be reviewed for cumulative effects within each of the resource sections. These activities are located within the project area unless otherwise noted. The project area consists of all or portions of the Upper Big Creek, Lake Creek, Summit Creek, and Bosenberg Creek subwatersheds in the Upper Malheur River Watershed. The year listed on the table is the year the activity was implemented or proposed for implementation.

Past Activities in the Summit Logan Grazing Authorization Project Area

Past Timber Sales:

Year	Sale Name	Harvest Type
1972	Little Logan	HPR
1972	Mickey Mouse	HSV
1974	Bosenberg	HPR
1975	Black Canyon	HPR
1977-1979	Lonsumess	HCC/HPR/HFR
1979	Muddy Shoe	HSH/HFR
1980-1983	Spiketail	HCR/HFR/HSH
1981	Big Pine	HSV/HPR/HCC
1981	Conroy	HPR
1981	Malheur River	HFR
1981-1984	Scots	HCC/HPR/HSH/HFR
1982	Stacked	HSV
1982	Logan IV	HCR
1982	Logan LP	HCR
1982-1983	Fourteen	HFR/HCC/HPR/HSV
1983	Logan 0	HCR
1983	Logan II	HCR
1983	Logan III	HCR
1983-1984	BO	HFR/HSV
1983-1984	Sage	HFR
1983-1987	Exchange II	HSV/HCR
1984-1985	Hare	HCC/HPR/HCR/HFR
1984-1986	Teen	HFR
1985	Bigham	HCR/HTH/HPR
1985-1987	Keystone	HSH/HFR
1986	Logan	HFR/HCR
1986	Exchange III	HCR/HFR/HTH/HPR
1986-1988	Exchange IV	HCR/HPR/HTH
1986-1988	PC Rock	HCC/HFR/HOR/HOH

Year	Sale Name	Harvest Type
1987-1989	Hilo Exchange II	HCC/HCR/HSH/HPR
1989-1995	McCoy	HCC/HCP/HOR/HSH
1990-1991	Parallel	HCC/HOR/HCP
1991-1992	Bullet	HCR/HCP/HSH
1991-1992	Silver	HSH/HCP/HSV/HCR
1991-1992	Sno A	HSH/HCC
1991-1992	Sno B	HCR/HCC
1991-1992	Sno C	HCC/HTH
1991-2001	Wickiup	HSH/HOR/HCC/HSV/HSA
2002-2011	Merit	HTH/HCR/HSH
2002-2011	Starvation Lodgepole	HTH

*Area ID – These harvest areas are broadly mapped; minimal historical records; A map showing the locations of past harvest areas is located in the Malheur Headwaters Watershed Assessment (2000), Figure 37.

Harvest Prescription Definitions:

- HTH: Commercial thinning
- HCR: Regeneration harvest (even aged management; the stands naturally or artificially regenerated)
- HCC: Clearcut
- HSH: Shelterwood/Seed tree
- HOR: Harvest overstory removal
- HFR: Final removal (of a mature overstory to release established immature crop tree that were not a result of a prescribed regeneration cut)
- HPR: Partial removal
- HSV: Selection removal
- HSA: Salvage harvest

Past Wildfires:

Year	Fire Name	Acres	Description
1990	Snowshoe, Corral Basin, and Sheep	10,022	Stand replacement fires in the Big Creek, Summit Creek and Bosenberg subwatersheds (Upper Malheur River watershed).
2002	High Robert	9,917	Stand replacement fire in the Rail Creek, Upper Big Creek and Lake Creek subwatersheds.

Other Past Activities:

Year	Activity	Description
Mid-1800's to Present	Livestock grazing (cattle/sheep)	From the mid-1880's to the 1900's, cattle mostly grazed in low-lying riparian areas but since the early 1900's, when overgrazing became an obvious problem, livestock grazing decreased considerably. Grazing activities include construction and maintenance projects (fences and water troughs) needed for range management. Currently, Dollar Basin, McCoy Creek, Summit Prairie and Logan Valley are active allotments; Lake Creek has been vacant with no livestock grazing since 1985.

Year	Activity	Description
Mid-1800's to Present	Private land livestock grazing adjacent to project area.	There are four private land owners adjacent to the project area. All private lands are grazed to some extent. The private lands located along Lake Creek and McCoy Creek are generally grazed from June through October. The private land located along Bosenberg Creek is generally grazed from June through October. The private land located south of the Forest Service road 16 is generally grazed May through October. The riparian areas have been placed in a conservation program and are currently not being grazed. The private land at the south end of the project area along the Malheur River is grazed early in the season from June to July, and in the fall for a week or two before livestock are trucked home. The private land located along Summit Creek is generally grazed from June through October.
Early 1900's to Present	Water withdrawal for irrigation	Construction and maintenance of diversions and ditches for either pasture irrigation or livestock watering.
Early 1900's to Present	Summer Recreation	Use includes camping, mushroom picking, fishing and sightseeing.
Early 1900's to Present	Fall Recreation	Use includes hunting and fishing.
1920s to Present	Use and Maintenance of National Forest roads	Road maintenance includes but is not limited to cleaning culverts, ditches and cattleguards, blading, brushing and signing roads. All road maintenance activity follows the commercial roads rule requirements of 2009.
Early 1900's to 1960's	Railroad Line	Railroad lines were constructed from Seneca, Oregon to Summit Prairie. The track was abandoned and removed in the 1960's and the majority of the lines were converted to roads.
1950's to Present	Fire Suppression	Fire suppression activities
1950's	Introduction of Brook Trout	Introduction of brook trout into the Malheur River system.
1960's to Present	Firewood Cutting	Firewood cutting throughout the project area. Firewood cutting has increased since the 1920s as railroad lines and roads were established.
1960's to Present	Lake Creek Organization Camp	In 2005 a Special Use Permit (20 year permit) granting continued use of approximately 20 acres of NFS lands to Lake Creek Youth Recreational Camp, Inc. (Lake Creek Camp). The permit authorizes maintenance and seasonal operation of existing facilities on this site primarily for a youth camp. Additional conditions under the permit removal of facilities within Riparian Habitat Conservation Areas.

Year	Activity	Description
		Historically the area was a Forest Service Ranger Station (early 1900's).
1970's to Present	Winter Recreation	Use includes snowmobiling, grooming and use of existing snowmobile trails.
1990's	Sandpiper Habitat Restoration	Removal and piling of encroaching lodgepole pine saplings along the edges of meadow areas in Logan Valley.
2004	Burns Piaute Bridge	Construction of an access bridge.
2004	Bridge removal	Removal of two unsafe railroad bridges.
2005	Meadow Fork Culvert Replacement	Replaced the culvert on Meadow For Big Creek with a bridge.
2009-2010	Merit Road Closures and Decommissioning	Road closures (10.4 miles with gates and 15.3 miles with dirt berms) and decommissioning (12.6 miles) in the Lake Creek subwatershed.
2005-2011	Merit Precommercial Thinning	Precommercial thinning and machine piling and handpiling on approximately 370 acres in the Lake Creek subwatershed.
2010	Merit Underburning	Underburned 250 acres
2005-Present	Big Creek Aspen Restoration	Construction of buck and pole fence, commercial and noncommercial thinning, and fuel treatments on 22 acres. Still need to do jackpot burning.
2008	Logan Valley Meadow Restoration	5 acres of meadow restoration in Logan Valley. Noncommercial removal of encroaching lodgepole pine and handpiling in meadows.
2010 - Present	Logan Valley Meadow/Grassland Enhancement, Aspen Restoration Project.	Project is partially complete. Approximately 229 acres of grassland/meadow enhancement which includes combinations of hand cutting of encroaching lodgepole, fuel treatments, and underburning. Aspen restoration on approximately 18 acres which includes conifer cutting and seedling protection (hinging and fencing). Commercial thinning on approximately 100 acres to minimize the impacts of Mt. Pine beetle.

Present or Ongoing Activities (2012)

Present or Ongoing Activities

Activity	Description
Water withdrawals/irrigation	Same as in the past
Firewood cutting	Same as in the past
Livestock grazing	Same as in the past
Invasive weed control	Same as in the past
Summer, fall, winter recreation	Same as in the past
Use and maintenance of National Forest roads	Same as in the past
Fire suppression	Same as in the past
Lake Creek Organization Camp	Same as in the past
Logan Valley Meadow/Grassland Enhancement, Aspen Restoration Project.	Same as in the past

Activity	Description
West Fork Summit Creek fence and water gap	Construct a 4-wire let-down fence along approximately 0.3 miles of West Fork of Summit Creek. The fence and water gap would be constructed along the west side of the stream.
West Fork Summit Creek parallel tree felling	Green lodgepole felled parallel along West Fork of Summit Creek for approximately ½ miles (roughly 50-75 trees).
Little Logan willow restoration (continued)	Enlarge or replace existing cages around willows. Cages would be approximately 20 ft. in diameter. Construct a ¼ mile buck and pole exclosure around a group of willows, removing cages.
Sagehen stock ponds	Construction of 3 stock ponds in the Sagehen unit. Ponds would be located in the uplands (outside of RHACs), capturing runoff from snow melt.
Lake Creek unit division fence reconstruction	Reconstruction of approximately 1 mile of 4-wire barbed wire let-down fence.
Big Creek fence and water-gap	Construct a 4-wire barbed let-down fence along approximately 0.2 miles of Big Creek. The fence (with rock jacks) and water gap would be constructed along the east side of the stream. Some willows may be cut or removed, depending on the timing, willow stems or entire places with roots may be transplanted to other locations along Big and/or Lake Creeks.
Lake Creek fence and water-gap	Construct a 4-wire barbed let-down fence with water-gaps along approximately 0.2 miles of Lake Creek.
Lake Creek willow gallery fence	Construct a 4-wire barbed wire fence with rock jacks along approximately 0.5 miles of Lake Creek.
Big Creek and Lake Creek off-site water source	A flex tub with pump would be placed in stream channel. A small piece of equipment would trench the pipeline from the adjacent riparian area to the troughs. A solar panel would be placed in the adjacent area of the stream channel to power the pump. Trough locations would be leveled and hardened with rocks.
West Lake Creek riparian fence	Construct a 4-wire let-down fence with rock jacks along approximately 1 mile of Lake Creek (totally 2.1 miles of fence).

Foreseeable Activities

Year	Approved	Foreseeable Activity	Description
Annual	Yes	Water withdrawals/irrigation	Same as in past
Annual	Yes	Firewood cutting	Same as in past
Annual	Yes	Livestock grazing	Same as in past
Annual	Yes	Summer, fall, winter recreation	Same as in past
Annual	Yes	Use and maintenance of National	Same as in past

Year	Approved	Foreseeable Activity	Description
		Forest roads	
Annual	Yes	Fire Suppression	Same as in past
2012-2013	Yes	Riparian Hardwood Planting Restoration	Planting of hardwood cuttings along approximately 1.2 miles of Lake Creek and 2.5 miles of Big Creek to restore shade and cover.
2013	NO	Malheur National Forest Travel Management	Cross country travel would be prohibited across 1,337,770 acres on the Malheur National Forest where it is not already prohibited with the exception of cross country travel from designated open routes for the sole purpose of dispersed camping when resource damage caused by motor vehicle use can be avoided. The distance that cross country travel would be allowed from open routes to existing dispersed camp sites would vary by alternative considered in the travel management analysis. Existing dispersed sites in a riparian area would also have a setback distance from the stream where motorized access would be restricted.
2013	No	Malheur National Forest Site-Specific Invasive Plant Treatment	Treatment of known and newly discovered invasive plants using herbicide, manual, mechanical, biological and/or cultural treatments.

Appendix D

Definition of Terms

A:

Access – The mode by which activities are pursued and how well users can travel to or within the setting.

Adaptive Management – 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.

Allotment Management Plan (AMP) – A long-term operating plan for a grazing allotment on public land prepared and agreed to by the permittee and appropriate agency.

Allowable Use – (1) The degree of utilization considered desirable and attainable on various parts of a ranch or allotment considering the present nature and condition of the resource, management objectives and levels of management. (2) The amount of forage planned to be used to accelerate range improvement.

Animal-Unit-Month (AUM) – The amount of dry forage required by one animal unit for one month based on a forage allowance of 26 pounds per day. Not synonymous with animal-month. The term AUM is commonly used in three ways: (a) stocking rate, as in "X acres per AUM", (b) forage allocations, as in "X AUMs in Allotment A", (c) utilization, as in "X AUMs taken from Unit B."

Available Forage – That portion of the forage production that is accessible for use by a specified kind or class of grazing animal.

Average Bankfull Width **–** The width at the elevation of the bank where flooding occurs.

B:

Bankfull width to depth – A ratio that divides the bankfull width by the average depth of the bankfull channel. A higher value is typically wide and shallow, whereas a lower values is narrower and deeper.

Bankfull **–** The elevation of the bank where flooding begins. The bankfull level is associated with the streamflow that just fills the channel to the top of its banks where water begins to overflow onto the floodplain.

Bryophyte – Species of land plants that do not have true vascular tissue (non-vascular), such as mosses, liverworts, and hornworts (compare to vascular plant).

C:

Capability – 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 a given level of management intensity. Capability depends upon current resource 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 – The maximum stocking rate possible without inducing damage to vegetation or related resources. It may vary from year to year on the same areas due to fluctuating forage production. Syn., grazing capacity.

Complete Survey – For this type of survey, the survey area is given a very close review by walking through the entire area and its perimeter more than once. Virtually all of the area is examined.

Cultural Resources – The physical remains (artifacts, ruins, burial mounds, petroglyphs, etc.) and conceptual content or context (as a setting for legendary, historic, or prehistoric events, as a sacred area of native peoples, etc.) of an area associated with human use capable of providing scientific or humanistic understanding of past human behavior, cultural adaptation and related topics through the application of scientific or scholarly techniques of investigation, or has spiritual value for members of the affiliated culture.

D:

Dedicated Old Growth (DOG) – Forest Plan Management Area 13 which is comprised of mature trees (150 years or older) provides habitat for wildlife species dependent on mature forest conditions and provides for ecosystem diversity. These areas are equally distributed across the Forest. Wildlife species dependent on these lands include pileated woodpecker and American (pine) marten.

Deferred Grazing – The use of deferment in grazing management of a management unit, but not in a systematic rotation including other units.

Deferred Rotation – Any grazing system, which provides for a systematic rotation of the deferment among pastures.

Designated Monitoring Area (DMA) – A relatively small portion of a pasture or management unit selected because of its location, use or grazing value as a monitoring point for grazing use. It is assumed that key areas, if properly selected, will reflect the overall riparian condition and the acceptability of current grazing management in riparian areas.

Desired Condition – (1) A portrayal of the land or resource conditions that are expected to result if goals and objectives are fully achieved. (2) A description of the landscape as it could reasonably be expected to appear at the end of the planning period if the plan goals, objectives, standards, and guidelines for that landscape are fully achieved.

Dispersed Recreation – Recreation use that occurs outside of developed sites and requires few, if any, facilities other than roads and trails. Dispersed recreation activities include hiking, backpacking, cross-country skiing, hunting, and snowmobiling, viewing scenery, and driving for pleasure.

E:

Ecological Status (seral status) – The present state of vegetation and soil protection of an ecological site in relation to the potential natural community for the site. Vegetation status is the expression of the relative degree of which the kinds, proportions, and amounts of plants in a community resemble that of the potential natural community. If classes or ratings are used, they should be described in ecological rather than utilization terms. For example, some agencies are utilizing four classes of ecological status ratings (early seral, mid-seral, late seral, potential natural community) of vegetation corresponding to 0-25%, 26-50%, 51-75% and 76-100% of the potential natural community standard. Soil status is a measure of present vegetation and litter cover relative to the amount of cover needed on the site to prevent accelerated erosion. This term is not used by all agencies.

Ecological Status Rating – The average ecological status rating of plants. The ecological status is calculated using plant successional status ratings and Winward's Riparian Capability Groups. It is further adjusted where a woody overstory component should be present but currently is not present.

Effective Shade – The percent reduction of potential daily solar radiation delivered to the water surface.

End-point Indicator – Physical features that can be measured as a group to assess cause and affect relationships and determine condition and trend. The timing of measurements is based on the objective – bank disturbance features (such as hoof prints) are best measured at the end of the grazing season, vegetation monitoring is generally conducted at the end of the growing season (or the end of the grazing season-whichever is later).

Exclosure – An area fenced to exclude animals.

Extensive Management Strategy – A Forest Plan strategy where management seeks full utilization of forage available to livestock. Cost-effective management systems and techniques, including fencing and water development, are designed and applied to obtain relatively uniform distribution and use of forage and to maintain plant vigor.

F:

Featured Species – The Malheur Forest Plan defines a featured species as a wildlife species of high public interest or demand.

Fen – A groundwater-dependent ecosystem and type of minerotrophic peatland that has a relatively constant supply of groundwater which saturates the soil and slows decomposition to the point that peat accumulates. The water table is slightly below, at, or just above the surface;

there is internal groundwater seepage in these systems, but sometimes they have over-surface flow. The dominant vegetation are bryophyte, graminoid, or low shrub species.

Floodplain – The relatively flat area adjacent to a stream or lake that experiences occasional or periodic flooding.

Forage – (n) Browse and herbage which is available and may provide food for grazing animals or be harvested for feeding. (v) To search for or consume forage.

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 either green, air-dry, or oven-dry. The term may also be modified as to time of production such as annual, current years or seasonal forage production.

Foreground – A term used in visual management to describe the portions of a view between the observer and up to ¼ to ½ mile distant.

Functional At Risk (FAR) – Riparian-wetland areas that are in functional condition but an existing soil, water, or vegetation attribute makes them susceptible to degradation.

G:

General Survey – For this type of survey, the survey area is given a closer review by walking through the area and its perimeter or by walking more than once through the area. Most of the area is examined.

Geomorphology – The study of landforms and the processes that form them.

Graminoid – Species of vascular plants that include grasses and grass-like plants, such as sedges, rushes, bulrushes, and spikerushes.

Grassland – Land on which the vegetation is dominated by grasses, grass-like plants, and/or forbs. Non-forest land shall be classified as grassland if herbaceous vegetation provides at least 80% of the canopy cover excluding trees. Lands not presently grassland that were originally or could become grassland through natural succession may be classified as potential natural grassland. See also: Rangeland.

Grazing Permit – Official written permission to graze a specific number, kind, and class of livestock for a specified period on a defined allotment or management area. See also: Term Permit.

Grazing Permittee – An individual or other legal entity who has been granted a term grazing permit to graze a specified number of livestock for a specific period on a range allotment.

Grazing Season – (1) On public lands, an established period for which grazing permits are issued. May be established on private land in a grazing management plan. (2) The time interval when animals are allowed to utilize a certain area.

Grazing Use -

Actual Use – Report of the actual livestock use.

Authorized Use – is the use specified on the annual Bill(s) for Collection and verified by permittee's payment of fees.

Permitted Use – is the number of animals, period of use, and location of use specified in Part 1 of the grazing permit (see also definition for authorized use).

Greenline Stability Rating – The average vegetation stability rating of plants measured during the greenline plant composition component of MIM.

Greenline to Greenline Width – The nonvegetated width of a stream channel measured from the greenline on one side of the channel perpendicular to the streamflow to the greenline on the opposite side.

Groundwater-Dependent Ecosystem (GDE) – A wetland community that is reliant on having access to groundwater to maintain its ecological structure and function. They are diverse, complex, and often have a disproportionate amount of rare, sensitive, and unusual plant species. Springs, seeps, fens, swamps, and marshes are all types of GDEs.

H:

Hyphoreic Zone **–** The region beneath and adjacent to a stream where mixing in shallow groundwater and surface water occurs. Fish spawning typically occurs in these regions that provide cool water.

I:

Incidental Survey – This type of survey is conducted while accomplishing other botanical, ecological, or biological work. Thus, the primary purpose of the survey is not necessarily to locate and document TES plant species, but to accomplish other goals related to plant species function and occurrence. However, TES species are often located through this method. Most of the area is examined.

Interdependent – A relationship where each member is mutually dependent on the others.

Interrelated **–** Relates or connects to one another.

Intuitive Survey – This type of survey is the most commonly used and most efficient method of surveying for TES plants. Potential suitable habitat is identified for each species of interest and the survey effort is focused in those areas. When conducting intuitive controlled surveys, an area somewhat larger than the identified suitable habitat is searched to validate current suitable habitat definitions.

Invasive species – 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.

Irretrievable – Applies primarily to the use of nonrenewable resources. For example, some or all of the timber production from an area is irretrievably lost during the time an area is used as a winter sports site. If the use is changed, timber production can be resumed. The production lost is irretrievable, but the action is not irreversible.

Irreversible – Applies primarily to the use of nonrenewable resources, such as minerals or cultural resources, or to those factors such as soil productivity that are renewable only over long time periods. Irreversible also includes loss of future options.

L:

Landscape Character – Particular attributes, qualities, and traits of a landscape that give it an image and make it identifiable or unique.

Late and Old Structural (LOS) Forest – A term used in Regional Forester's Eastside Forest Plans Amendment #2 (Interim Wildlife Standard) that refers to the structural stages where large trees are common. In this document old growth and mature forest are sometimes used as surrogate terms.

Lentic – Pertaining to ecosystems with still or slow moving waters (as lakes, ponds, fens, marshes, or swamps).

M:

Management Indicator Species – Species selected by the Malheur National Forest as "barometers" of species diversity, viability, and the forest ecosystem. They are monitored over time to assess how changes in forest conditions (especially from management) affect MIS populations and habitat, and thus also populations of other species with similar habitat needs.

Meadow – (1) An area of perennial herbaceous vegetation, usually grass or grass-like, (2) Openings in forests and grasslands of exceptional productivity in arid regions, usually resulting from high water content of the soil, as in streamside situations and areas having a perched water table.

Mean Residual Pool Depth **–** The average of all differences between the crest depth and pool max depth in the survey. This difference can be visualized by imagining that if water ceased to flow, the water left in the pool that can't flow into the next riffle is the amount of the residual pool depth.

Middleground – The visible terrain beyond the foreground where individual trees are still visible, but do not stand out distinctly from the stand. It is the zone between the foreground and the background in a landscape. The area located from ½ mile to 4 mile from the observer.

Minerotrphic – Soils and vegetation whose water supply comes mainly from streams or springs. This water has flowed over or through rocks or other minerals, often acquiring dissolved chemicals which raise the nutrient levels and reduce the acidity.

Modification – A Visual Quality Objective meaning human activity may visually dominate the characteristic landscape, but also must utilize naturally established form, line, color, and texture.

N:

Non-Use – (1) Absence of grazing use on current year's forage production. (2) Lack of exercise, temporarily, of a grazing privilege on grazing lands. (3) An authorization to refrain, temporarily, from placing livestock on public ranges without loss of preference for future consideration

Noxious Weed – A plant species that is undesirable because it conflicts, restricts, or otherwise causes problems under management objectives. Not to be confused with species declared noxious by lows concerned with plants that are weedy in cultivated crops and on range.

O:

On-Site Recreation Development – The degree and appropriateness of recreation facilities provided within the setting.

P:

Partial Retention – Management activities may be evident to the viewer but must remain visually subordinate to the surrounding landscape.

Pasture – A grazing area enclosed and separated from other areas by fencing or other barriers; the management unit for grazing land.

Peat **–** Organic soils that are composed of partially decayed vegetation. Peat formation occurs when decomposition is very slow due to low oxygen conditions associated with waterlogging. Peat is primarily composed of un-decomposed graminoids and bryophytes.

Peatland **–** Any wetland that accumulates partially decayed plant matter (peat). Peatlands are often thousands of years old, and take from hundreds to thousands of years to form. Fens and bogs are the two primary peatland types.

Pedestaling – An evidence of soil erosion, where soil has been eroded from around a piece of ground cover (such as a clump of grass, or a piece of gravel), leaving the ground cover on a pedestal of un-eroded soil.

Percent Use – Grazing use of current growth, usually expressed as a percent of the current growth (by weight) that has been removed.

Permittee – One who holds a permit to graze livestock on state, federal, or certain privately owned lands.

Phenology – The study of periodic biological phenomena that are recurrent such as flowering, seeding, etc., especially as related to climate.

Plant Vigor – Plant health.

Potential Natural Community (PNC) – The biotic community that would become established on an ecological site if all successional sequences were completed without interferences by man under the present environmental conditions. Natural disturbances are inherent in its development. The PNC may include acclimatized or naturalized non-native species.

Productivity – (1) Soil productivity: the capacity of a soil to produce plant growth, due to the soil's chemical, physical, and biological properties (such as depth, temperature, water-holding capacity and mineral, nutrient, and organic matter content). (2) Vegetative productivity: the rate of production of vegetation within a given period. (3) General: the innate capacity of an environment to support plant and animal life over time.

Proper Functioning Condition – A riparian-wetland area is considered to be in proper functioning condition when adequate vegetation, landform, or large woody debris is present to: dissipate stream energy associated with high waterflow, thereby reducing erosion and improving water quality; filter sediment, capture bedload, and aid floodplain development; improve flood-water retention and ground-water recharge; develop root masses that stabilize streambanks against cutting action; develop diverse ponding and channel characteristics *to provide* the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; support greater biodiversity.

R:

Range – (n.) Any land supporting vegetation suitable for grazing including rangeland, grazable woodland and shrubland. Range is not a use. (adj.) Modifies resources, products, activities, practices and phenomena pertaining to rangeland.

Rangeland – Land where the vegetation is predominantly grasses, grass-like plants, forbs, or shrubs suitable for grazing and browsing.

Range Improvement – Any structure or nonstructural improvement to facilitate management of rangelands or livestock.

Range Readiness – 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. To be determined by Range Management Specialist with input from IDT.

Recreation Opportunity Spectrum (ROS) – A system for planning and managing recreation resources. Land delineations that identify a variety of recreation experience opportunities categorized into classes on a continuum from primitive to urban. Each class is defined in terms of the degree to which it satisfies certain recreation experience needs, based on the extent to which the natural environment has been modified, the type of facilities provided, the degree of outdoor skills needed to enjoy the area, and the relative density of recreation use. The settings, activities, and opportunities for obtaining experiences have been arranged along a continuum or spectrum divided into seven classes: Primitive, Semi-primitive Non-motorized, Semi-primitive Motorized, Roaded Modified, Roaded Natural, Rural, and Urban.

Remoteness – The extent to which individuals perceive themselves removed from the sight and sounds of human activity.

Replacement Old Growth (ROG) – Part of Forest Plan Management Area 13. These areas serve as replacements for DOG in the case of catastrophic damage or deterioration of dedicated old growth. Replacement old growth areas are to be located within ¼ mile of the dedicated areas and are one-half the size of corresponding dedicated old growth units.

Resilient, resilience, resiliency – (1) The ability of a system to respond to disturbances. Resiliency is one of the properties that enable the system to persist in many different states or successional stages. (2) In human communities, refers to the ability of a community to respond to externally induced changes such as larger economic or social forces.

Retention – Provides for management activities that are not visually evident. Management activities are permitted, but the results of the activities on the natural landscape must not be evident to the average viewer.

Riparian area – Area with distinctive soil and vegetation between a stream and other body of water and the adjacent upland; includes wetlands and those portions of floodplains and valley bottoms that support riparian vegetation.

Riparian Habitat Conservation Areas (RHCAs) – Portions of watersheds where riparian-dependent resources receive primary emphasis and management activities are subject to specific standards and guidelines. Riparian Habitat Conservation Areas include traditional riparian corridors, wetlands, intermittent streams, and other areas that help maintain the integrity of aquatic ecosystems by (1) influencing the delivery of coarse sediment, organic matter, and woody debris to streams, (2) providing root strength for channel stability, (3) shading for stream, and (4) protecting water quality.

Riparian Pasture – Riparian pastures are designed to protect riparian values. They may be smaller areas of rangeland containing both upland and riparian vegetation that are managed together as a unit to achieve riparian objectives, or they may be streamside pastures containing only riparian vegetation.

Riparian Species – Plant species occurring within the riparian zone. Obligate species require the environmental conditions within the riparian zone; facultative species tolerate the environmental conditions, and may occur away from the riparian zone.

Riparian Zone – The banks and adjacent areas of water bodies, watercourses, seeps and springs whose waters provide soil moisture sufficiently in excess of that otherwise available locally so as to provide a moister habitat than that of contiguous flood plains and uplands.

Roaded Natural – A natural-appearing environment with moderate evidence of the sights and sounds of humans. Such evidence usually harmonizes with the natural environment. Interaction between users may be moderate to high with evidence of other users prevalent. Motorized use is allowed.

Roaded Modified – A natural environment substantially modified, particularly by vegetation and landform alterations. There is strong evidence of roads and/or highways. Frequency of contact is low to moderate.

Rosgen Channel Types – An alpha-numeric classification system for communicating the type of stream channel that exists. Streams are grouped by entrenchment (the ease in which water flows onto the floodplain or is confined in the stream channel), the bankfull width/depth ratio, the sinuosity (or degree of meandering), water surface slope, and streambed rock size. The system goes from A-G and 1-6. A channel types are steep headwater streams. B channel types typically have water surface slopes between 2 and 4%, C channel types are lower gradient streams that typically have floodplains and point bars. D channel types drain glacially outwash areas such as Logan Valley. E channel types are extremely low gradient, have very sinuous channel patterns, don't have point bars and have vegetation creating a very narrow, deep channel dimension. F and G channel types typically have been incised and are evolving into a different channel type.

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 of plant defoliation.

S:

Satisfactory Range Condition – On suitable range, forage condition is at least fair, with stable trend, and allotment is not classified PC (basic resource damage) or PD (other resource damage).

Scabland **–** An area characterized by elevated tracts of rocky land with little or no soil and sparse vegetation of vascular plants.

Scenery Management System – Management guidelines based on the premise that land management activities (including construction of facilities) should not contrast with the existing natural appearing landscape. Within a framework of regional landscape, character types, form, line, color, and texture should be used to make activities and structures "fit" within landscapes.

Scenic Integrity – The degree of direct human-caused deviations in the landscape, such as road construction, timber harvesting, or activity debris. Scenic integrity is evaluated by measuring degree of alteration in line, form, color, and texture from the natural or natural-appearing landscape character or form the established landscape character accepted over time by the general public. This is done by measuring changes in scale, intensity, and pattern against the attributes of that landscape character.

Seasonal Grazing – Grazing restricted to a specific season.

Season of Use – The time during which livestock grazing is permitted on a given range area, as specified in the grazing permit.

Sediment – Solid materials, both mineral and organic, in suspension or transported by water, gravity, ice, or air; may be moved and deposited away from their original position and eventually will settle out.

Semi-Primitive Motorized – A natural or natural-appearing environment of moderate to large size. Interaction between users is low, but there is often evidence of other users. The opportunity exists to use motorized equipment.

Semi-Primitive, Non-Motorized – A natural or natural-appearing environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. Use of local roads for recreation purposes is not allowed.

Seral – 1) Refers to the stages that plant communities go through during succession. Developmental stages have characteristic structure and plant species composition. Early seral refers to plants that are present soon after a disturbance or at the beginning of a new successional process (in riparian areas-usually shallow-rooted, weak-stemmed colonizing plants that grow quickly and filter very fine sediment-often grasses); mid seral is often a mix of early and late seral plants; late or old seral refers to plants present during a later stage of plant community succession (in riparian areas-commonly stabilizing plants such as sedges and rushes that have strong cord-like rhizomes, deep, fibrous roots, coarse leaves and strong crowns that buffer streambanks against erosion, enhance streambank strength, filter sediments, and with water build/rebuild eroded banks-Winward 2000). 2) Refers to species or communities that are eventually replaced by other species or communities within a sere.

Seral stage – The developmental phase of rangeland with characteristic structure and plant species composition (see SERAL). Seral stage is a measure of vegetative condition which varies from very early to late seral with potential natural community (PNC) being the latest seral stage. Generally, an area falls into a later seral stage if it has a high percentage of "stabilizers" (usually native, deep-rooted sedges and grasses, and in some places rocks and down wood) and a shrub component. Areas with a higher percentage of "colonizers" (usually short-lived, shallow-rooted plants that respond quickly to change, including non-native plants) and with fewer shrubs are in earlier seral stages (adopted from Winward, 2000). PACFISH (USDA Forest Service 1995) defines seral stage by percent similarity of riparian vegetation to PNC or stream condition: under 25% similarity to PNC or "poor" stream condition equals early seral, over 50% similarity to PNC or "good" or better stream condition equals late seral. In terms of riparian function, later stages provide better stability and function, but in terms of forage, mid- and early seral stages tend to provide more production.

Social Encounters – The degree of solitude or social opportunities provided.

Soil – In this document "soil" means soil outside of stream channels.

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.

Standard 127 – LRMP Forest Wide Standard 127, which gives minimum ground cover by soil erodibility class.

Stock Water Development – Development of a new or improved source of stock water supply, such as well, spring, pond, together with storage and delivery system.

Suitable Range – Land which produces or has the inherent capability to produce 50 pounds or more of palatable forage per acre, can be grazed on a sustained-yield basis, and is or can be feasibly made accessible for use.

Suitability – a determination of 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 foregone.

T:

Term Permit – A document that authorizes grazing on public lands for a stated number of years as contrasted with an annual or temporary permit. See also: Grazing Permit.

Thinning – An operation to remove stems from a forest for the purpose of reducing fuel, maintaining stand vigor, regulating stand density/composition, or for other resource benefits. Although thinning can result in commercial products, thinning generally refers to non-commercial operations.

Threatened, Endangered and Sensitive Species – An endangered species is an animal or plant species listed under the Endangered Species Act that is in danger of extinction throughout all or a significant portion of its range. A threatened species is an animal or plant species listed under the Endangered Species Act that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. A sensitive species is an animal or plant species identified by the Forest Service Regional Forester for which species viability is a concern either a) because of significant current or predicted downward trend in population numbers or density, or b) because of significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

Trend – The direction of change in ecological status or resource value rating observed over time. Trend in ecological status should be described as toward or away from the potential natural community, or as not apparent. Trend in a resource value rating for a specific use should be described as up, down or not apparent. Trends in resource value ratings for several uses on the same site at a given time may be in different directions, and there is no necessary correlation between trends in resource value ratings and trend in ecological status. Some agencies use trend only in the context of ecological status.

U:

Understory – The trees and other woody species that grow beneath the canopy of other plants. Usually refers to grasses, forbs, and low shrubs under a tree or shrub canopy.

Unsatisfactory Range Condition – Allotment does not meet criteria for satisfactory condition.

Upland – Ground elevated above the lowlands along rivers or between hills. The portion of the landscape above the valley floor or stream.

Use – 1) The proportion of current year's forage production that is consumed or destroyed by grazing animals. May refer either to a single species or to the vegetation as a whole. (2) Utilization of range for a purpose such as grazing, bedding, shelter, trailing, watering, watershed, recreation, forestry, etc.

Utilization – Syn. Use.

Utilization Standards – The prescribed level of grazing by livestock which will achieve specific objectives including maintenance of vegetation and soil condition. Expressed as the percent of the annual herbaceous production removed by grazing.

V:

Vascular Plant – Species of land plants that have true vascular tissue, such as flowering plants, conifers, and ferns (compare to bryophyte).

Vegetation condition rating – A rating for range vegetation from Condition and Trend (C/T) plot data that is calculated by using a model that uses four successional stages (climax, late seral, mid seral, and early seral) mainly determined by percentage of climax vegetation on site. The C/T plots on the Malheur National Forest used ratings of excellent, good, fair, and poor which correlate to climax, late seral, mid seral and early seral and can be substituted in the vocabulary if necessary. With heavy grazing and subsequent defoliation of decreases (palatable productive plants and perennial grasses associated with climax seral stages) comes retrogression to an earlier seral stage resulting in an increase of increasers (plants usually of lower productivity and/or palatability associated with early seral stages).

Vigor – Relates to the relative robustness of a plant in comparison to other individuals of the same species. It is reflected primarily by the size of a plant and its parts in relation to its age and the environment in which it is growing. Syn. plant vigor.

Visitor Impacts – The degree of impact on both the attributes of the setting and other visitors within the setting.

Visitor Management – The degree and appropriateness of how visitor actions are managed and serviced.

Visual Corridor (Viewshed) – The total landscape seen or potentially seen from all or a logical part of a travel route.

Visual Quality – The degree of apparent modification of the natural landscape.

Visual Quality Objectives (VQOs) – A desired level of management based on physical and sociological characteristics of an area. Refers to the degree of acceptable alteration of the characteristic landscape.

W:

Water Gap – 1) A specially constructed fence across drainage. The fence is easily moved by the forces of a flood, thus preventing damage to the permanent fence. (2) An opening of fences area providing access to a developed or natural water supply permitting one watering facility to serve two or more pastures.

Wetland Rating **–** The average wetland ranking of plants as computed using the Wetland Indicator Status of Reed (1996).

Wolf Plant (wolfiness) – 1) A plant that, though of a species generally considered palatable, is not grazed by livestock. 2) An isolated plant growing to extraordinary size, usually from lack of competition.

Woody Cover – The sum of the percent cover of woody species along the greenline.

Appendix E

Move Triggers and Allowable Use Levels

Alternatives 2, 3, and 4 propose different combinations of use levels that control the duration of the grazing management system to address the purpose and need and the significant issues shown in Chapter 1. To control the duration of grazing, move triggers and thresholds for allowable use levels (end-point indicators) are identified for each alternative. Established thresholds are identified for upland and riparian herbaceous species use, bank alteration, and shrub browsing.

Monitoring would ensure that management is helping or moving towards attaining desired conditions. Appendix A, Part 4 describes the monitoring that would be implemented with the action alternatives. The Malheur National Forest Range Monitoring Guidelines lists accepted methodologies for monitoring, which may continue to be updated overtime.

Allowable use, move triggers, and end-point indicators may change for pastures based on site specific data collected at representative monitoring sites during the life of this analysis based on adjustments made in response to monitoring results, timing, or climatic conditions. As recovery is obtained through meeting management objectives (see Appendix A, part 1), less restrictive use levels may be adequate to maintain or continue recovery of stream conditions. If management objectives are not being achieved in a timely manner, changes in move triggers and allowable use levels may be necessary to accelerate recovery (see Appendix A, part 3).

Table 1: Alternative 2 (Proposed Action)

Indicator	Measurement Location	Move Triggers[17]	Allowable Use (End-Point Indicators)	Allotment and Pasture
Stubble Height on herbaceous hydrophytic riparian species (i.e., sedges and rushes)	Along the greenline[18]	45% use OR 5-inch stubble height[19]	4-inch stubble height	All pastures not listed below
		35% use OR 7-inch stubble height	6-inch stubble height	Logan Valley Allotment: ▪ West Bosenberg Riparian Pasture ▪ West Lake Creek Riparian Pasture Summit Prairie Allotment: ▪ Sagehen unit ▪ West Summit Recovery unit ▪ West Fork Summit Creek within in the Summit Rock unit
Grass and grass-like (non-hydrophytic species) within riparian benches[20] and upland[21] areas of the unit	Uplands and in soils that are non-hydrophytic in nature	45% use of available forage[22] within riparian benches and forested stands, 55% within grasslands and 50% within shrublands.		All pastures
Riparian woody shrubs (i.e., willows, alders, dogwood, wildrose)	Riparian Areas	Light (30%) to moderate (50%)[23] hedging. **Note:** The level of use would be gathered in conjunction with estimates of age class distribution. A good mix of age classes is desired		All pastures
Bank Alteration	Along the greenline	20% bank alteration		All pastures not listed below
	Along the greenline	15% bank alteration		West Bosenberg Riparian pasture
	Critical DMA	10% bank alteration		Bosenberg unit
	Representive	15% bank alteration		

[17] Move Triggers are used to determine when livestock should be relocated from an area or pasture to achieve desired use levels.
[18] Greenline is the first hydrophytic perennial vegetation for the water's edge.
[19] Stubble is the basal portion of herbaceous plants remaining after the top portion has been harvested by grazing animals.
[20] Benches, riparian terraces or islands are those portions of the riparian areas slightly higher and drier than the rest of the riparian area.
[21] Uplands are defined as the portion of the landscape above the valley floor or stream.
[22] Available use is the portion of the forage production that is accessible for use by a specific kind or class of grazing animal.
[23] In general, light (30%) hedging would be an expected end-point indicator. However, moderate (50%) hedging may be acceptable on an occasional basis if the woody component is in a healthy and vigorous condition and there is good representation of age cohorts and the moderate use does not result in significant suppression in the vigor or growth form of the plant.

Indicator	Measurement Location	Move Triggers[17]	Allowable Use (End-Point Indicators)	Allotment and Pasture
	DMA			

Table 2: Alternative 3

Indicator	Measurement Location	Move Trigger	Allowable Use (End-Point Indicators)	Allotment and Pasture
Stubble Height on herbaceous hydrophytic riparian species (i.e., sedges and rushes)	Along the greenline	45% use OR 5-inch stubble height	4-inch stubble height	All pastures not listed below
		35% use OR 7-inch stubble height	6-inch stubble height	Logan Valley allotment: ▪ West Bosenberg Riparian Pasture Summit Prairie allotment: ▪ Sagehen unit ▪ Little Logan unit ▪ West Summit Recovery unit
		9-inch stubble height	7-inch stubble height	Logan Valley allotment: ▪ Big Creek Riparian pasture ▪ West lake Creek Riparian pasture Summit Prairie allotment: ▪ Summit Rock unit (Reach 2 of W. Fork Summit Creek, Reach 6 of Summit Creek) ▪ Upper Little Logan Riparian pasture ▪ Lower Little Logan Riparian pasture ▪ Sagehen Riparian pasture
Grass and grass-like (non-hydrophytic species) within riparian bunches and upland areas of the unit	Uplands and in soils that are non-hydrophytic in nature	45% use of available forage within riparian benches and forested stands, 55% within grasslands and 50% within shrublands.		All pastures
Riparian woody shrubs (i.e., willows, alders, dogwood, wildrose)	Riparian Areas	30%	40%	All pastures not listed below
		20%	30%	Logan Valley allotment: ▪ Big Creek Riparian pasture ▪ West Lake Creek Riparian pasture Summit Prairie allotment: ▪ Sagehen ▪ Little Logan ▪ North Summit Riparian pasture
Bank Alteration	Along the greenline	20%	25%	All pastures not listed below
		10%	15%	Logan Valley allotment:

Indicator	Measurement Location	Move Trigger	Allowable Use (End-Point Indicators)	Allotment and Pasture
				▪ Big Creek Riparian pasture ▪ West Lake Creek Riparian pasture ▪ West Bosenberg Riparian pasture Summit Prairie allotment: ▪ Sagehen ▪ Little Logan ▪ Summit Rock (Reach 2 of W. Fork Summit Creek & Reach 6 of Summit Creek) ▪ Upper Little Logan Riparian pasture ▪ Lower Little Logan Riparian pasture ▪ Sagehen Riparian pasture
		15%	20%	Summit Prairie allotment: ▪ North Summit Riparian pasture

Table 3: Alternative 4

Indicator	Measurement Location	Move Trigger	Allowable Use (End-Point Indicators)	Allotment and Pasture
Stubble Height on herbaceous hydrophytic riparian species (i.e., sedges and rushes)	Along the greenline	45% use OR 5-inch stubble height	4-inch stubble height	All pastures and greenlines not listed below
		35% use OR 7-inch stubble height	6-inch stubble height	Logan Valley allotment: ▪ West Bosenberg Riparian pasture Summit Prairie allotment: ▪ Prairie Riparian pasture (Summit Creek)
		9-inch stubble height	7-inch stubble height	Logan Valley allotment: ▪ Big Creek Riparian pasture ▪ West Lake Creek Riparian pasture Summit Prairie allotment: ▪ Sagehen ▪ Little Logan ▪ Summit Rock units (Reach 2 of W. Fork of Summit Creek & Reach 6 of Summit Creek) ▪ Prairie Riparian pasture and West Summit Recovery unit (7-9 inches on W. Fork of Summit Creek)

Indicator	Measurement Location	Move Trigger	Allowable Use (End-Point Indicators)	Allotment and Pasture
Grass and grass-like (non-hydrophytic species) within riparian bunches and upland areas of the unit	Uplands and in soils that are non-hydrophytic in nature	45% use of available forage within riparian benches and forested stands, 55% within grasslands and 50% within shrublands		Uplands and in soils that are non-hydrophytic in nature
Riparian woody shrubs (i.e., willows, alders, dogwood, wildrose)	Riparian Areas	30%	40%	All pastures and greenlines not listed below
		20%	30%	Logan Valley allotment: ▪ Big Creek Riparian pasture ▪ West Lake Creek Riparian pasture Summit Prairie allotment: ▪ Sagehen unit ▪ Little Logan unit ▪ Prairie Riparian pasture and West Summit Recovery unit
Bank Alteration	Along the greenline	20%	25%	All pastures and greenlines not listed below
		10%	15%	Logan Valley allotment: ▪ Big Creek Riparian pasture ▪ West Lake Creek Riparian pasture ▪ West Bosenberg Riparian pasture Summit Prairie allotment: ▪ Sagehen, Little Logan, & Summit Rock units (Reach 2 of W. Fork Summit Creek & Reach 6 on Summit Creek)
		15%	20%	Summit Prairie allotment: ▪ Prairie Riparian pasture and West Summit Recovery unit