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Final Environmental Impact Statement

Divide Travel Plan

Volume I

Helena Ranger District, Helena National Forest
Powell and Lewis and Clark Counties, Montana

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Divide Travel Plan
Final Environmental Impact Statement
Lewis and Clark and Powell Counties, Montana

Lead Agency: **USDA Forest Service**
Helena National Forest

Responsible Official: **Bill Avey, Forest Supervisor**
2880 Skyway Drive
Helena, Montana 59602

For Information Contact: **Heather DeGeest**
2880 Skyway Drive
Helena, Montana 59602 (406) 449-5201

Abstract The Helena National Forest is proposing changes to the existing motorized public access routes and prohibitions for wheeled and over-snow motorized vehicles on National Forest system lands within the Divide Travel Planning Area on the Helena Ranger District. The overall objective of this proposal is to provide a manageable system of designated public motorized access routes, consistent with and to achieve the purposes of, Forest Service travel management regulations at 36 CFR part 212 subpart B.

This final environmental impact statement (FEIS) considers five alternatives in detail – the No Action and four action alternatives. Alternative 1 is the No Action alternative, which provides a baseline for comparing the magnitude of environmental effects of the action alternatives. Alternative 2 was the proposed action presented to the public during the 2008 scoping period. This alternative was developed using the current Forest Transportation System maps, information from the 2004 Helena Roads Analysis, field verification and public input. Alternative 3 was developed in response to public input regarding wildlife security issues, non-motorized uses and general resource concerns relative to erosion and sedimentation from road conditions. Alternative 4 was developed as a result of public comments. This alternative addresses both social and resource concerns identified by the public. Alternative 5, the final preferred alternative, was developed in response to public comment on the draft environmental impact statement (DEIS) as well as additional field reviews and is designed to increase motorized loop trail opportunities and reduce the short spur and redundant parallel routes. It also improves big game security as well as addresses resource concerns relative to erosion and sedimentation from roads and stream crossings. Consideration was given to further align the Continental Divide National Scenic Trail (CDNST) with National Standards.

The No Action alternative would defer implementation of the Travel Management Rule and would not result in a Motor Vehicle Use Map (MVUM). No changes would be made to the existing system of available public motorized routes and areas within the Divide Travel planning area.

The four action alternatives would be consistent with the travel planning regulations at 36 CFR 212 Subpart B, with the resulting available wheeled motorized access routes and areas designated on a MVUM and public use of a motor vehicle other than in accordance with those designations would be prohibited as per 36 CFR 261.13. If an action alternative is selected, it would meet the intent of subsequent site-specific planning as required by the 'Off-Highway

Vehicle Record of Decision and Forest Plan Amendment' (January 2001). This FEIS includes a programmatic plan amendment to the Helena National Forest Plan for Standard 4a, big game security. This amendment would establish a new standard for elk security for those herd units within the planning area.

This FEIS and associated draft decision documents (Records of Decision) are subject to the pre-decisional administrative review process (objection process) pursuant to 36 CFR 218, subparts A and B. Objections will only be accepted from those who have previously submitted specific written comments regarding this proposed planning effort during scoping or other designated opportunity for public comment in accordance with §218.5(a). Issues raised in objections must be based on previously submitted, timely, specifically written comments regarding this proposed planning effort unless based on new information arising after the designated comment opportunities. Objections, including attachments, must be filed via mail, fax, email, hand delivery, express delivery, or messenger service. An automated response will confirm the electronic objection has been received. Electronic objections must be submitted in MS Word, Word Perfect, or Rich Text Format (RTF).

Objections must be submitted within 45 calendar days following the publication in the Helena Independent Record, the newspaper of record. The publication date in the newspaper of record is the exclusive means for calculating the time to file an objection. It is the objector's responsibility to ensure timely filing of a written objection with the reviewing officer pursuant to §218.9. The regulations prohibit extending the time to file an objection.

Because this travel plan decision also includes a programmatic Forest Plan Amendment, this aspect of the decision is subject to objection pursuant to 36 CFR Part 219, subpart B. Objections specific to the programmatic amendment will be accepted for an additional 15 days, so therefore must be submitted within 60 calendar days following publication in the Helena Independent Record-newspaper of record. It is the responsibility of the objector to ensure their objection is received in a timely manner. The publication date of the legal notice of the objection period in the newspaper of record is the exclusive means for calculating the time to file an objection. Objectors should not rely on date or timeframe information provided by any other source.

The objection must contain the minimum content requirements specified in §218.8(d) and 219.54(c) and incorporation of documents by reference is permitted only as provided in §218.8(b) and 219.54(b). All objections are available for public inspection during and after the objection process.

At a minimum an objection must include the following (36 CFR 218.8(d)) and 36 CFR 219.54(c)): (1) The objector's name and address, with a telephone number, if available; (2) a signature or other verification of authorship upon request (a scanned signature for Email may be filed with the objection);

(3) when multiple names are listed on an objection, identification of the lead objector (verification of the identity of the lead objector shall be provided upon request); (4) the name of the proposed plan or plan amendment, the name and title of the Responsible Official and the name(s) of the National Forest(s) and/or Ranger District(s) on which the proposed plan or plan amendment, will be implemented; and (5) a description of those aspects of the proposed plan or plan amendment addressed by the objection, including specific issues related to the proposed plan or plan amendment, if applicable, how the objector believes the environmental analysis or draft decision specifically violates law, regulation, or policy; suggested remedies that would resolve the objection; supporting reasons for the reviewing officer to consider; and (6) a

statement that demonstrates connection between prior specifically written comments on the particular proposed plan or activity and the content of the objection, unless the objection concerns an issue that arose after the opportunity for formal comment.

Paper objections must be submitted to: USDA Forest Service, Northern Region, ATTN: Objection Reviewing Officer, P.O. Box 7669, Missoula, MT 59807; or submitted to: USDA Forest Service, Northern Region, ATTN: Objection Reviewing Officer, 200 East Broadway, Missoula, MT 59802. Office hours are: 7:30 a.m. to 4:00 p.m. Electronic objections must be submitted to: appeals-northern-regional-office@fs.fed.us. The subject line for electronic objections should contain the name of the plan or plan amendment being objected to.

SUMMARY

The Helena National Forest (HNF) is proposing changes to the existing system of designated motorized public access routes and prohibitions within the Divide Travel Planning area for wheeled and over-snow motorized vehicles.

The area this travel plan includes is approximately 155,500 acres of National Forest System (NFS) lands and lies within Lewis and Clark and Powell Counties, located in the state of Montana. The area encompasses Black Mountain and extends to the Tenmile Drainage and Little Blackfoot and Bison Mountain Areas. The following four Inventoried Roadless Areas (IRA) are included in the Divide Travel Plan area: Electric Peak, Jericho Mountain, Lazyman and Nevada Mountain. The Helena National Forest Plan recommended portions of the Electric Peak IRA for Congressional designation as wilderness.

The existing system of available public motor vehicle routes and areas in the Divide area is the culmination of multiple agency decisions over recent decades. Public motor vehicle use of much of this available system continues to be manageable and consistent with the current travel management regulation. Exceptions have been identified, based on public input and the criteria listed at 36 CFR 212.55 and in these cases changes are proposed. The overall objective is to provide a manageable system of designated public motorized access routes and areas within the Divide Travel Plan area, consistent with and to achieve the purposes of Forest Service travel management regulations at 36 CFR part 212 subpart B.

Executive Order (EO) 11644 (1972) as amended directed the agency to, among other things, designate "*the specific areas and trails on public lands on which the use of off-road vehicles may be permitted and areas in which the use of off-road vehicles may not be permitted*." The executive order, Section 8, then requires the agency to "*monitor the effects of the use of off-road vehicles [and] from time to time amend or rescind designations.*" The Helena National Forest has updated its travel plan numerous times over the last three decades, amending or rescinding designations as monitoring indicated the need. This proposal continues that longstanding approach. Public motor vehicle use of much of the existing system continues to be manageable and consistent with EO 11644 and current travel management regulations; however, the Forest has identified a need for change in some locations.

In 2005 the Forest Service published new implementing regulations (Federal Register 2005: 70 FR 68264). This rule, known as the Travel Management Rule (36 CFR 212 Subpart B), replaced the previous regulations. While carrying forward the requirements of the executive order, it makes two other national requirements. First, all units will now use a consistent approach to wheeled motor vehicle use designations by identifying on a map those routes and areas that are open to wheeled motorized use. Second, once designations are in place, wheeled motorized travel off of designated routes and areas will be prohibited.

The purpose of this travel plan is to comply with the 2005 Travel Management Rule by providing a system of roads, trails and areas designated for wheeled vehicle use by class of vehicle and time of year on the Helena National Forest (36 CFR 212.50). This travel plan will also designate routes and areas for over-snow motorized vehicle use.

Several actions were needed to comply with the Travel Management Rule, this decision meets these needs by:

- Having no motorized cross-country travel except in designated areas - Cross country travel has been prohibited since 2001 on the Helena National Forest.
- Clarification of which trails would be open for motorized use - This decision will result in a Motor Vehicle Use Map (MVUM) which will show designated motorized routes.
- The optional designation of the limited use of motor vehicles within a specified distance of certain designated routes and, if appropriate, within specified time periods, solely for the purpose of dispersed camping or parking - This decision restricts parking for dispersed camping to within 70 feet of a designated route and within 30 feet for all other uses.
- Amending the forest plan direction if there is need - This decision requires an amendment. See Forest Programmatic Amendment for Big Game section in Chapter 3 of this document.

This decision also achieves the overall objective by meeting the following needs:

- Designate public wheeled motorized use for roads and trails - This decision will result in a MVUM that will show designated motorized routes.
- Ensure the route system provides continued access for resource management needs - This decision designates routes open for public motorized travel. Administrative travel for resource management is analyzed, if necessary, and authorized on a site specific basis. A future site specific analysis will also consider access needs for future resource management when determining appropriate closure methods.

Ensure the route system minimized exclusive use from and to private land and mining - In most cases this decision designated routes that receive regular private land access use open to the public as well. There are situations in the Divide Travel Planning area where road conditions or resource concerns indicated it was not feasible for a private land access route.

The Divide Travel Plan was initially part of a forestwide travel planning approach that began in 2000. In January 2001, the Forest Service and Bureau of Land Management (BLM) issued a joint decision known as the 2001 Tri-State Off-Highway Vehicle (OHV) Decision; this decision prohibited motorized cross-country wheeled-vehicle travel on all National Forest System (NFS) and BLM public lands in a three state area except on designated routes and areas. The decision amended nine Forest Plans, including the Helena National Forest Plan. It also directed all National Forests to establish a schedule for completing site-specific planning that would designate appropriate uses on all system and non-system roads and trails.

In 2004, the Helena National Forest completed a Forest Roads analysis report for maintenance level 1-5 roads (see project record). The Helena National Forest used this as an additional tool for developing the road-by-road comparison table located in Appendix E of the FEIS.

In November 2005, the Forest Service published new implementing regulations (Federal Register 2005: 70 FR 68264). This rule, known as the 2005 Travel Management Rule (36 CFR Subpart B), replaced the previous regulations.

In December of 2008, the Helena National Forest mailed a newsletter summarizing the updated proposal and alternatives with a request for comments. It reiterated the change in scope of the plan from the forestwide 2003 effort to the Divide Travel Planning area, provided details about the proposal, contained a public comment sheet and furnished information on the Final Travel Management Rule of November 2005.

In September 2011, a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) was published in the Federal Register. An additional scoping period ensued, issues were identified and alternatives developed, which then led to the development of the DEIS.

In February 2013, the Helena National Forest sent a letter to interested parties notifying them that there would be two separate decisions for this plan; one for the travel plan portion of the Environmental Impact Statement (EIS) and the other for the programmatic plan amendment. This letter also explained the objection process (36 CFR part 219) for the programmatic amendment; and the potential for the use of the 36 CFR part 218 objection process if it became available. Since then, the agency has received direction that any decisions that fall under 36 CFR part 212 made after September 27, 2013 would be made under 36 CFR part 218 regulations.

The Helena District Ranger and Forest Supervisor also met with County Commissioners, tribal leaders and individuals in addition to a variety of special user groups to discuss the alternatives and options.

The DEIS was released in March of 2014. Based on the comments from the public and field reviews a fifth alternative and revised Forest Plan Amendment were developed for the Divide Travel Plan and released for public comment in September of 2014. The analyses were then updated to include alternative 5, the preferred alternative and the revised Forest Plan Amendment. These updates are included in this FEIS.

The Divide Travel Plan Decision would include only open or closed determinations. Any existing route not identified as a Helena National Forest (HNF) system route in this travel plan decision would be considered closed to wheeled motorized use. None of the alternatives would prohibit non-motorized activities. The proposed changes would determine where wheeled and over-snow motorized vehicles could access the Forest System roads and trails and areas open to off route over-snow travel.

Alternative 1 – No Action: The No Action alternative is required under NEPA regulations [40 CFR 1502.14(d)]. This alternative represents the existing, baseline condition or trends by which the action alternatives are compared.

The No Action alternative would defer implementation of the Travel Management Rule and would not result in a Motor Vehicle Use Map (MVUM). No changes would be made to the existing system of available public motorized routes and areas within the Divide Travel Planning area.

No Action is represented by the current Helena National Forest map and supporting prohibitions. Permissible motorized uses include those routes and areas not otherwise prohibited. Under No Action, motorized access for dispersed camping, parking associated with camping.

The Helena National Forest Plan, as amended, prohibits wheeled cross country travel (2001 Tri-State OHV Decision). However, wheeled motorized use of unauthorized routes that existed at that time of that Forest Plan amendment are unaffected by this prohibition. That use is not defined as cross-country travel under the amended Forest Plan as long as the vehicle fits within the pre-existing width of the route. The motorized access for dispersed camping is an exception and that use is also permitted up to 300 feet from these routes. Under the No Action alternative, these uses could continue.

Alternative 2: Alternative 2 was the proposed action presented to the public during the 2008 scoping period. This alternative was developed using the current Forest Transportation System maps, information from the 2004 Helena Roads Analysis, field verification and public input.

Consistent with the travel planning regulations at 36 CFR 212 Subpart B, the resulting available wheeled motorized access routes and areas would be designated on a MVUM and public use of a motor vehicle other than in accordance with those designations would be prohibited as per 36 CFR 261.13.

For more specific detail regarding mileage please refer to appendix E in addition to the alternative maps at the end of the document. If this alternative is selected, it would meet the intent of subsequent site-specific planning as required by the 'Off-Highway Vehicle Record of Decision and Forest Plan Amendment' (January 2001).

Alternative 3: Comments received in the 2008 scoping process included comments regarding the desire to enjoy the outdoors in its natural state without the interruption of motorized use. Alternative 3 was developed in response to public comments regarding wildlife security issues, non-motorized uses and general resource concerns relative to erosion and sedimentation from road conditions.

Consistent with the travel planning regulations at 36 CFR 212 Subpart B, the resulting available wheeled motorized access routes and areas would be designated on a MVUM and public use of a motor vehicle other than in accordance with those designations would be prohibited as per 36 CFR 261.13.

If this alternative is selected, it would meet the intent of subsequent site-specific planning as required by the 'Off-Highway Vehicle Record of Decision and Forest Plan Amendment' (January 2001).

Alternative 4: Alternative 4 was developed in response to public comments. This alternative addresses both social and resource concerns identified by the public.

Consistent with the travel planning regulations at 36 CFR 212 Subpart B, the resulting available wheeled motorized access routes and areas would be designated on a MVUM and public use of a motor vehicle other than in accordance with those designations would be prohibited as per 36 CFR 261.13.

If this alternative is selected, it would meet the intent of subsequent site-specific planning as required by the 'Off-Highway Vehicle Record of Decision and Forest Plan Amendment' (January 2001).

Alternative 5: This proposed alternative was developed in response to public comment and field reviews and is designed to increase motorized loop trail opportunities and reduce the short spur and redundant parallel routes. It also improves big game security as well as addresses resource concerns relative to erosion and sedimentation from roads and stream crossings. Consideration was given to further align the Continental Divide National Scenic Trail (CDNST) with National Standards.

The selection of this alternative would result in the production of a Motor Vehicle Use Map which would identify motorized routes that are open for use along with corresponding restrictions and designations. In addition, this map would show restrictions regarding dispersed camping. Use of a motor vehicle other than in accordance with specific designations would be prohibited. The authority for this action comes from 36 CFR 212 and 36 CFR 261.13.

Alternative 5 would meet the intent of subsequent site-specific planning as required by the 'Off-Highway Vehicle Record of Decision and Forest Plan Amendment' (January 2001).

Programmatic Plan Amendment: Implementing any of the action alternatives would require a plan amendment to the Helena National Forest Plan for the planning area regarding the

standard for the hiding cover/open road density index. The proposed programmatic plan amendment would establish a new standard for elk security for those herd units within the planning area. The programmatic amendment includes two alternatives; a no action alternative and a revised alternative B which is the proposed alternative.

Alternative A - No Action: Alternative A is the existing Forest Plan Standard. In this case, 'no action' means no amendment to the existing Forest Plan. The analysis of effects associated with alternative A describes the effects of the current Forest Plan standard.

Alternative B: Alternative B was designed to address best science and local knowledge. It also expanded consideration to all open motorized routes (whereas alternative A only applies to roads as originally envisioned in the Forest Plan). Alternative B would replace the existing Forest Plan Big Game Standard 4(a). The Divide Travel Plan area encompasses only about ¾ of the Divide landscape (portions of the Quartz, Black Mountain – Brooklyn Bridge and Little Prickly Pear – Ophir EHUs falling into areas covered by previous travel management plans); however, the proposed amendment would apply to all portions of the herd units included in the Divide Travel Plan analysis. Under the Forest Plan amendment proposed for the Divide Travel Plan and applicable to future projects in the Travel Plan Area, the "security area" approach would replace the "road density/hiding cover index" as the Forest Plan standard for gauging the vulnerability of elk to hunting. The amendment derives from the Hillis methodology (1991) and adopts specific guidelines for its application from Recommendations for Big Game Habitat Management on the Custer, Gallatin, Helena and Lewis and Clark National Forests (MDFWP and USDA Working Group 2013).

Several public comments received during scoping and the comment period for the DEIS included the request that a travel plan alternative be developed to meet Standard 4a. An analysis was completed to determine if the Forest had management discretion to close enough Forest System roads to achieve compliance with Standard 4a in the elk herd units in the Divide Travel Plan project area. That analysis indicated that the Forest did have the jurisdiction to close several miles of open roads during the hunting season to achieve consistency with Standard 4a in 5 out of 6 herd units. However, for one of those five herd units – Quartz Creek – travel planning has already been completed in a majority of that herd unit; so even with extensive closures in the Divide Travel Plan there is no alternative that would be able to meet the standard. The Greenhorn EHU would also remain out of compliance with Standard 4a because the Forest simply does not have sufficient jurisdiction on roads or closure discretion to meet the existing standard. For the most part, the extensive closures that would be necessary to meet the standard in the remaining EHUs would not provide reasonable access to the HNF during hunting season.

In the development of alternative five, great consideration was given to maximize the quantity and quality of security areas while maintaining reasonable access. When designating routes, the 2005 Travel Management Rule requires Forests to consider effects on the following, with the objective of minimizing:

- Damage to soil, watershed, vegetation and other forest resources;
- Harassment of wildlife and significant disruption of wildlife habitats;
- Conflicts between motor vehicle use and existing or proposed recreational uses of NFS or neighboring Federal lands; and
- Conflicts among different classes of motor vehicle uses of NFS lands or neighboring Federal lands.

For the purposes of this planning effort, the Helena National Forest interprets the term "minimize" to mean meeting Forest Plan standards, moving forest resources toward the goals and objectives described in the Forest Plan and complying with all state and federal regulations which would diminish the impacts of the effects on Forest resources.

Based upon the effects of the alternatives, the responsible official will decide what changes, if any, to make to the current designated wheeled and over-snow motorized system and what, if any, Forest Plan amendments to adopt within the Divide Travel Planning area. The responsible official will also review and make a determination on the proposed Forest Plan programmatic amendment, which is described briefly in Chapter 2 and in full in Chapter 3.

With respect to the scope of the Divide analysis, the decision space is narrow. The decision centers around designating type and season of motorized use on roads, trails and over-snow areas.

Per the January 28, 2015 Over-Snow Vehicle Use Rule, the responsible official is including over-snow vehicles in this analysis so that suitable areas, routes and seasons for their operation can be provided as envisioned in the Helena Forest Plan.

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CHAPTER 1. PURPOSE OF AND NEED FOR ACTION

Document Structure

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

- *Chapter 1. Purpose and Need for Action:* The chapter includes information on the history of the project proposal, the purpose of and need for the project and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- *Chapter 2. Alternatives, including the Proposed Action:* This chapter provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- *Chapter 3. Affected Environment and Environmental Consequences*: This chapter describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by [insert topic (i.e., resource area, significant issues, environmental component)].
- *Chapter 4. Consultation and Coordination:* This chapter provides a list of preparers and agencies consulted during the development of the environmental impact statement.
- *Appendices:* The appendices provide more detailed information to support the analyses presented in the environmental impact statement.
- *Index:* The index provides page numbers by document topic.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record.

Background

The Divide Travel Plan was initially part of a forestwide travel planning approach that began in 2000. In January 2001, the Forest Service and Bureau of Land Management (BLM) issued a joint decision known as the 2001 Tri-State Off-Highway Vehicle (OHV) Decision; this decision prohibited motorized cross-country wheeled-vehicle travel on all National Forest System (NFS) and BLM public lands in a three state area except on designated routes and areas. The decision amended nine Forest Plans, including the Helena National Forest Plan. It also directed all National Forests to establish a schedule for completing site-specific planning that would designate appropriate uses on all system and non-system roads and trails.

In 2004, the Helena National Forest completed a Forest Roads analysis report for maintenance level 1-5 roads (see project record). The Helena National Forest used this as an additional tool for developing the route-by-route comparison table located in Appendix E of this FEIS.

In November 2005, the Forest Service published new implementing regulations (Federal Register 2005: 70 FR 68264). This rule, known as the 2005 Travel Management Rule (36 CFR Subpart B), replaced the previous regulations.

In December of 2008, the Helena National Forest mailed a newsletter summarizing the updated proposal and alternatives with a request for comments. It reiterated the change in scope of the plan from the forestwide 2003 effort to the Divide Travel Planning area, provided details about the proposal, contained a public comment sheet and furnished information on the Final Travel Management Rule of November 2005.

In September 2011, a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) was published in the Federal Register. An additional scoping period ensued, issues were identified and alternatives developed, which then led to the development of the DEIS.

In February 2013, the Helena National Forest sent a letter to interested parties notifying them that there would be two separate decisions for this plan; one for the travel plan portion of the Environmental Impact Statement (EIS) and the other for the programmatic plan amendment. This letter also explained the objection process (36 CFR part 219) for the programmatic amendment; and the potential for the use of the 36 CFR part 218 objection process if it becomes available. Since then, the agency has received direction that any decisions that fall under 36 CFR part 212 made after September 27, 2013 would be made under 36 CFR part 218 regulations.

The DEIS was released in March of 2014. Based on the comments from the public and field reviews a fifth alternative and revised Forest Plan Amendment were developed for the Divide Travel Plan and released for public comment in September of 2014. The analyses were updated to include alternative 5, the preferred alternative and the revised Forest Plan Amendment. These updates are included in this FEIS.

Purpose and Need for Action

The overall objective of this proposal is to provide a manageable system of designated public motorized access routes and areas within the Divide area, consistent with and to achieve the purposes of Forest Plan and travel management regulations at 36 CFR part 212 subpart B.

Executive Order (EO) 11644 (1972) as amended directed the agency to, among other things, designate "*the specific areas and trails on public lands on which the use of off-road vehicles may be permitted and areas in which the use of off-road vehicles may not be permitted*." The executive order, Section 8, then requires the agency to "*monitor the effects of the use of off-road vehicles [and] from time to time amend or rescind designations.*" The Helena National Forest has updated its travel plan numerous times over the last three decades, amending or rescinding designations as monitoring indicated the need. This proposal continues that longstanding approach. Public motor vehicle use of much of the existing system continues to be manageable and consistent with EO 11644 and current travel management regulations; however, the Forest has identified a need for change in some locations.

In 2005 the Forest Service published new implementing regulations (Federal Register 2005: 70 FR 68264). This rule, known as the Travel Management Rule (36 CFR 212 Subpart B), replaced the previous regulations. While carrying forward the requirements of the executive order, it makes two other national requirements. First, all units will now use a consistent approach to wheeled motor vehicle use designations by identifying on a map those routes and areas that are open to wheeled motorized use. Second, once designations are in place, wheeled motorized travel off of designated routes and areas will be prohibited.

The purpose of this travel plan is to comply with the 2005 Travel Management Rule by providing a system of roads, trails and areas designated for wheeled vehicle use by class of vehicle and time of year on the Helena National Forest (36 CFR 212.50). This travel plan will also designate routes and areas for over-snow motorized vehicle use, per the 2015 Over-Snow Vehicle Use ruling.

On the Helena National Forest, complying with the Travel Management Rule means there is a need for:

- Having no motorized cross-country travel except in designated areas;
- Clarification of which trails would be open for motorized use;
- The optional designation of the limited use of motor vehicles within a specified distance of certain designated routes and if appropriate, within specified time periods, solely for the purposes of dispersed camping or parking; and
- Amending the forest plan direction if there is need (i.e. projects and plans must be consistent with the forest plan, or the forest plan must be amended.)

For the Helena National Forest, wheeled motorized cross country travel has been prohibited since 2001 and therefore no change is needed for most lands to be consistent with the rule. Existing user-built or unauthorized motorized routes, however, were unaffected by the 2001 decision. At the time the 2001 Tri-State Decision was signed, several miles of user-created routes existed on Helena National Forest system lands within the Divide Planning area. These miles, in addition to the existing system routes were analyzed under each alternative. Therefore, this proposal must determine future use and/or need of all routes (system and non-system) within the Divide Travel Planning area.

To meet the overall objective, there is a need to:

- Designate public wheeled and over-snow motorized and non-motorized use for roads and trails;
- Ensure the route system provides continued access for resource management needs (e.g. vegetation management and fire);
- Ensure the route system minimizes exclusive use from and to private land and mining claims;
- Reduce the number of different travel restriction types including seasonal restrictions; and
- Maintain inventoried roadless characteristics in the four identified inventoried Roadless Areas (IRAs)

Alternative 5 - Preferred Alternative

In response to the Purpose and Need for Action, the Helena National Forest developed the preferred alternative using current Forest Transportation System maps, information from the 2004 Helena Roads Analysis process, field verification and monitoring and public input. Consistent with our travel planning regulations, the resulting available wheeled motorized access routes and areas on a MVUM would be designated and public use of a motor vehicle other than in accordance with those designations would be prohibited as per 36 CFR 261.13.

The preferred alternative (alternative 5) includes closing some roads and trails that are currently open to motorized use; and opening some roads and trails for motorized use that are currently closed. No areas would be designated for off-route wheeled motorized use other than the limited exception for dispersed camping and parking.

This alternative is designed to increase motorized loop trail opportunities and reduce the short spur and redundant parallel routes. It also improves big game security and addresses resource concerns relative to erosion and sedimentation from roads and stream crossings. Consideration was given to further align the Continental Divide National Scenic Trail (CDNST) with National Standards.

If this alternative is selected, the wheeled motorized vehicle routes and areas would be identified on a map as part of the record of decision for this travel plan. In addition, a Motor Vehicle Use Map (MVUM) would be produced and available to the public for this planning area. Public use of a motor vehicle other than in accordance with specific designations would be prohibited. The authority for this action comes from 36 CFR 212 and 36 CFR 261.13.

Design Features Specific to Alternative 5

Seasonal Trail (route) Dates

All motorized trails with seasonal use open to wheeled motorized vehicles 50 inches and less in width would be open from 5/16 to 8/31 with the exception of the Lava Mountain connector trail # 4009-A1 which would be open from 5/16 to 10/14. There are approximately 14.5 miles of motorized trails that would have no seasonal restrictions.

Kading-Limburger Springs Area

National Forest System Route (NFSR) #227 would remain open to Kading campground. Beyond Kading campground, NFSR #227-E1 would become part of non-motorized trail 329. The trailhead parking area on NFSR #227 past Kading campground where the route would change to non-motorized use would be expanded to accommodate day use vehicles and horse trailers.

Motorized Trail #501 would remain open to motorized vehicles of 50 inches and less in width from 5/16 to 8/31.

Over snow motorized travel would be allowed in areas north and west of NFSR #227 from 12/2 to 5/15. Refer to the Alt 5 map for more detailed over-snow motorized travel in this area.

Sweeny Creek Area

With exception of the Priest Pass Road, all routes in the Sweeny Creek area would be closed year-long to motorized use including over-snow vehicles.

Continental Divide National Scenic Trail (CDNST)

NFSR #136-D1 would be closed to wheeled motorized vehicles yearlong. Approximately, one mile of the CDNST trail located north of NFSR #136, and just south and east of Meyers Hill, would be rerouted and designated as a non-motorized section of the CDNST. Refer to the CDNST map for information on motorized and non-motorized segments of the CDNST.

Larabee Crossing and Golden Anchor Crossing – Little Blackfoot Area

The crossing at Larabee (227-D1) would be closed to wheeled motorized travel. In addition, a foot/stock bridge would be constructed to connect to the non-motorized Larabee Trail #359. A trailhead would be designated nearby on NFSR #227.

The stream crossing located on Golden Anchor NFSR #4100 is currently a ford crossing. This alternative would replace the ford crossing with a bridge, bottomless culvert, or structure installed to accommodate wheeled motorized vehicles 50 inches in width and less and over-snow motorized vehicles.

Unauthorized Routes

Alternative 5 would designate approximately 1.4 miles of identified unauthorized routes to be added to the Forest Transportation System. All routes, including unauthorized routes, not identified or included in this alternative, as well as any future created routes, would be considered closed and would be physically closed without additional NEPA.

Parking

Parking would be limited up to 30 feet from the edge of a designated route.

Access to Dispersed Campsites up to 70 feet from a designated route

Parking and motor vehicle use associated with dispersed camping would be limited to no more than 70 feet from the edge of a designated route as long as:

- No new permanent routes are created by this activity
- No damage to existing vegetation, soil, or water resources i.e., damage to live trees and shrubs, rutting, and eroding of stream banks or bare soil.
- Travel off-route does not cross streams
- Travel off-route does not traverse riparian or wet areas
- Vehicles travel to dispersed campsites would be limited to no closer than 30 feet of a stream or body of live water.

Access to Dispersed Campsites further than 70 feet from a designated route

Dispersed campsites located more than 70 feet from the edge of a designated route that are identified on the alternative 5 map would remain open for dispersed camping and parking associated with dispersed camping. The five items identified under the access to dispersed campsites up to 70 feet from a designated route section are applicable for this as well.

Other Features

- NFSR #314 would be open to wheeled motorized vehicles 50 inches in width and less from 5/16 to 8/31, past the gate in Section 7.
- NFSRs #314-J1 and #314-J3 would be closed year-long to motorized travel
- Motorized Trails #502, #503, and #504 in the Kading/Limburger Springs area, and NFSR #1868 would be closed to wheeled motorized use year-long.
- NFSR #1870 and NFSR #1871-A2 are currently closed yearlong; however, alternative 5 would open them to wheeled motorized vehicles 50 inches and less in width from 5/16 to 8/31. This route would connect to NFSR #1871 to create a loop trail. The road spurs within this area that dead-end would be closed yearlong to wheeled motorized vehicles.

- Two fords on NFSR # 495-D1 would remain open to motorized vehicles to provide access to Motorized Trail 4101-A1 which will be open to vehicles 50 nches and less in width from 5/16 to 8/31.

Approximately ½ mile of NFSR #1805-A1 (accessed from NFSR #1805) would be open to wheeled highway legal vehicles from 5/16 to 10/14; A motorized vehicle trailhead would be developed at this location where it would connect to a one-mile loop trail open to wheeled motorized vehicles 50 inches and less in width from 5/16 through 10/14.

Additional details regarding the preferred alternative are provided in Chapter 2.

Public use of a motor vehicle on routes and areas not included in the above designations, including currently available unauthorized routes, would become prohibited pursuant to 36 CFR 212.50 and 261.13 at the time the MVUM is published.

Analysis indicates the action alternatives in this travel plan would require a programmatic amendment to the Forest Plan for the area regarding Forest Plan Standard 4a for the hiding cover/open road density index (HFP, p. II/17-II/18). Four of the six elk herd units in the Divide landscape are deficient in elk security at this point in time and do not meet the standard. As a result, the Forest Plan standard would be amended under a separate decision as it relates to the Divide Travel Planning Area.

Temporary closures, for spring break-up, could still be implemented as needed to limit damage to any such road, trail, or segment thereof (e.g. 36 CFR 261 - Prohibitions).

Decision Framework

The Forest Supervisor of the Helena National Forest is the responsible official for this plan. Given the purpose and need for this action, the Forest Supervisor will review the five alternatives, the anticipated effects and public input. The Forest Supervisor will decide what changes, if any, to make to the current designated wheeled and over-snow motorized system and what, if any, Forest Plan amendments to adopt within the Divide Travel Planning area. Any combination of the alternatives could be selected. The responsible official will consider the comments, disclosures of environmental consequences and applicable laws and regulations and policies in making the decision and stating the rationale in the Record of Decision (ROD). The responsible official will also review and make a determination on the amendment to the “Helena National Forest Plan” proposed for each alternative, which is described briefly in Chapter 2 and in full in Chapter 3.

With respect to the scope of the Divide analysis, the decision space is narrow. The decision centers around designating type and season of motorized use on existing roads, trails, non-system routes and over-snow areas.

Per the 2015 Over-Snow Vehicle Use ruling, the responsible official elected to include over-snow vehicles in this analysis so that suitable areas, routes and seasons for their operation can be provided as envisioned in the Helena Forest Plan.

In addition, the decision maker chose not to include construction, reconstruction, decommissioning, or obliteration in the alternatives that were analyzed in detail. The responsible official felt that potential resource impacts resulting from construction of new roads and trails, or the reconstruction of existing routes, would be better analyzed in detail at the site-specific level and documented in later analyses and decisions.

Public Involvement

Since 2000, public involvement for the Divide Travel Plan process has been initiated several times. Varying circumstances have dictated the start and stop of the process since the inception in 2000 when the Helena National Forest introduced the Forestwide approach to travel planning. The Forestwide travel plan effort first appeared in the Federal Register as a NOI in December of 2000. It was then rescinded in March of 2003. In April, 2003 another NOI to prepare an EIS was printed in the Federal Register and then rescinded in June of 2007.

The Helena National Forest has provided opportunities for public involvement for this travel planning effort throughout this planning process. This planning effort, as currently proposed, has been posted on the quarterly Schedule of Proposed Actions (SOPA) report since April of 2008. Information gathered and received during scoping helped the Helena National Forest develop the action alternatives for the area within the Divide Travel Plan.

In December of 2008, the Helena National Forest mailed a newsletter that summarized the updated proposed action alternative with a request for comments. The information was also posted on the Forest website. The proposed action reiterated the change in scope of the plan from the 2003 effort, provided details about the proposal, contained a public comment sheet and furnished information on the Final Travel Management Rule of November 2005.

During the scoping period, the Helena National Forest hosted open houses to provide information and answer questions regarding the planning effort. The proposal was also covered in the Helena Independent Record. Over 300 public responses were received during the scoping period. All the letters and emails were summarized on a spreadsheet and are available for public review in the project record. A third alternative was developed in response to address some of the input received from those seeking non-motorized opportunities. The fourth alternative combines attributes from alternatives 2 and 3, addressing both social and resource concerns. The fifth alternative was designed to increase motorized loop trail opportunities and reduce the short spur and redundant parallel routes.

The NOI announcing the preparation of an EIS was published in the Federal Register on Thursday September 8, 2011. This marked the continuation of the scoping comment period; during which time the Forest received comments in support of the proposed changes to routes in the Sweeny Creek area specifically. The Forest also received requests for maps of the proposed alternatives. People who requested maps were informed of the schedule and that maps would be produced and released with the DEIS for public review and comment. People were also informed that upon release of the DEIS, a formal 60 day public comment period would be initiated and published in the Federal Register. During this time, they were encouraged to provide specific comments to assist the deciding official in understanding their concerns and/or support. Every effort was made to ensure that a comprehensive mailing list was developed to ensure the widest distribution to the public possible. The Helena National Forest also provided additional information and planning process updates on the Forest website.

In February 2013, the Helena National Forest sent a letter to the public and other agencies notifying them that there would be two separate decisions for this travel plan; one for the travel plan portion of the EIS and the other for the programmatic plan amendment. Each would utilize a separate objection process which would fall under different regulation processes. The EIS objection process is governed by 36 CFR part 218 and the amendment objection process is governed by 36 CFR 219.53(a).

In March of 2014, the Helena National Forest released the Draft Environmental Impact Statement (DEIS) and Forest Plan Amendment. A notice of availability and request for comments on the DEIS and Forest Plan Amendment for comment was published in the Federal Register on April 18, 2014. We received a

total of approximately 148 responses during the 45-day (FEIS) and 60-day (programmatic amendment) comment period. As a result of a detailed analysis of these comments and additional public input, we developed a new travel plan alternative, alternative 5 (preferred alternative) and revised proposed wildlife programmatic plan amendment for big game security.

In September of 2014, the Helena National Forest released a draft alternative 5 and a revised proposed wildlife programmatic plan amendment for public review and an additional 27 day comment period. Approximately 90 comments were received and were considered during analysis and used to inform this FEIS and the Draft Record of Decision (ROD).

Issues

Issues serve to highlight effects or unintended consequences that may occur from the proposed action and alternatives, giving opportunities during the analysis to reduce adverse effects and compare trade-offs for the decision maker and public to understand. An issue is phrased as a cause-effect statement relating actions under consideration to effects. An issue statement describes a specific action and the environmental affects expected to result from the action (FSH 1909.15.12.4).

The CEQ regulations have specific direction for issues in EISs. Agencies shall determine the scope and the significant issues to be analyzed in depth in the environmental impact statement (40 CFR 1501.8(a)(2)) and identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review, narrowing the discussion of these issues in the statement to a brief presentation of why they will not have a significant effect on the human environment (40 CFR 1501.7(a) (3)). We separated the issues into two groups: significant and non-significant issues. Significant issues were defined as those directly or indirectly caused by implementing the proposed action. Non-significant issues were 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 Council on Environmental Quality (CEQ) NEPA regulations explains this delineation in Sec. 1501.7, "…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

The following topics were identified as Significant Issues by the interdisciplinary team for the Divide Travel Plan.

Wildlife Habitat Security

Forest roads and overall road density have the potential to affect the quality of wildlife habitat including habitat security for a variety of species. Increasing road density could result in adverse effects while decreasing road density could result in beneficial effects, depending on the species and the habitat affected.

Measurement Indicators:

- General Habitat – Helena Forest Plan Consistency;
- Riparian Habitat – Miles of road in riparian habitat conservation areas and amount of off-route travel authorized;
- Connectivity and Fragmentation – Open road density and large non-motorized habitat patches;

- Snags and Woody Debris – Open road density;
- Migratory Landbirds and Shorebirds – Open road density;
- Big Game, Elk – Road density on summer range, human disturbance on winter range, security during hunting season; and
- Threatened, Endangered and Sensitive Species – Open road density, the size of large non-motorized habitat patches, motorized use in key habitat areas.

We have conducted an effects analysis and documented this in the wildlife specialist report and wildlife section of chapter 3 of this document. This section will describe in more detail how these measures are defined for each species and used in the analysis.

Water Quality and Fisheries

Forest roads can contribute to increased soil erosion, increased sediment delivery and peak flows that could impact water quality and aquatic habitat, especially if road densities in a watershed are high. These effects would vary depending on the location of a road on a landscape (sloped or flat ground), their proximity to streams or drainages and timing of precipitation events.

Measurement Indicators:

- Number of stream-road intersections
- Miles of high risk roads (those within INFISH buffers)

We have conducted an effects analysis and documented it in the soil, water and fisheries reports and in these sections of chapter 3 of this document.

Quality Motorized Trail/Route System

Changes in the transportation system have the potential to affect the quality of the recreation experience for motorized users. Prohibiting motorized travel on unclassified roads and trails could limit access throughout the planning area. Reduction in open motorized routes could adversely impact this experience while increases could result in beneficial effects to the overall motorized experience.

Measurement indicators:

- Miles of roads open for motorized use;
- Miles of trails open for 50 inches or less in width motorized use;
- Miles of motorized routes in Inventoried Roadless Areas; and
- Overall ease-of-use of the motor vehicle use map for motorized users.

We have conducted an effects analysis and documented this in the recreation and transportation specialist report and chapter 3 of this document.

Continental Divide National Scenic Trail

The Continental Divide National Scenic Trail (CDNST) occurs within the planning area. The primary purpose of this trail is to provide a “continuous, appealing trail route, designed for the hiker and horseman, but compatible with other land uses…” It is to be managed primarily for non-motorized recreational opportunities. The Continental Divide National Scenic Trail currently has sections that are motorized. Motorized use and roads/road density within the Continental Divide National Scenic Trail have the potential to adversely affect the quality of non-motorized recreational opportunities within this corridor while improved or enhanced non-motorized opportunities have the potential for beneficial effects.

- Miles of non-motorized routes within the Continental Divide National Scenic Trail.

We have conducted an effects analysis and documented this in the recreation and transportation specialist report and chapter 3 of this document.

Other Related Efforts

Kading/Limburger Springs Area

The Kading Grade was once a popular route providing motorized access from the Helena National Forest to private lands and the Beaverhead-Deerlodge National Forest. Motorized use on the Kading Grade route has declined to some extent due to the designated maintenance level for the route. In addition, National Forest lands west of Kading Grade have been closed to OHV use, with the exception of over-snow vehicles. Forest System Road 1868, Kading Grade (MTR-502) and routes 501, MTR-503 and MTR-504 are currently open to wheeled motorized vehicles from May 16th through October 14th. With the exception of the winter season, these routes are primarily used by wheeled motorized vehicles from the middle of summer through the fall hunting season.

Additionally, OHVs, which are allowed on the Kading Grade from May 16th through October 14th, also travel onto adjacent lands on the Beaverhead-Deerlodge National Forest which are closed to wheeled motorized travel.

Sweeny Creek Area

A popular area for off-highway vehicle (OHV) use is Sweeny Creek. While use is currently managed in accordance with the 2001 Tri-State OHV Decision, there are concerns regarding the amount and type of motorized use occurring in the Divide Travel Planning area and the associated impacts.

The Sweeny Creek area has been identified through public input (both written and verbal) as a specific area of concern. It is adjacent to both Forest boundary and a growing number of privately owned residences. As a result, Sweeny Creek is important to local residents who recreate in that location and/or may be impacted by others recreating there. For many years this area provided recreation opportunities for: hiking, picnicking, camping, folfing (Frisbee golf), group use, nature study and hunting. During the past 10 years the Sweeny Creek area has grown increasingly popular for OHV use (ATVs and trail bikes), paint ball activities, mountain biking and horseback riding. Increased recreation use has displaced some recreationists and raised concerns with local residents regarding what they consider to be unacceptable resource and social impacts. In particular, residents have expressed frustration with the noise, dust, vandalism, litter, loss of vegetation and soil erosion that is occurring as a result of some recreation activities.

Wheeled motorized vehicles are used on constructed roads and other routes within the Sweeny Creek area. Those routes are designated as motorized trails (MTR) on alternative maps 1 and 2: MTR-001, MTR-004, MTR-008, MTR-011, MTR-016, MTR-017, MTR-018 and MTR-021. Other routes in the Sweeny Creek area were not carried forward in any of the alternatives as they didn't meet the definition of a route as per the 2001 Travel Decision; for various reasons, i.e. they were created after the 2001 Tri-State Travel decision. Twenty years ago motorized use on the Sweeny Creek routes was limited to an occasional high clearance vehicle and motorized trail bikes. With the increased popularity of OHVs, motorized use in Sweeny Creek has greatly expanded. It's a popular location for motorized use during the spring because it is close to the town of Helena, Montana and generally snow-free earlier than many other areas on the Forest. While existing travel restrictions mandate wheeled motorized use on existing routes only, violations frequently occur and result in new unauthorized routes and resource damage. The Helena Forest Plan identified most of the Sweeny Creek area as Management Area (MA) T-1. A management standard for MA T-1, which speaks specifically to motorized recreation, states: "*controls*

on motorized recreation will be implemented where necessary to protect the vegetation, soil and water resources and to prevent road damage." Although the Sweeny Creek area is open to over-snow vehicles, that use is limited due to the lack of a consistent snow base.

Continental Divide National Scenic Trail (CDNST)

There were concerns from the public that wheeled motorized travel was occurring on the Continental Divide National Scenic Trail. In the planning area there are many portions of the Continental Divide National Scenic Trail that are located on designated (NFSR) roads and/or county roads. There are also many places that the Continental Divide National Scenic Trail crosses or intersects these roads. In addition, there are sections of the Continental Divide National Scenic Trail that have some type of motorized use permitted.

The Continental Divide National Scenic Trail (CDNST), which extends through the Divide Travel Planning area, is nationally designated and recognized as an important recreation destination/opportunity. Travel planning in the analysis area may provide an opportunity to make Continental Divide National Scenic Trail travel decisions which would move the Helena National Forest toward greater compliance with national direction for the trail.

Unauthorized Routes

As stated earlier, the agency received public comments that were opposed to the Helena National Forest analyzing unauthorized routes within the planning area. However, the agency is directed to analyze all non-system or unauthorized motorized routes that were in existence when the 2001 Tri-State Decision was signed. This planning effort serves as the site-specific analysis to meet the 2001 Decision requirements.

Accessibility

We received comments from the public regarding the need for motorized opportunities during the big game hunting season that would benefit the elderly and person with disabilities. In all alternatives motorized opportunities are provided during the big game hunting season and within those motorized routes there are different skill levels provided for elderly and disabled use.

CHAPTER 2. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

Introduction

This chapter describes and compares the No Action alternative and four action alternatives considered by the Responsible Official for the Divide Travel Planning effort. Included in this chapter is a detailed description of the alternatives, how they were developed and tables showing comparisons between them. There is also a section on alternatives considered but eliminated from detailed analysis. Please see alternative maps and road and trail details in Appendix E.

The Divide Travel Plan Decision would include only open or closed determinations; decommissioning would not be specified in this decision. Any existing route not identified as a Helena National Forest (HNF) system route in this travel plan decision would be considered a non-system route and would not be considered for future motorized use. Any action resulting from this planning decision would require additional NEPA analysis.

The IDT used the issues brought forward in comments received through public involvement and field verification to develop alternatives. Additional issues include: protection of natural resources, amount and type of motorized access, motorized use on the Continental Divide National Scenic Trail (CDNST) and the Kading/Limburger Springs and Sweeny Creek areas.

None of the alternatives would prohibit non-motorized activities. The proposed changes would determine where wheeled and over-snow motorized vehicles could access the Forest System roads and trails.

Implementing any action alternative for this Travel Plan would require a programmatic plan amendment to the Helena National Forest Plan for the planning area regarding the standard for the hiding cover/open road density index. The proposed programmatic plan amendment would establish a new standard for elk security for those herd units within the planning area.

Alternatives Considered in Detail

Five alternatives were considered in detail. Alternative 1 (No Action) represents the existing condition in the Divide Travel Plan area, which is the baseline condition, used to compare and contrast the action alternatives. Alternative 2 represents a system of motorized roads and trails including winter travel use while reducing motorized use on the Continental Divide National Scenic Trail and compliments the purpose of this trail as described in this Continental Divide National Scenic Trail Comprehensive Plan of 1985 (p. 10). Alternative 3 increases non-motorized use and reduces resource impacts in areas such as Sweeny Creek and Kading/Limburger Springs. Alternative 4 is a combination of alternatives 2 and 3. Alternative 5 was developed based on comments from the public on alternatives 1 through 4 and additional field reviews. It is designed to increase motorized loop trail opportunities, reduce the short spur and parallel or redundant routes, improve big game security and address resource concerns relative to erosion and stream sedimentation.

A description of each route and its status by alternative is found in Appendix E of this document. The alternative descriptions in this chapter summarize the road and trail mileages by category of access for both summer and winter uses. It is important to note that route mileages listed in this chapter may slightly differ from those queried for specialist's reports. Individual resource analysis boundaries may extend beyond the established planning area boundaries. For official mileages and route-by-route designations please refer to appendix E.

Features Common to All Alternatives

Laws and Policies

Below are some current laws and policies which apply to all the alternatives analyzed in this analysis:

- Motorized use on National Forest System roads and trails is subject to Montana State Law;
- In accordance with 36 CFR 261.12, National Forest System roads and trails, the following is prohibited: (c) Damaging and leaving in a damaged condition any such road, trail, or segment thereof;
- In accordance with 36 CFR 261.15, use of vehicles off roads (h), it is prohibited to operate any vehicle off National Forest System, State, or county roads in a manner which damages or unreasonably disturbs the land, wildlife, or vegetative resources;

- As provided for in the Travel Management Rule, none of the alternatives preclude the forest from closing roads, trails, or areas to motorized use through emergency closure orders;

The public must continue to follow State and Federal rules and regulations as well as Helena National Forest regulations.

Types of Routes and Other Definitions

This analysis includes roads as they would be available for vehicles consistent with State laws. A mixed motorized use analysis and designation requires an engineering evaluation rather than a NEPA analysis. This will be completed as part of the implementation phase of this travel planning effort.

The following categories of routes used in this planning analysis are taken from the definitions in 36 CFR 212-Travel Management. The Forest Transportation System includes NFS roads (NFSR), NFS trails and airfields on NFS lands. A glossary is located at the end of this document.

- Designated Road, Trail or Areas - NFS roads, NFS trails, or areas on NFS lands that are designated for public motor vehicle use pursuant to 36 CFR 212.51 on a motor vehicle use map.
- Mixed motorized use –NFS road for use by both highway-legal and non-highway-legal motor vehicles (FSM 7705).
- Motorized use – A term used to refer to travel by any motor vehicle (FSM 7705, FSH 2309.18.05); for purposes of this analysis, motorized use is considered use by wheeled motor vehicles (Not over-snow vehicles).
- Motorized vehicle – Any vehicle which is self-propelled, other than: (1) A vehicle operated on rails; and (2) Any wheelchair or mobility device, including one that is battery-powered, that is designed solely for use by a mobility-impaired person for locomotion and that is suitable for use in an indoor pedestrian area.
- Off Highway Vehicle (OHV) – Any motor vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other natural terrain (36 CFR 212.1).
- Over-Snow Vehicle - A motor vehicle that is designed for use over-snow and runs on a track or tracks and/or a ski or skis. Over-snow replaces the term snowmobile. These terms may be found interchangeably throughout specialist reports.
- Road - A motor vehicle route over 50 inches wide, unless identified and managed as a trail.
- Route – A term used in this document to refer to a road or a trail.
- Trail - A route 50 inches or less in width that is identified and managed as a trail. Trails identified for motorized use are available for non-motorized use as well.
- Unauthorized Road or Trail - One that is not included in a forest transportation system. Unauthorized Road or Trail replaces old terms of non-system and unclassified route as well as user-created and undesignated. These terms may be found interchangeably throughout specialist reports.

Continental Divide National Scenic Trail (CDNST)

The attached map displays the Continental Divide National Scenic Trail (CDNST) that is within the Divide Travel Planning area. In the planning area there are portions of the Continental Divide National Scenic Trail that are located on designated (NFSR) roads and/or county roads. There are also places that the

Continental Divide National Scenic Trail crosses or intersects these roads. In addition, there are sections of the Continental Divide National Scenic Trail that have some type of motorized use permitted. The descriptions provided in each alternative reflect these portions – identifying each road segment (with motorized activity) along the trail and the proposed designations for each segment under the action alternatives.

Features Common to All Action Alternatives

- If, through monitoring, the Forest Service finds that motor vehicle use on a route is directly causing adverse effects on public safety or on natural or cultural resources, it may be closed immediately per 36 CFR 212.52(b)(2) until the Forest Supervisor determines that such adverse effects have been mitigated or eliminated. Depending on the situation, the Forest Service could try other means of preventing or repairing damage to natural or cultural resources.
- Safe parking would be allowed within 30 feet from the edge of a designated motorized route for the purpose of any legal forest activity (FSM 7700).
- A portion of the Nevada Mountain IRA is located on the Lincoln Ranger District and a portion of the Electric Peak IRA is located on the Beaverhead-Deerlodge National Forest. This travel plan proposal covers only the areas of each IRA located within the Divide Travel Planning area.
- Road closure effectiveness for resource concerns would be monitored.
- If temporary closures are necessitated the public will be given adequate notification
- The stream crossing that provides access to the Larabee Gulch Trailhead on NFSR #227-D1 would be closed to motorized use until the ford can be replaced with a bridge, bottomless arch or culvert.
- The stream crossing that provides access to Golden Anchor on NFSR #4100 would be closed to motorized use until the ford can be replaced with a bridge, bottomless arch or culvert.
- Two unnamed stream crossings located on NFSR #495-D1 in T8N, R6W Section 28 would be closed to motorized use until the ford can be replaced with a bridge, bottomless arch or culvert.
- Motorized over-snow use would have seasonal restrictions.
- Groomed snowmobile routes located on Forest roads and trails would be closed to wheeled motorized vehicles during their designated period of use.
- Seasonal restrictions would be placed on some trails open to motorized wheeled vehicles 50 inches in width or less.
- Roads would be open to over-snow motorized vehicles located in areas open to over-snow motorized vehicles to match the use of the surrounding area. All other motorized use would continue to be restricted from using these routes unless authorized for emergency or administrative uses.

Alternative 1 - No Action

The No Action alternative is required under NEPA regulations [40 CFR 1502.14(d)]. This alternative represents the existing, baseline condition or trends by which the action alternatives are compared.

The No Action alternative would defer implementation of the Travel Management Rule and would not result in a Motor Vehicle Use Map (MVUM). No changes would be made to the existing system of available public motorized routes and areas within the Divide Travel Planning area.

No Action is represented by the current Helena National Forest map and supporting prohibitions. Permissible motorized uses include those routes and areas not otherwise prohibited. Under No Action, motorized access for dispersed camping, parking associated with camping.

The Helena National Forest Plan, as amended, prohibits wheeled cross country travel (2001 Tri-State OHV Decision). However, wheeled motorized use of unauthorized routes that existed at that time of that Forest Plan amendment are unaffected by this prohibition. That use is not defined as cross-country travel under the amended Forest Plan as long as the vehicle fits within the pre-existing width of the route. The motorized access for dispersed camping is an exception and that use is also permitted up to 300 feet from these routes. Under the No Action alternative, these uses could continue.

Design Features

Kading-Limburger Springs Area

Under this alternative, Forest Road 1868, Kading Grade (MTR-502) and routes 501, MTR-503 and MTR-504 would remain open to wheeled motorized vehicles 50 inches in width or less from May 16th through October 14th. This motorized activity would provide opportunities for off highway vehicle (OHV) enthusiasts and hunters.

Motorized access on Forest Service Road #227-D1 would continue to provide limited wheeled motorized vehicle access (with a ford across the Little Blackfoot River) to a trailhead and Miller Cabin in Larabee Gulch. Although there is no road bridge across the Little Blackfoot River, the short spur road east of the river is currently open to motorized travel.

The existing non-system motorized routes located in the Kading area would be authorized as designated motorized trails open from May 16th through October 14th. These routes would be maintained as system trails.

Sweeny Creek Area

Existing unauthorized motorized routes located in the Sweeny Creek area would continue to be open as motorized trails with no seasonal restrictions.

Continental Divide National Scenic Trail (CDNST)

There are approximately nine miles of the Continental Divide National Scenic Trail which are currently open to wheeled motorized travel. Per Forest Service Manual (FSM) 2300 direction, motorized use would only be allowed on the Continental Divide National Scenic Trail if the route and type of use was in existence prior to November 10, 1978. Spur road 136-D1 was identified on the 1977 Helena National Forest map as a trail open to motorized vehicles under 40 inches wide. As a result, any wheeled motorized vehicles exceeding 40 inches in width would not be authorized on Forest Road 136-D1.

Other motorized segments of the Continental Divide National Scenic Trail are roads which existed prior to November 10, 1978. In accordance with recent direction, those routes could continue to serve as segments of the Continental Divide National Scenic Trail if they are primitive and motorized use does not substantially interfere with the nature and purposes of the Continental Divide National Scenic Trail. Most of the existing motorized segments of the Continental Divide National Scenic Trail are located on Forest Roads #136, 495, 622, 1802, 1802-B2 and 1855. Motorized use on existing Continental Divide National Scenic Trail segments would continue. Approximately 19 miles of the Continental Divide

National Scenic Trail would be closed to wheeled motorized travel. The existing single track trail segments in the vicinity of Priest Pass and Mullan Pass would remain open to motorized trail bikes. In addition, Forest Road #136–D1 would remain open to motorized use year- long.

Approximately 24.6 miles of the Continental Divide National Scenic Trail would continue to be open to wheeled motorized travel.

Approximately 8 miles of the Continental Divide National Scenic Trail would continue to be located in an area open to over-snow motorized vehicles.

Table 1 at the end of this summary identifies the type of use the trail is currently being managed for. Some segments are on designated County roads and others are on a portion of the National Forest System Roads. The segments are arranged from north to south.

Unauthorized Routes

Identified unauthorized routes are considered open within the context of this alternative. Sixteen miles are identified as unauthorized routes which are currently open to wheeled motorized use. Any unauthorized routes not identified or included in this alternative are considered closed.

Accessibility

Under the existing condition there are no special for provisions to provide motorized access opportunities during big game rifle season.

Access to Dispersed Campsites

Under the existing condition, Alternative 1, the 2001 Tri-State Decision allowed off-vehicle camping within 300 feet of roads and motorized trails; but, required visitors to select campsites by non-motorized means and access the campsites by the most direct route causing the least damage. Parking safely adjacent to a road or motorized trail within 30 feet from the edge of the road or motorized trail is also permitted under the existing condition.

For additional details, please refer to the map packet and appendix E for information that reflects each individual route by proposed designation (open/seasonal restrictions/closed) by alternative.

Other Features

- Seasonal closures
- Larabee Gulch Trailhead stream crossing would remain open
- Two stream crossings on NFSR #495-D1 that provide access to motorized vehicles 50 inches in width or less from May 16th through October 14th on NFSR #4104A would remain open
- Stream crossing or ford access to Golden Anchor on NFSR #4100 would remain open
- Approximately 75 miles of road located within areas open to over-snow motorized use would continue to be closed to over-snow motorized vehicles

The following table reflects the miles for each type of use for alternative 1, the existing condition. For additional details, please refer to the map packet and appendix E for information that reflects each individual route by proposed designation (open/seasonal restrictions/closed) by alternative.

Table 1: Alternative 1, Miles of Each Type of Use

Type of Use (Corresponding designation on Alternative Maps)	Alt. 1 Existing Condition
Roads open to highway legal vehicles, no seasonal restrictions (OPEN-HWY-LEGAL)	286
Roads closed to motorized vehicles yearlong, including over-snow motorized vehicles	85
Roads open to highway legal vehicles 12/2-10/14 (02-Res) Open to over-snow motorized vehicles 12/2-10/14 (02-Res)	8
Roads open to highway legal vehicles 5/16-12/1 (03-Res) Open to over-snow motorized vehicles 12/2 – 5/15 (03-Res)	4
Roads closed to wheeled motorized vehicles yearlong (06-Res) Open to over-snow motorized vehicles 12/2-10/14 (06-Res)	42
Roads open to wheeled motorized vehicles 6/1-8/31 (13-Res) Open to over-snow motorized vehicles 12/1-8/31 (13-Res)	8
Roads open to wheeled motorized vehicles 5/16-4/14 (15-Res) Open to over-snow motorized vehicles, no seasonal restrictions (15-Res)	7
Trails open to vehicles 50 inches or less in width 5/16-10/14	7
Trails open to vehicles 50 inches or less in width, no seasonal restriction	12
Open non-system roads and trails (UOPEN-HWY-LEGAL)	16
Non-motorized system trail (NO MTR)	20
CDNST Non-Motorized (closed to wheeled motorized vehicles)	19.2
CDNST open to wheeled motorized vehicles	24.6
CDNST located in an area open to over-snow motorized vehicles	8.0
CDNST located on State or County Jurisdiction	4.4

Alternative 2 - The Proposed Action

Alternative 2 was the proposed action presented to the public during the 2008 scoping period. This alternative was developed using the current Forest Transportation System maps, information from the 2004 Helena Roads Analysis, field verification and public input.

Consistent with the travel planning regulations at 36 CFR 212 Subpart B, the resulting available wheeled motorized access routes and areas would be designated on a MVUM and public use of a motor vehicle other than in accordance with those designations would be prohibited as per 36 CFR 261.13.

For more specific detail regarding mileage please refer to appendix E in addition to the alternative maps at the end of the document. If this alternative is selected, it would meet the intent of subsequent site-specific planning as required by the 'Off-Highway Vehicle Record of Decision and Forest Plan Amendment' (January 2001).

Design Features Specific to Alternative 2

Kading/Limburger Springs Area

NFSR #1868, Kading Grade (MTR-502) and routes 501, MTR-503 and MTR 504 would remain open to wheeled motorized vehicles 50 inches in width or less from May 16th through October 14th.

Sweeny Creek Area

The existing unauthorized motorized routes located in the Sweeny Creek area would be designated as trails open to motorized vehicles 50 inches in width or less from May 16th thru October 14th. Designation of these routes as system trails would provide another area on the Helena Forest specifically recognized for OHV use. Although that area does not receive a great deal of over-snow vehicle use at the current time, it has become popular with OHV riders both during the winter and spring.

One notable change in the Sweeny Creek area under alternatives 2 is the winter closure to motorized travel. Approximately 5,700 acres in that area (including the motorized trails) would be closed to over-snow motorized travel from October 16th thru May 14th.

Continental Divide National Scenic Trail (CDNST)

Under this alternative the majority of Forest Road #136-D1 (two miles) would be closed to wheeled motorized vehicles yearlong. The remaining 0.5 miles, which provide access to existing stock facilities and trailhead parking, would remain open to highway legal vehicles yearlong.

- Approximately 22.5 miles of the Continental Divide National Scenic Trail would be open to wheeled motorized travel.
- Approximately 19.3 miles of the 50 inches in width or less Continental Divide National Scenic Trail would be closed to wheeled motorized vehicles.
- Approximately 12 miles of the Continental Divide National Scenic Trail would be located in an area open to over-snow motorized vehicles.

Please see appendix E for a comparison of alternatives in Continental Divide National Scenic Trail designations.

Unauthorized Routes

Alternative 2 would designate approximately 10 miles of identified unauthorized routes to be added to the Forest Transportation System. The existing unauthorized routes not identified or included in this alternative would be considered closed.

Accessibility

NFSRs #335-A1 and A2, #1856 and #314-J3 would be open from October 15th through December 1st to provide additional motorized access during big game rifle season.

For additional details, please refer to the map packet and appendix E for information that reflects each individual route by proposed designation (open/seasonal restrictions/closed) by alternative.

Access to Dispersed Campsites

Under alternative 2, parking safely adjacent to a road within 30 feet from the edge of the road or motorized trail would be allowed. In addition, wheeled motorized vehicle travel for camping or parking associated with camping would be allowed within 300 feet of designated system routes, including roads and trails (unless signed otherwise or specifically closed) as long as:

- No new permanent routes are created by this activity,
- No damage to existing vegetation, soil, or water resource occurs,
- Travel off-route does not cross streams and
- Travel off-route does not traverse riparian or wet areas.

Access to dispersed camping is identified as an acceptable use in the planning area under the 2001 Tri-State Decision and the 2005 Travel Management Rule. Agency personnel have observed that, in general, this has occurred without causing unacceptable resource damage. Where site-specific issues have occurred, emergency closures were issued for resource protection. The Forest Service has this tool available when needed; therefore, the Helena National Forest is proposing to continue this practice under this alternative.

Other Features

- There would be winter closures in Hahn Creek areas as well as lower elevation west facing slopes in Clarks Canyon north to Threemile Creek.
- Areas that remain open would have a season of December 2nd through May 15th for motorized over-snow travel.
- The stream crossing that provides access to the Larabee Gulch Trailhead on NFSR #227-D1 would be closed to motorized use until the ford could be replaced with a bridge, bottomless arch or culvert.
- Two stream crossings on NFSR #495-D1 that provide access to Motorized Vehicles 50 inches in width or less from May 16th through October 14th on NFSR #4104A would be closed to motorized use until the ford can be replaced with a bridge, bottomless arch or culvert.

For additional details, refer to the map packet and appendix E for information that reflects each individual route by proposed designation (open/seasonal restrictions/closed) by alternative.

Alternative 3

Comments received in the 2008 scoping process included comments regarding the desire to enjoy the outdoors in its natural state without the interruption of motorized use. Alternative 3 was developed in response to public comments regarding wildlife security issues, non-motorized uses and general resource concerns relative to erosion and sedimentation from road conditions.

Consistent with the travel planning regulations at 36 CFR 212 Subpart B, the resulting available wheeled motorized access routes and areas would be designated on a MVUM and public use of a motor vehicle other than in accordance with those designations would be prohibited as per 36 CFR 261.13.

For additional details, refer to the map packet and appendix E for information that reflects each individual route by proposed designation (open/seasonal restrictions/closed) by alternative. If this alternative is selected, it would meet the intent of subsequent site-specific planning as required by the 'Off-Highway Vehicle Record of Decision and Forest Plan Amendment' (January 2001).

Design Features Specific to Alternative 3

Kading-Limburger Springs Area

The Kading/Limburger Springs area would incorporate additional motorized closures. Under this alternative, NFSR #1868, Kading Grade (MTR-502) and routes 501, MTR-503 and MTR 504 would be closed to wheeled motorized vehicle travel yearlong; however, open to over-snow motorized vehicles

from December 2nd through May 15th. This would also apply to non-system trails MTR-502, MTR-503 and MTR-504.

Current OHV travel for wheeled motorized vehicles 50 inches in width or less would be prohibited. Existing over-snow motorized travel on those routes would continue.

NFSR #227 would be closed just past the Kading campground with NFSR #227-E1 becoming a non-motorized trail.

Sweeny Creek Area

The existing unauthorized routes located in the Sweeny Creek area would be closed to motorized travel yearlong. With exception of the Priest Pass road, all routes in the Sweeny Creek area would be closed yearlong to all motorized use including over-snow vehicles.

Similar to alternative 2, approximately 5,700 acres in that area would be closed to over-snow motorized travel.

Continental Divide National Scenic Trail (CDNST)

Under this alternative the majority of Forest Road #136-D1 (2 miles) would be closed to wheeled motorized vehicles yearlong. The remaining 0.5 miles, which provide access to existing stock facilities, would remain open to highway legal vehicles yearlong. Approximately 0.6 additional miles of Continental Divide National Scenic Trail would be closed to wheeled motorized travel over alternative 1.

- Existing single track trail segments would be closed to wheeled motorized travel yearlong.
- The area south of Highway 12 along the Continental Divide from MacDonald Pass to Jericho Mountain would be closed to over-snow vehicles, except on designated routes.
- Approximately 20.6 miles of the Continental Divide National Scenic Trail would be open to wheeled motorized travel.
- Approximately 19.3 miles of the Continental Divide National Scenic Trail would be closed to wheeled motorized vehicles.
- Approximately 10.1 miles of the Continental Divide National Scenic Trail would be located in an area open to over-snow motorized vehicles.

Please see appendix E for a comparison of alternatives in Continental Divide National Scenic Trail designations.

Unauthorized Routes

Alternative 3 would designate approximately nine miles of identified unauthorized routes that would be added to the Forest Transportation System. The existing unauthorized routes not identified or included in this alternative would be considered closed.

Accessibility

There would be no special provisions to provide motorized opportunity considerations for motorized access during the big game rifle season under this alternative.

For additional details, please refer to the map packet and appendix E for information that reflects each individual route by proposed designation (open/seasonal restrictions/closed) by alternative.

Access to Dispersed Campsites

Under alternative 3, parking safely adjacent to a road within 30 feet from the edge of the road or motorized trail would be allowed. In addition, wheeled motorized vehicle travel for camping or parking associated with camping would be allowed within 300 feet of designated system routes, including roads and trails (unless signed otherwise or specifically closed) as long as:

- No new permanent routes are created by this activity,
- No damage to existing vegetation, soil, or water resource occurs,
- Travel off-route does not cross streams and
- Travel off-route does not traverse riparian or wet areas.

Access to dispersed camping is identified as an acceptable use in the planning area under the 2001 Tri-State Decision and the 2005 Travel Management Rule. Agency personnel have observed that, in general, this has occurred without causing unacceptable resource damage. Where site-specific issues have occurred, emergency closures were issued for resource protection. The Forest Service has this tool available when needed; therefore, the Helena National Forest is proposing to continue this practice under this alternative.

Other Features

- NFSR #314 would be closed yearlong to motorized wheeled vehicles past the gate in Section 7.
- NFSRs #314-J1 and J3 would also be closed yearlong.
- Non-System Motorized Trails #501, #503, #502 and #1868 and NFSR #1871-002 would be closed to wheeled motorized use yearlong.
- The stream crossing that provides access to the Larabee Gulch trailhead on NFSR #227-D1 would be closed to motorized use until the ford can be replaced with a bridge, bottomless arch or culvert.
- Two stream crossings on NFSR #495-D1 that provides access to motorized vehicles 50 inches in width or less on NFSR #4104A would be closed under this alternative.

For additional details, refer to the map packet and appendix E for information that reflects each individual route by proposed designation (open/seasonal restrictions/closed) by alternative.

Alternative 4

Alternative 4 was developed in response to public comments. This alternative addresses both social and resource concerns identified by the public.

Consistent with the travel planning regulations at 36 CFR 212 Subpart B, the resulting available wheeled motorized access routes and areas would be designated on a MVUM and public use of a motor vehicle other than in accordance with those designations would be prohibited as per 36 CFR 261.13.

For additional details, refer to the map packet and appendix E for information that reflects each individual route by proposed designation (open/seasonal restrictions/closed) by alternative. If this alternative is selected, it would meet the intent of subsequent site-specific planning as required by the 'Off-Highway Vehicle Record of Decision and Forest Plan Amendment' (January 2001).

Design Features Specific to Alternative 4

Kading-Limburger Springs Area

With the exception of over-snow vehicles during the winter, the unauthorized trails in the Kading area would be closed to wheeled motorized use.

Kading/Limburger Springs areas would be closed to wheeled motorized use yearlong for resource and winter wildlife protection.

FSR #227 would be closed at the turn around located just past Kading campground and FSR #227-E1 would be closed to wheeled motorized vehicles year-long.

NFSR #1868, Kading Grade (MTR-502) and routes 501, MTR-503 and MTR 504 would be closed to wheeled motorized vehicle travel yearlong; however, open to over-snow motorized vehicles from December 2nd through May 15th. This would also apply to non-system trails MTR-502, MTR-503 and MTR-504.

Sweeny Creek Area

Like alternative 3, the existing unauthorized routes located in the Sweeny Creek area would be closed to motorized travel yearlong for resource and winter wildlife protection. Similar to alternatives 2 and 3, approximately 5,700 acres in that area would be closed to over-snow motorized travel. This area does not receive a great deal of over-snow vehicle use.

Continental Divide National Scenic Trail (CDNST)

Under this alternative the majority of Forest Road #136-D1 (2 miles) would be closed to wheeled motorized vehicles yearlong. The remaining 0.5 miles, which provide access to existing stock facilities, would remain open to highway legal vehicles yearlong. In addition Forest Road #1802 would be closed to motorized vehicles yearlong.

Forest Road #1802 existed prior to November 10, 1978. Therefore, to meet agency direction for the Continental Divide National Scenic Trail, it "*should not be closed to wheeled motorized travel*."

Additional segments of the Continental Divide National Scenic Trail would be closed to wheeled motorized use. This includes the microwave tower road FSR#1802 (please refer to appendix E for specifics on each segment of the route).

- Approximately 18 miles of the Continental Divide National Scenic Trail would be open to wheeled motorized travel.
- Approximately 21.9 miles of the Continental Divide National Scenic Trail would be closed to wheeled motorized vehicles.
- Approximately 12 miles of the Continental Divide National Scenic Trail would be located in an area open to over-snow motorized vehicles.

Please see appendix E for a comparison of alternatives in Continental Divide National Scenic Trail designations.

Unauthorized Routes

Alternative 4 would designate six miles of identified unauthorized routes that would be added to the Forest Transportation System. The existing unauthorized routes not identified or included in this alternative would be considered closed.

Accessibility

There would be no special provisions to provide motorized opportunity considerations for motorized access during the big game rifle season under this alternative.

For additional details, please refer to the map packet and appendix E for information that reflects each individual route by proposed designation (open/seasonal restrictions/closed) by alternative.

Access to Dispersed Campsites

Alternative 4 would permit wheeled motorized vehicle travel within 300 feet of designated system routes, including roads and trails (unless signed otherwise). It would allow motorized travel in this zone for legal recreational activities, in addition to camping and parking associated with dispersed camping. Legal recreation activities include, but are not limited to, parking, camping, big game retrieval, hiking, hunting, or firewood gathering. These activities would be allowed as long as:

- No new permanent routes are created by this activity,
- No damage to existing vegetation, soil, or water resource occurs,
- Travel off-route does not cross streams and
- Travel off-route does not traverse riparian or wet areas.

For additional details, please refer to the map packet and appendix E for information that reflects each individual route by proposed designation (open/seasonal restrictions/closed) by alternative.

Other Features

There would be winter closures in the Hahn Creek area as well as lower elevation west facing slopes in Clarks Canyon north to Threemile Creek.

FSR #1802 and FSR #1802-C1 would be closed to wheeled motorized vehicles yearlong.

FSR #314 in the Spotted Dog area would be open to highway legal vehicles from May 16th to October 14th and closed to wheeled motorized vehicles from October 15th to May 15th.

Areas that remain open would have a season of December 2nd through May 15th for motorized over-snow travel.

Alternative 5 – Preferred Alternative

This proposed alternative was developed in response to public comment and field reviews and is designed to increase motorized loop trail opportunities and reduce the short spur and redundant parallel routes. It also improves big game security as well as addresses resource concerns relative to erosion and sedimentation from roads and stream crossings. Consideration was given to further align the Continental Divide National Scenic Trail (CDNST) with National Standards.

The selection of this alternative would result in the production of a Motor Vehicle Use Map which would identify motorized routes that are open for use along with corresponding restrictions and designations. In addition, this map would show restrictions regarding dispersed camping. Use of a motor vehicle other than in accordance with specific designations would be prohibited. The authority for this action comes from 36 CFR 212 and 36 CFR 261.13.

For additional details, refer to the map packet and appendix E for information that reflects each individual route by proposed designation (open/seasonal restrictions/closed) by alternative. Alternative

5 would meet the intent of subsequent site-specific planning as required by the 'Off-Highway Vehicle Record of Decision and Forest Plan Amendment' (January 2001).

Design Features Specific to Alternative 5

Seasonal Trail (route) Dates

All motorized trails with seasonal use open to wheeled motorized vehicles 50 inches in width or less would be open from May 16th to August 31st with the exception of the Lava Mountain connector trail # 4009-A1 which would be open from May 16th to October 14th. There are approximately 14.5 miles of motorized trails that would have no seasonal restrictions.

Kading-Limburger Springs Area

National Forest System Route (NFSR) #227 would remain open to Kading campground. Beyond Kading campground, NFSR #227-E1 would become part of non-motorized trail 329. The trailhead parking area on NFSR #227 past Kading campground where the route would change to non-motorized use would be expanded to accommodate day use vehicles and horse trailers.

Motorized Trail #501 would remain open to motorized vehicles of 50 inches in width or less from May 16th to August 31st.

Over-snow motorized travel would be allowed in areas north and west of NFSR #227 from December 2nd to May 15th. Refer to the alternative 5 map for detailed over-snow motorized travel in this area.

Sweeny Creek Area

With the exception of the Priest Pass Road, all routes in the Sweeny Creek area would be closed yearlong to motorized use including over-snow vehicles.

Continental Divide National Scenic Trail (CDNST)

NFSR #136-D1 would be closed to wheeled motorized vehicles yearlong. Approximately, one mile of the Continental Divide National Scenic Trail trail located north of NFSR #136 and just south and east of Meyers Hill, would be re-routed and designated as a non-motorized section of the Continental Divide National Scenic Trail. Refer to the Continental Divide National Scenic Trail map for information on motorized and non-motorized segments of the Continental Divide National Scenic Trail.

Larabee Crossing and Golden Anchor Crossing – Little Blackfoot Area

The crossing at Larabee (227-D1) would be closed to wheeled motorized travel. In addition, a foot/stock bridge would be constructed to connect to the non-motorized Larabee Trail #359. A trailhead would be designated nearby on NFSR #227.

The stream crossing located on Golden Anchor NFSR #4100 is currently a ford. This alternative proposed to replace the ford with a bridge, bottomless culvert, or structure installed to accommodate wheeled motorized vehicles 50 inches in width or less and over-snow motorized vehicles. The ford would remain open for motorized use until the structure is in place or two years from the start of the implementation phase of this project, whichever is less. If a structure is not installed during this timeframe, the ford crossing would be closed to vehicle travel until a structure is in place. The area beyond this crossing would remain open to wheeled vehicles 50 inches in width or less in addition to over-snow motorized vehicles.

Unauthorized Routes

Alternative 5 would designate approximately 1.4 miles of identified unauthorized routes to be added to the Forest Transportation System for non-motorized use. All routes, including unauthorized routes, not identified or included in this alternative as part of this planning effort, as well as any future created routes, would be considered closed and would be physically closed without additional NEPA.

Parking

Parking would be limited up to 30 feet from the edge of a designated route.

Access to Dispersed Campsites up to 70 feet from a Designated Route

Parking and motor vehicle use associated with dispersed camping would be limited to no more than 70 feet from the edge of a designated route as long as:

- No new permanent routes are created by this activity;
- No damage to existing vegetation, soil, or water resources i.e., damage to live trees and shrubs, rutting and eroding of stream banks or bare soil;
- Travel off-route does not cross streams;
- Travel off-route does not traverse riparian or wet areas;
- Vehicles travel to and parking associated with dispersed campsites would be limited to no closer than 30 feet of a stream or body of live water.

Access to Dispersed Campsites further than 70 feet from a Designated Route

Dispersed campsites located more than 70 feet from the edge of a designated route that are identified on the alternative 5 map would remain open for dispersed camping and parking associated with dispersed camping. The five items identified under the access to dispersed campsites up to 70 feet from a designated route section are applicable for this as well.

Other Features

- NFSR #314 would be open to wheeled motorized vehicles 50 inches in width or less from May 16th to August 31st, past the gate in Section 7.
- NFSRs #314-J1 and #314-J3 would be closed yearlong to motorized travel
- Motorized Trails #502, #503 and #504 in the Kading/Limburger Springs area and NFSR #1868 would be closed to wheeled motorized use yearlong.
- NFSR #1870 and NFSR #1871-A2 are currently closed yearlong; however, alternative 5 would open them to wheeled motorized vehicles 50 inches in width or less from May 16th to August 31st. This route would connect to NFSR #1871 to create a loop trail. The road spurs within this area that dead-end would be closed yearlong to wheeled motorized vehicles.
- Two fords on NFSR # 495-D1 would remain open to motorized vehicles to provide access to Motorized Trail 4101-A1 which will be open to vehicles 50 inches in width or less from May 16th to August 31st.
- Approximately ½ mile of NFSR #1805-A1 (accessed from NFSR #1805) would be open to wheeled highway legal vehicles from May 16th to October 14th. A motorized vehicle trailhead would be developed at this location where it would connect to a one-mile loop trail open to wheeled motorized vehicles 50 inches in width or less from May 16th to October 14th.

Emergency Closures in accordance with 7716.51 – Temporary Emergency Closures

1. If the responsible official determines that motor vehicle use on an NFS road, an NFS trail, or in an area on NFS lands is directly causing or will directly cause considerable adverse effects on public safety, soil, vegetation, wildlife habitat, or cultural resources associated with that road, trail, or area, the responsible official shall immediately close that road, trail, or area to motor vehicle use (36 CFR 212.52(b)(2)).
2. Temporary, emergency closures must remain in effect until the responsible official determines that:
    a. The adverse effects have been mitigated (that is, reduced to the point where they are not considerable adverse effects) or eliminated; and
    b. Measures have been implemented to prevent future recurrence (36 CFR 212.52(b)(2)).

For additional details, refer to the map packet and appendix E for information that reflects each individual route by proposed designation (open/seasonal restrictions/closed) by alternative.

Proposed Forest Plan Programmatic Amendment for the Big Game Security Index

This section provides an overview of Forestwide standard 4a and the proposed amendment to replace that standard. This amendment is common to all alternatives. This would be a separate decision as per 36 CFR 219. Alternative A describes the existing condition – the current Forest Plan standard 4a. Alternative B describes the proposed amendment to the Helena National Forest plan. Detailed information and background for the proposed programmatic plan amendment is located in chapter 3.

Alternative A, Existing Condition

Alternative A, the No Action alternative, is the existing Forest Plan Standard. In this case, 'no action' means no amendment to the existing Forest Plan. The analysis of effects associated with alternative A describes the effects of the current Forest Plan standard. The exact language of the current standard is as follows:

Forestwide Standard Big Game 4(a) (HFP pp. II/17 – II/18)

Road management will be implemented to at least maintain big game habitat capability and hunting opportunity. To provide for a first week bull elk harvest that does not exceed 40 percent of the total bull harvest, roads will be managed during the general big game hunting season to maintain open road densities with the following limits.

Table 2: Forest Plan Big Game Security Index

Forest Plan Big Game Security Index		
Existing Percent Hiding Cover [(1)]	Existing Percent Hiding Cover [(2)]	Max Open Road Density mi/mi^2
56	80	2.4
49	70	1.9
42	60	1.2
35	50	0.1
[(1)] Forest Service definition - a timber stand which conceals 90 percent or more of a standing elk at 200 feet. [(2)] MDFWP definition - a stand of coniferous trees having a crown closure of greater than 40 percent.		

The existing hiding cover to open road density ratio should be determined over a large geographic area, such as a timber sale analysis area, a third order drainage, or an elk herd unit.

The big game security index is calculated for EHUs that include all lands, public and private, within the respective EHU. This means that elk security as determined by this index is also a function of road densities and timber harvest on private lands outside management control of the Helena National Forest.

Alternative B

Alternative B was designed to address best science and local knowledge. It also expanded consideration to all open motorized routes (whereas alternative A only applies to roads as originally envisioned in the Forest Plan). Alternative B would replace the existing Forest Plan Big Game Standard 4(a).

The Divide Travel Plan area encompasses only about ¾ of the Divide landscape (portions of the Quartz, Black Mtn – Brooklyn Bridge and Little Prickly Pear – Ophir EHUs falling into areas covered by previous travel management plans); however, the proposed amendment would apply to all portions of the herd units included in the Divide Travel Plan analysis.

Under the Forest Plan amendment proposed for the Divide Travel Plan and applicable to future projects in the Travel Plan Area, the "security area" approach would replace the "road density/hiding cover index" as the Forest Plan standard for gauging the vulnerability of elk to hunting. The amendment derives from the Hillis methodology (1991) and adopts specific guidelines for its application from Recommendations for Big Game Habitat Management on the Custer, Gallatin, Helena and Lewis and Clark National Forests (MDFWP and USDA Working Group 2013). The exact language of the standard is as follows:

Standard

Road management will be implemented to maintain or improve big game security and hunting opportunity.

Road management will also be implemented to maintain or improve big game intermittent refuge areas.

This standard applies only to the National Forest System lands within those portions of the following elk herd units that are within the Helena Ranger District, Helena National Forest administrative boundary – Black Mountain-Brooklyn Bridge, Greenhorn, Jericho, Little Prickly Pear-Ophir, Quartz Creek and Spotted Dog-Little Blackfoot.

Public Motorized Use: Public motorized use will be managed during the hunting season (from 9/1 – 12/1) to maintain elk security at the following levels:

Table 3: Elk Security by Elk Herd Unit

Percentage of Elk Security within that Portion of an Elk Herd Unit within the Helena Ranger District Administrative Boundary by Travel Plan Alternative					
Herd Unit	Alt 1 Security %	Alt 2 Security %	Alt 3 Security %	Alt 4 Security %	Alt 5 Security %
Black Mountain–Brooklyn Bridge	16	16	16	16	16
Greenhorn	7	10	23	25	30
Jericho	12	12	16	16	17
Spotted Dog - Little Blackfoot	30	29	39	34	44
Little Prickly Pear—Ophir	23	25	26	25	28
Quartz	0	0	0	0	0

Public motorized use will be managed during the hunting season (from 9/1 – 12/1 to maintain intermittent refuge areas at the following levels:

Table 4: Intermittent Refuge Areas by Elk Herd Units

Percentage of Intermittent Refuge Areas within that Portion of an Elk Herd Unit within the Helena Ranger District Administrative Boundary by Travel Plan Alternative					
Herd Unit	Alt 1 % Intermittent Refuge Area	Alt 2 % Intermittent Refuge Area	Alt 3 % Intermittent Refuge Area	Alt 4 % Intermittent Refuge Area	Alt 5 % Intermittent Refuge Area
Black Mountain–Brooklyn Bridge	5	5	5	5	5
Greenhorn	4	7	4	4	1
Jericho	3	3	0	0	0
Spotted Dog - Little Blackfoot	4	1	2	2	2
Little Prickly Pear—Ophir	0	0	0	1	1
Quartz	5	5	5	5	6

Other Use: Administrative use for travel on routes that are closed to public motorized use is permitted subject to existing authorization procedures (i.e. variances approved by line officers are required prior to use of motorized routes closed to the public).

Temporary reductions associated with management activities in security blocks and intermittent refuge areas between 9/1 and 12/1 are allowed as long as impacts to elk or elk security are mitigated at the project level. Temporary reductions will be evaluated and effects analyzed (including cumulative effects) at the project level and reviewed by a wildlife biologist. It is at this scale and time when project design features and/or mitigations would be applied to ensure that impacts to elk or elk security during hunting season are addressed and reduced during implementation of the project. Temporary reductions are managed at the project scale and at the herd unit (or across herd units where security blocks cross into one or more herd units) to ensure big game security during the 9/1 – 12/1 hunting season is maintained or improved over the long term.

Permanent changes (e.g. reduction in overall secure acres) are allowed in elk security areas as long as the overall percent of elk security in a herd unit does not decrease and a site-specific analysis indicates that elk are unlikely to be negatively impacted by that change.

Permanent changes are allowed in intermittent refuge areas as long as the overall percent of intermittent areas in a herd unit does not decrease and a site-specific analysis indicates that elk are unlikely to be negatively impacted by that change OR if the decrease is due to those acres becoming part of a security area.

Exceptions to the Standard

Emergency situations are not subject to this standard.

Standard Definitions

Security is defined as a proportion of an elk herd unit within the administrative boundary of the Helena Ranger District that consists of an area of at least 1,000 acres in size that is at least ½ mile from a motorized route open to the public between 9/1 and 12/1. Security blocks are adjusted for constrictions less than or equal to ½ mile in width. Security is calculated across all ownerships within the administrative boundary.

Intermittent Refuge Areas are defined as those areas at least 250 acres in size and less than 1000 acres in size that are greater than or equal to ½ mile from a motorized route open to the public between 9/1 and 12/1. Intermittent Refuge Areas are adjusted for constrictions less than or equal to ½ mile in width. Intermittent Refuge Areas are calculated across all ownerships within the administrative boundary.

Administrative use for travel on motorized routes is defined as vehicle use associated with management activities or projects on National Forest land administered by the Forest Service or under authorization of the Forest Service. Management Activities include but are not limited to, law enforcement, timber harvest, reforestation, cultural treatments, prescribed fire, watershed restoration, wildlife and fish habitat improvement, private land access, allotment management activities and mineral exploration and development that occur on National Forest land administered by the Forest Service or under authorization of the Forest Service.

Mitigation is defined as design elements and/or constraints applied to project level activities that reduce project impacts on elk or elk security. Mitigation measures may include but are not limited to one or more of the following: timing restrictions of activities in security blocks, confining activities to one security block at a time, completing as much of the preparatory work as possible prior to the hunting season, reducing the size/acres/intensity/magnitude of the activity, allowing activities that benefit elk (particularly in management areas with a wildlife emphasis), limiting activities to one season, temporarily closing roads open to the public to compensate for the activity, etc.

Alternative B also includes cover guidelines as follows:

Guidelines

1. Cover should be distributed in a manner that mimics or approximates a natural range of variation (NRV). NRV is generally defined as the spatial and temporal variation in ecosystem characteristics under historic disturbance regimes during a reference period. A reference period should be sufficiently long to include the full range of variation produced by dominant natural disturbance regimes. Fire, wind and insect/disease outbreaks are examples of disturbances.
2. Subject to Guideline #1, provide cover, if available, between elk security areas to maintain habitat connectivity and facilitate seasonal movement. Saddles, low divides and heads of drainages are examples of important landscape features within which cover should be retained when possible in order to provide habitat connectivity.
3. Subject to Guideline #1, vegetation management projects should be planned to recruit or improve cover, where such habitat is limited or not available.

4. Subject to Guideline #1, provide cover, if available, in elk security areas to maintain and/or improve elk security in areas known to be used by elk or that have the potential to be used by elk. The upper third of the slope in moderate to large drainages and lower third of slope in drainage heads are examples of areas that have the potential to be used by elk.
5. Frequent, continuous dense cover, if available, should be provided adjacent to system roads within and between elk security areas to maintain habitat connectivity and elk security. 'Dense' cover may include trees, shrubs and/or topography among other factors and is site-specific in nature; as such it is purposefully not defined here.
6. Design management activities to avoid reducing hiding cover where recruitment of hiding cover is an objective.

Guidelines Definitions

Cover is defined as vegetation that provides elk with a means of escape from the threat of predation or harassment and reduces the chance of detection. Here, the definition of cover may include hiding cover, screening cover, or concealment cover. Hiding cover is defined in the Helena National Forest Plan as either (1) vegetation capable of hiding 90 percent of an elk at 200 feet or (2) a standoff coniferous trees having a crown closure of greater than 40 percent or concealment cover which consists of vegetation dense enough to aid animals in escaping from predation or harassment. Screening cover may include conifers and other vegetation that afford longer sight distances then hiding cover but that can obstruct a clear view toward standing or moving elk. Concealment cover may include small conifers, shrubs, boulders, or dead fall that can hide calves/fawns and bedded adults and may service to impede hunter movement. Concealment cover is generally more open than hiding cover.

Habitat connectivity consists of an adequate amount of hiding or screening cover arranged in a way that allows elk to move around.

System Road is defined as a road that is part of the Forest development transportation system.

Alternative B also includes a goal as follows:

Goal

Maintain or, where opportunities arise, improve big game security in those portions of an elk herd unit within the administrative boundary of the Helena Ranger District during the 9/1 – 12/1 hunting season where security is less than 50 percent. Maintain big game security in those portions of an elk herd unit within the administrative boundary of the Helena Ranger District between 9/1 and 12/1 where security is greater than or equal to 50 percent.

Alternatives Considered but Eliminated from Detailed Study

Alternatives were proposed which focused on increasing access for multiple uses and increased motorized opportunities. These alternatives also included construction of new routes in addition to routes on private lands that are currently unavailable for public use.

In evaluating these alternatives, the Helena National Forest determined that many of the proposed motorized routes were already analyzed in alternative 1 (no action) or alternative 2. Portions of these alternatives were eliminated from detailed study because they fell outside the scope of this planning effort.

There were a number of suggestions proposing opportunities for motorized access during the hunting season. There was also a proposal to open an area to motorized use from dawn until dusk. These suggestions were considered but eliminated from detailed analysis because part of the purpose and need for the planning area is the identified need to reduce the number of area closure dates.

Several public comments received during scoping and during the comment period for the DEIS included the request that a travel plan alternative be developed to meet Standard 4a. An analysis was completed to determine if the Forest had management discretion to close enough Forest System roads to achieve compliance with Standard 4a in the elk herd units in the Divide Travel Plan project area. That analysis indicated that the Forest did have the jurisdiction to close several miles of open roads during the hunting season to achieve consistency with Standard 4a in 5 out of 6 herd units. However, for one of those five herd units, Quartz Creek, travel planning has already been completed in a majority of that herd unit; so there is limited opportunity to close additional roads during the hunting season. The Greenhorn elk herd unit would remain out of compliance with Standard 4a because the Forest simply does not have sufficient road closure discretion. Meanwhile, alternative 5 - includes sufficient closures during the hunting season such that four out of the six herd units achieve compliance with Standard 4a. The two herd units that remain out of compliance are Quartz Creek and Greenhorn.

Comparison of Alternatives

This summary provides a comparison of the proposed changes for motorized and non-motorized use for each alternative. In addition it summarizes the differences in proposed management for each segment of the Continental Divide National Scenic Trail for each alternative.

Table 5: Summary of the Proposed Changes for Motorized/non-motorized Use (miles)

Code	Description	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
01-RES	Roads closed to motorized vehicles yearlong, including over snow motorized vehicles (All Alternatives)	86.40	15.71	23.82	26.74	59.36
02-RES	Roads open to highway legal vehicles 12/2-10/14 (Alt 1) Open to over snow motorized vehicles12/2-10/14 (Alt 1)	7.60	0.00	0.00	0.00	0.00
03-RES	Roads open to highway legal vehicles 5/16-12/1 (All Alternatives) Open to over snow motorized vehicles 12/2-5/15 (Alt 2,Alt 3&Alt 4)	4.33	7.29	7.29	3.96	0.00
05-RES	Roads open to highway legal vehicles 5/16-10/14 (Alt 2 & Alt 3) Open to over snow motorized vehicles 12/2-5/15 (Alt 2,Alt 3, Alt 4, Alt 5)	0.00	9.86	3.13	9.86	2.93
06-RES	Roads closed to wheeled motorized vehicles yearlong (All Alternatives) Open to over snow motorized vehicles 12/2-10/14 (Alt 1) Open to over snow motorized vehicles 12/2-5/15 (Alt 2,Alt 3,Alt 4,Alt 5)	42.00	114.15	156.39	139.83	159.35
06-RES-SPC	Open designated routes to over snow motorized vehicles 12/2-5/15 (Alt 2)	0.00	1.78	0.00	0.00	0.00
07-RES	Roads open to highway legal vehicles 10/15-12/1 (Alt 2 and Alt 4) Open to over snow motorized vehicles 12/2-5/15 (Alt 2 and Alt 4)	0.00	9.92	0.00	2.58	0.00
13-RES	Roads open to wheeled motorized vehicles 6/1-8/31 (Alt 1) Open to over snow motorized vehicles 12/1-8/31 (Alt 1)	8.12	0.00	0.00	0.00	0.00
15-RES	Roads open to wheeled motorized vehicles 5/16-4/14 (Alt 1) Open to over snow motorized vehicles, no seasonal restrictions	7.63	0.00	0.00	0.00	0.00

Code	Description	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	(Alt 1)					
OPEN-HWY LEGAL	Roads open to highway legal vehicles, no seasonal restrictions (All Alternatives)	286.33	284.26	262.48	264.53	158.87
OPEN-PVT	Private roads within project boundary (All Alternatives)	98.90	98.90	98.90	98.90	98.55
UOPEN-HWY LEGAL	Open non-system roads & trails (Alt 1)	16.22	0.00	0.00	0.00	0.00
CDNST	Continental Divide System Trail	0.00	0.00	0.00	0.00	2.44
M-07	Trails open to vehicles 50” or less in width, no seasonal restriction (Alt 1)	11.68	0.00	0.00	0.00	0.00
M-08.01	Continental Divide National Scenic Trail CDNST (All Alternatives)	56.09	56.09	56.09	56.09	56.09
MT	Trails open to vehicles 50” or less in width, no seasonal restrictions (Alt 2)	0.00	1.28	0.00	0.00	14.50
MT 5/16-10/14	Trails open to vehicles 50” or less in width 5/16-10/14 (Alt 2,Alt 3,Alt4, Alt 5)	7.80	25.53	0.00	4.00	2.08
MT 5/16-8/31	Trails open to vehicles 50” or less in width 5/16-08/31	0.00	0.00	0.00	0.00	46.54
MT NEW 5/16-10/14	Proposed New construction Motorized Trails 50" or less in width 5/16-10/14	0.00	0.00	0.00	0.00	0.39
MT NEW 5/16-8/31	Proposed New Construction Motorized Trails 50" or less in width 5/16-8/31	0.00	0.00	0.00	0.00	0.81
MT-01-RES	Motorized Trails-Closed to Motorized Use	0.00	2.45	19.48	20.72	18.50
NM	Non-motorized system trail (All Alternatives)	0.00	0.00	0.00	0.00	1.68
NOMTR	Non-motorized system trail (All Alternatives)	19.62	19.62	19.62	19.62	20.10
NS-01-RES	Non-system roads, closed to motorized vehicles yearlong (Alt 2,Alt 3 &Alt 4)	0.00	5.88	7.15	5.88	0.00
NS-01-RES	Non-system roads, closed to motorized vehicles yearlong (Alt 2 & Alt 3)	0.00	0.00	0.00	0.00	12.38

Table 6: Acres Open to Over-Snow Motorized Vehicles within Each IRA

Inventoried Roadless Area (IRA)	Total Acres of NF in Divide Planning Area	Alt.1 Existing Condition	Alt.2	Alt. 3	Alt. 4	Alt. 5
Nevada Mountain	8,435	8435	7430	682	7430	1081
Lazyman	11,503	0	0	0	0	0
Jericho Mountain	8,415	8415	4520	2418	2418	1224
Electric Peak	27,851	9550	9550	9550	9550	6375

Table 7: Miles Open to Wheeled Motorized Vehicles within Each Inventoried Roadless Area (IRA)

Inventoried Roadless Area (IRA)	Alt. 1 Existing Condition	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Nevada Mountain	2	0.07	0.01	0.07	0
Lazyman	0.08	0.08	0.08	0.08	0.08
Jericho Mountain	4.11	2.4	2.4	2.4	1.5
Electric Peak	7.2	4.93	0.08	0.49	2.6

The following tables compare the segments of Continental Divide National Scenic Trail by mileage within the Divide Travel Planning area with alternative 1 being the No Action alternative in comparison to the action alternatives with the proposed designations for each segment.

Table 8: Alternative Comparisons of CDNST Segment Designations (miles)

Route Number	CDNST Segment by Mile Marker	Designation	Alt. 1 Existing Condition (miles)	Alt. 2	Alt. 3	Alt. 4
337	0 to 3.623	Non-Motorized Trail (NM Trail)	3.623	3.623	3.623	3.623
136-D1	0 to 0.5	OHL	0.5	0.5	0.5	0.5
136-D1	0.5 to 2.508	OHL	2.008	0	0	0
136-D1	0.5 to 2.508	Roads closed to wheeled motorized vehicles yearlong. Open to over-snow motorized vehicles 12/2-10/14 (06-Res) (Alt 1). Open to over-snow motorized vehicles 12/2-5/15 (06-Res) (Alt 2,3,4)	0	2.008	2.008	2.008
136	11.058 to 17.305	OHL	6.247	6.247	6.247	6.247
136	17.305 to 18.943	County Road	1.638	1.638	1.638	1.638
622	1.997 to 4.725	OHL	2.728	2.728	2.728	2.728
622	4.725 to 6.783	County Road	2.05	2.05	2.05	2.05
1855-C1	0 to 1.155	OHL	1.155	1.155	1.155	1.155
1855-B2	0 to 1.283	OHL	1.283	0	0	0
1855-B2	0 to 1.283	Roads closed to wheeled motorized vehicles yearlong. Open to over-snow motorized vehicles 12/2-10/14 (06-Res) (Alt 1). Open to over-snow motorized vehicles 12/2-5/15 (06-Res) (Alt 2,3,4)	0	1.283	1.283	1.283
1855-B1	0.367 to 0.912	OHL	0.545	0	0	0
1855-B1	0.367 to 0.912	Roads closed to wheeled motorized vehicles yearlong. Open to over-snow motorized vehicles 12/2-10/14 (06-Res) (Alt 1). Open to over-snow motorized vehicles 12/2-5/15 (06-Res) (Alt 2,3,4)	0	0.545	0.545	0.545
1854-A1	0 to 0.218	OHL	0.218	0.218	0.218	0.218

Route Number	CDNST Segment by Mile Marker	Designation	Alt. 1 Existing Condition (miles)	Alt. 2	Alt. 3	Alt. 4
1854	0.593 to 0.657	OHL	0.064	0.064	0.064	0.064
337	22.064 to 23.107	NM Trail	1.043	1.043	1.043	1.043
1805-D3	0 to 0.145	OHL	0.145	0	0	0
1805-D3	0 to 0.145	Roads closed to wheeled motorized vehicles yearlong. Open to over-snow motorized vehicles 12/2-10/14 (06-Res) (Alt 1). Open to over-snow motorized vehicles 12/2-5/15 (06-Res) (Alt 2,3,4)		0.145	0.145	0.145
337	23.255 to 23.358	NM Trail	0.103	0.103	0.103	0.103
355-B2	0 to 1.8	Roads closed to wheeled motorized vehicles yearlong. Open to over-snow motorized vehicles 12/2-10/14 (06-Res) (Alt 1). Open to over-snow motorized vehicles 12/2-5/15 (06-Res) (Alt 2,3,4)	1.8	1.8	1.8	1.8
335-B1	0 to 0.071	Roads closed to wheeled motorized vehicles yearlong. Open to over-snow motorized vehicles 12/2-10/14 (06-Res) (Alt 1). Open to over-snow motorized vehicles 12/2-5/15 (06-Res) (Alt 2,3,4)	0.071	0.071	0.071	0.071
1802-B2	0 to 2.041	OHL	2.041	0	0	0
1802-B2	0 to 2.041	Roads closed to wheeled motorized vehicles yearlong. Open to over-snow motorized vehicles 12/2-10/14 (06-Res) (Alt 1). Open to over-snow motorized vehicles 12/2-5/15 (06-Res) (Alt 2,3,4)	0	2.041	2.041	2.041
1802-B1	0 to 0.046	OHL	0.046	0	0	0
1802-B1	0 to 0.046	Roads closed to wheeled motorized vehicles yearlong. Open to over-snow motorized vehicles 12/2-10/14 (06-Res) (Alt 1). Open to over-snow motorized vehicles 12/2-5/15 (06-	0	0.046	0.046	0.046

Route Number	CDNST Segment by Mile Marker	Designation	Alt. 1 Existing Condition (miles)	Alt. 2	Alt. 3	Alt. 4
		Res) (Alt 2,3,4)				
1802	0 to 2.694	Roads open to highway legal vehicles 5/16-12/1. Open to over-snow motorized vehicles 12/2 - 5/15 (03-RES)	2.694	2.694	0	2.694
1802	0 to 2.694	Roads closed to motorized vehicles yearlong, including over-snow motorized vehicles (01-Res)	0	0	2.694	0
US 12	27.519 to 28.263	Highway	0.744	0.744	0.744	0.744
4197	0 to 0.613	Roads open to wheeled motorized vehicles 5/16-4/14. Open to over-snow motorized vehicles, no seasonal restrictions (15-Res)	0.613	0	0	0
4197	0 to 0.613	Roads open to highway legal vehicles 5/16-12/1 (03-Res). Open to over-snow motorized vehicles 12/2 – 5/15 (03-Res)	0	0.613	0.613	0.613
337	31.316 to 34.500	NM Trail	3.184	3.184	3.184	3.184
1864	3.399 to 3.959	Roads closed to motorized vehicles yearlong, including over-snow motorized vehicles (01-Res)	0.56	0.56	0.56	0.56
337	35.064 to 37.028	NM Trail	1.964	1.964	1.964	1.964
1856	4.108 to 5.979	Roads closed to wheeled motorized vehicles yearlong (06-Res) Open to over-snow motorized vehicles 12/2-10/14 (06-Res) (Alt 1). Open to over-snow motorized vehicles 12/2-5/15 (06-Res) (Alt 2,3,4)	1.87	0	1.87	1.87
1856	4.108 to 5.979	Roads open to highway legal vehicles 10/15-12/1 (07-Res). Open to over-snow motorized vehicles 12/2-5/15 (07-Res)	0	1.87	0	0
1836	0 to 1.274	Roads closed to wheeled motorized vehicles yearlong. Open to over-snow motorized	1.274	1.274	1.274	1.274

Route Number	CDNST Segment by Mile Marker	Designation	Alt. 1 Existing Condition (miles)	Alt. 2	Alt. 3	Alt. 4
		vehicles 12/2-10/14 (06-Res) (Alt 1). Open to over-snow motorized vehicles 12/2-5/15 (06-Res) (Alt 2,3,4)				
337	40.188 to 41.019	NM Trail	0.831	0.831	0.831	0.831
495-B1	0 to 0.52	Roads closed to wheeled motorized vehicles yearlong. Open to over-snow motorized vehicles 12/2-10/14 (06-Res) (Alt 1). Open to over-snow motorized vehicles 12/2-5/15 (06-Res) (Alt 2,3,4)	0.52	0.52	0.52	0.52
495	4.191 to 10.688	OHL	6.49	6.49	6.49	6.49
337	48.038 to 56.94	NM Trail	8.902	8.902	8.902	8.902

Table 9 - CDNST Segment Designations (miles) Alternative 5 Only

Route #	Beginning Mile Post	Ending Mile Post	Alternative 5	Miles
136	0	1.338	OLD TRAIL	1.338
622	0	2.593	OLD TRAIL	2.593
337	0	5.526	NOMTR	5.526
495	0	11.936	OLD TRAIL	11.936
337	5.526	6.122	NM	0.596
337	6.122	6.28	OPEN-HWY LEGAL	0.158
337	6.28	7.558	P-NM	1.278
337	7.558	12.308	OPEN-HWY LEGAL	4.75
337	12.308	16.005	CO	3.697
337	16.005	16.136	OPEN-HWY LEGAL	0.131
337	16.136	18.153	P-NM	2.017
337	18.153	21.139	NM	2.986
337	21.139	21.426	NM	0.287
337	21.426	22.746	NM	1.32
337	22.726	26.675	NOMTR	3.949
337	26.675	29.322	05-RES	2.647
337	29.322	30.063	STATE	0.741
337	30.063	30.676	OPEN-HWY LEGAL	0.613
337	30.676	36.097	NOMTR	5.421
337	36.097	37.097	NM	1
337	37.097	42.712	P-OPEN-HWY LEGAL	5.615
337	42.712	43.595	P-NM	0.883
337	43.595	51.001	NOMTR	7.406

Unauthorized Routes

As reflected in the summary of miles of motorized uses table(s) above:

Under the No Action alternative, permissible motorized uses include those routes and areas not otherwise prohibited.

Alternatives 2, 3 and 4 would all designate additional unauthorized routes that would be added to the Forest Transportation System. Any existing unauthorized routes not identified or included under these alternatives would be considered closed.

Alternative 5 would designate unauthorized routes to be added to the Forest Transportation System for non-motorized use. All routes, including unauthorized routes, not identified or included in this alternative as part of this planning effort, as well as any future created routes, would be considered closed and would be physically closed without additional NEPA.

Access to Dispersed Campsites

Under the existing condition, alternative 1, the 2001 Tri-State Decision allowed off-vehicle camping within 300 feet of roads and motorized trails; but, required visitors to select campsites by non-

motorized means and access the campsites by the most direct route causing the least damage. Parking safely adjacent to a road or motorized trail within 30 feet from the edge of the road or motorized trail is also permitted under the existing condition.

Under Alternatives 2 and 3, parking safely adjacent to a road within 30 feet from the edge of the road or motorized trail would be allowed. In addition, wheeled motorized vehicle travel for camping or parking associated with camping would be allowed within 300 feet of designated system routes, including roads and trails (unless signed otherwise or specifically closed) as long as:

- No new permanent routes are created by this activity;
- No damage to existing vegetation, soil, or water resource occurs;
- Travel off-route does not cross streams; and
- Travel off-route does not traverse riparian or wet areas.

Access to dispersed camping is identified as an acceptable use in the planning area under the 2001 Tri-State Decision and the 2005 Travel Management Rule. Agency personnel have observed that, in general, this has occurred without causing unacceptable resource damage. Where site-specific issues have occurred, emergency closures were issued for resource protection. The Forest Service has this tool available when needed; therefore, the Helena National Forest is proposing to continue this practice under alternatives 2 and 3.

Alternative 4 would permit wheeled motorized vehicle travel within 300 feet of designated system routes, including roads and trails (unless signed otherwise). It would allow motorized travel in this zone for legal recreational activities, in addition to camping and parking associated with dispersed camping. Legal recreation activities include, but are not limited to, parking, camping, big game retrieval, hiking, hunting, or firewood gathering. These activities would be allowed as long as:

- No new permanent routes are created by this activity,
- No damage to existing vegetation, soil, or water resource occurs,
- Travel off-route does not cross streams and
- Travel off-route does not traverse riparian or wet areas.

Alternative 5 would no longer permit wheeled motorized vehicle travel within 300 feet of designated system routes, including roads and trails. In response to comments received on the DEIS, additional field review of dispersed sites occurred during the 2014 field season. We found the number of routes being developed for dispersed camping and firewood cutting have increased. As a result we're seeing an increase in ground disturbance as a result of the 300 foot rule. This is a concern from a resource perspective. For example: It's a concern from a weed treatment perspective due to the high cost and limited funds available to treat beyond primary designated routes. Debris cleanup at these sites also impacts our recreation program and reduces funding available to maintain and improve the other aspects of the program. Alternative 5 addresses this concern by permitting wheeled motorized vehicle travel up to 30 foot from water and 70 foot from a designated route while still allowing for many of the historic dispersed campsites, greater than 70 feet from the road to remain. These historic dispersed sites where travel off a designated route would be allowed would be mapped and displayed for the public.

Therefore, alternative 5 would permit parking and motor vehicle use associated with dispersed camping no more than 70 feet from the edge of a designated route as long as:

- No new permanent routes are created by this activity;
- No damage to existing vegetation, soil, or water resources i.e., damage to live trees and shrubs, rutting and eroding of stream banks or bare soil;

- Travel off-route does not cross streams;
- Travel off-route does not traverse riparian or wet areas; and
- Vehicles travel to and parking associated with dispersed campsites would be limited to no closer than 30 feet of a stream or body of live water.

Dispersed campsites located more than 70 feet from the edge of a designated route that are identified on the alternative 5 map would remain open for dispersed camping and parking associated with dispersed camping. The five items identified under the access to dispersed campsites up to 70 feet from a designated route section are applicable for this as well.

Proposed Forest Plan Programmatic Amendment for Big Game Standard 4a

The following tables compare the elk security within security blocks and intermittent refuge areas within the Divide Travel Planning area with alternative A being the existing condition alternative and alternative B being the proposed alternative. The following tables also compare how the Travel plan alternatives affect big game security.

Table 10 - Elk Security during the Hunting Season (9/1 – 12/1) under Alternative B by Travel Plan Alternative

Elk Herd Unit	Total Acres within Admin Boundary	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Acres of Elk Security	% of EHU (within boundary)	Acres of Elk Security	% of EHU (within boundary)	Acres of Elk Security	% of EHU (within boundary)	Acres of Elk Security	% of EHU (within boundary)	Acres of Elk Security	% of EHU (within boundary)
Black Mountain – Brooklyn Bridge	35,874	5,781	16	5,785	16	5,785	16	5,785	16	5,788	16
Greenhorn	21,693	1,494	7	2,134	10	4,892	23	5,323	25	6,563	30
Jericho	29,364	3,435	12	3,463	12	4,791	16	4,791	16	5,070	17
Little Prickly Pear - Ophir	59,311	13,863	23	15,069	25	15,195	26	15,069	25	16,566	28
Quartz Creek	23,036	0	0	0	0	0	0	0	0	0	0
Spotted Dog/ Little Blackfoot	63,561	18,880	30	18,645	29	25,064	39	21,879	34	28,019	44

Table 11 - Elk Intermittent Refuge Areas During the Hunting Season (9/1 – 12/1) under Alternative B by Travel Plan Alternative

Elk Herd Unit	Total Acres within Admin Boundary	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Acres Inter. Refuge Area	% of EHU (within boundary)	Acres Inter. Refuge Area	% of EHU (within boundary)	Acres Inter. Refuge Area	% of EHU (within boundary)	Acres Inter. Refuge Area	% of EHU (within boundary)	Acres Inter. Refuge Area	% of EHU (within boundary)
Black Mountain – Brooklyn Bridge	35,874	1,738	5	1,738	5	1,738	5	1,738	5	1,738	5
Greenhorn	21,693	970	4	1,473	7	803	4	803	4	308	1
Jericho	29,364	923	3	886	3	0	0	0	0	0	0
Little Prickly Pear - Ophir	59,311	0	0	0	0	0	0	422	1	588	1
Quartz Creek	23,036	1,124	5	1,124	5	1,124	5	1,124	5	1,396	6
Spotted Dog/ Little Blackfoot	63,561	2,400	4	661	1	1,397	2	1,100	2	1,090	2

Table 12 - Public Motorized Use and Elk Herd Units

Percentage of Elk Security within that Portion of an Elk Herd Unit within the Helena Ranger District Administrative Boundary by Travel Plan Alternative					
Herd Unit	Alt 1 Security %	Alt 2 Security %	Alt 3 Security %	Alt 4 Security %	Alt 5 Security %
Black Mountain–Brooklyn Bridge	16	16	16	16	16
Greenhorn	7	10	23	25	30
Jericho	12	12	16	16	17
Spotted Dog - Little Blackfoot	30	29	39	34	44
Little Prickly Pear—Ophir	23	25	26	25	28
Quartz	0	0	0	0	0

Table 13 – Public Motorized Use and Intermittent Refuge Areas

Percentage of Intermittent Refuge Areas within that Portion of an Elk Herd Unit within the Helena Ranger District Administrative Boundary by Travel Plan Alternative					
Herd Unit	Alt 1 % Intermittent Refuge Area	Alt 2 % Intermittent Refuge Area	Alt 3 % Intermittent Refuge Area	Alt 4 % Intermittent Refuge Area	Alt 5 % Intermittent Refuge Area
Black Mountain - Brooklyn Bridge	5	5	5	5	5
Greenhorn	4	7	4	4	1
Jericho	3	3	0	0	0
Spotted Dog - Little Blackfoot	4	1	2	2	2
Little Prickly Pear - Ophir	0	0	0	1	1
Quartz	5	5	5	5	6

CHAPTER 3 - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Introduction

This chapter presents the relevant resource components of the existing environment – the baseline environment. It describes the resources of the area that would be affected by the alternatives. This chapter also discloses the environmental effects of implementing the alternatives. These form the scientific and analytical basis for comparing the alternatives described in Chapter 2.

Chapter 3 explains the basic components of the analysis followed by a section on each resource. This should provide the reader a better understanding of the overall motorized routes and designations for wheeled and over-snow motorized vehicles within the Divide travel planning area. Acre and mileage totals are approximate within tables and text due to rounding.

The purpose of this analysis is to compare alternatives, not to make predictions about the future. The analysis in this chapter focuses on the effects of the proposed changes to the current designated system. It does not analyze the effects of the whole designated system.

This FEIS looks at effects within the Divide Travel Planning area. The effects of proposed changes to the Divide Planning area were aggregated rather than describing the site-specific effect at each road or trail. For instance, specialist's reports describe the overall effects of reducing or allowing places people could drive instead of listing every route and predicting the effects at a particular site.

Most specialists used Geographic Information System (GIS) to calculate the miles and areas affected, or to model habitats. If specialists used models other than GIS, it will be described in their report.

It was assumed that motorized use would occur where it is proposed. In doing so, the effects analysis describes the effects resulting from the change between where people are currently driving (alternative 1) and where people would drive (alternatives 2 through 5).

Affected Environment

An effects analysis starts by describing the affected environment. As the name implies, this section describes those parts of the environment or project area that would change as a result of implementing the action alternatives. The CEQ describes it this way:

"*The environmental impact statement shall succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration. The descriptions shall be no longer than is necessary to understand the effects of the alternatives.*" (40 CFR 1502.15).

In this project, the Helena National Forest proposes to close some roads and trails to motorized use and prohibit driving off designated routes, with the exception of some proposed provisions for motorized travel within 300 feet of a designated route within the Divide Travel Planning Area. The affected environment, then, would relate to things that would change by opening or closing roads to wheeled motorized and over-snow vehicle travel, such as wildlife habitat and recreational opportunities.

Past Actions

The interdisciplinary team considered the effects of past actions as part of the existing condition. The current conditions are the sum total of past actions. The CEQ recognizes "*agencies can conduct an*

adequate cumulative effects analysis by focusing on current aggregate effects of past actions without delving into the historical details of individual past actions" (Council on Environmental Quality 2005). Innumerable actions over the last century and beyond have shaped the Helena National Forest's current designated road system within the Divide Travel Planning Area. Attempting to isolate and catalog these individual actions and their effects would be nearly impossible. By looking at current conditions, the effects of past human actions and natural events, regardless of which event contributed to those effects are captured. Listing the past actions, however, can show trends. On balance, some past actions increased the amount of motorized use in the Divide Travel Planning Area and others decreased it.

Environmental Consequences

The impact analysis and conclusions contained in this chapter were based on forest staff knowledge of the resources and site, reviewing existing literature and agency studies, information provided by specialists within the Forest Service and other agencies and professional judgment. The methodology section for each resource describes additional specific data collection or analysis or other methods used for that resource.

Potential impacts in this chapter are described in terms of type (direct, indirect, cumulative and are the effects beneficial or adverse?); context (are the effects site specific, local or regional?); duration (are the effects short term or long term?) and intensity.

The CEQ lists different kinds of effects that need to be analyzed under the NEPA:

- Direct effects are caused by the action and occur at the same time and in the same location as the actions that cause them.
- Indirect effects are caused by the action and are later in time or farther removed in distance, but still reasonably foreseeable.
- Cumulative effects are the sum of the incremental impacts from the action combined with other actions (past, present and reasonably foreseeable future actions in or near the area). These are described in the next section.

Effects can be both beneficial and detrimental (40 CFR 1508.8). For example, this travel management project, closing roads to motorized use could improve wildlife habitat (beneficial effect for wildlife species) and reduce the amount of motorized recreational opportunities (detrimental impact to riders).

The regulations do not require agencies to separate the direct and indirect effects, so in this document we describe them together by resource. Cumulative effects have their own section by resource.

For the purposes of this analysis, short-term effects are those expected within the next one to 10 years (throughout the course of project implementation) and long-term effects are those that are expected between 10 and 20 years or more (after implementation is complete) unless specifically defined in individual resource sections that follow.

Cumulative Effects

The definition of cumulative impact according to the CEQ is:

" '*Cumulative impact' is the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.*" (40 CFR 1508.7).

To be cumulative, effects must overlap in space and time. Cumulative impacts are important because they could cause a tipping point, either beneficial or detrimental. To analyze cumulative effects, the interdisciplinary team looked at the effects from this proposal and added them to the effects from past, present and reasonably foreseeable future actions.

Reasonably Foreseeable Actions

Courts have interpreted a "reasonably foreseeable future action" as one that has been proposed and is in the planning stages. To analyze the cumulative effects of present and reasonably foreseeable future actions, each resource specialist looked at the list of projects in Appendix B. They identified the ones expected to cause effects to their resource, at the same time and in the same place as effects from the proposed action or alternatives. Some specialists analyzed additional actions that pertained only to their resource.

Consistency with Adjacent National Forest Travel Management Planning

The southwest corner of the Divide Travel Plan Area on the Helena National Forest (HNF) shares a common boundary with the Beaverhead-Deerlodge National Forest (B-D NF). This boundary includes the Electric Peak Inventoried Roadless Area and the Kading/Limburger Springs area located on the Helena National Forest. Please see the map below.

The Electric Peak Inventoried Roadless Area is located on both the Helena and Beaverhead Deerlodge National Forests and is identified as recommended wilderness in both Forest Plans. Proposed Travel management for this area is consistent in all five alternatives for the Divide Travel Plan Area and coincides with current management direction on the adjacent B-D NF.

The Helena National Forest Kading Grade/Limburger Springs area is also adjacent to the B-D NF. Over-snow vehicle management for this area is consistent with the B-D NF with both areas being open to over-snow motorized vehicle use. The adjacent lands administered by the B-D NF are closed to over-snow motorized use from 10/15 through 12/1, which is consistent with Divide alternative 1. Divide alternatives 2 through 5 propose closure to over-snow motorized use from 5/16 through 12/1 for resource protection.

However, proposed wheeled motorized use for the Kading/Limburger Springs area varies in the Divide Travel Plan between the five alternatives and is intended to be consistent with adjacent management on B-D NF. Those variations are described in further detail below. Motorized Trail 502 located within the Divide Travel Plan, connects to B-D NF Forest System Route (FSR) 5182 which would be managed as a non-motorized route from October 15 to December 1 and non-motorized trail 8130. (Please refer to the map that follows in addition to the Divide alternative maps.) The variations are as follows:

- Alternative 1 (No Action/Existing Condition): Motorized trail route (MTR) 502 located within the Kading/Limburger Springs area connects the Helena National Forest to the neighboring B-D NF Route 5182. MTR 502 is open to wheeled vehicles 50 inches or less in width from May 16 to October 14.
- Forest System Route 1868, located on the Helena National Forest, also connects to BD NF route 5182. FSR 1868 is currently open to wheeled motorized vehicles June 1 through August 31. The B-D NF closed Route 5182 to motorized vehicles from May 16 through December 2 under their 2010 Forest Plan Revision. As a result, these two

routes are not consistent with the B-D NF travel management system where routes from the Helena National Forest connect to FSR 5182 located on the B-D NF.

- Alternative 2: Management of the wheeled motorized routes in the Kading/Limburger Springs Area would remain the same as alternative 1. However, FSR 1868 would only be open to wheeled motorized vehicles 50 inches in width and less from May 16 through October 14. The B-D NF closed Route 5182 to motorized vehicles from May 16 through December 2 under their 2010 Forest Plan Revision. Similar to alternative 1, these two routes are not consistent with the B-D NF travel management system where routes from the Helena National Forest connect to FSR 5182 located on the B-D NF.
- Alternatives 3 and 5: MTR-502 and FSR 1868 would be closed to wheeled motorized vehicles year-long and would be consistent with the B-D NF.

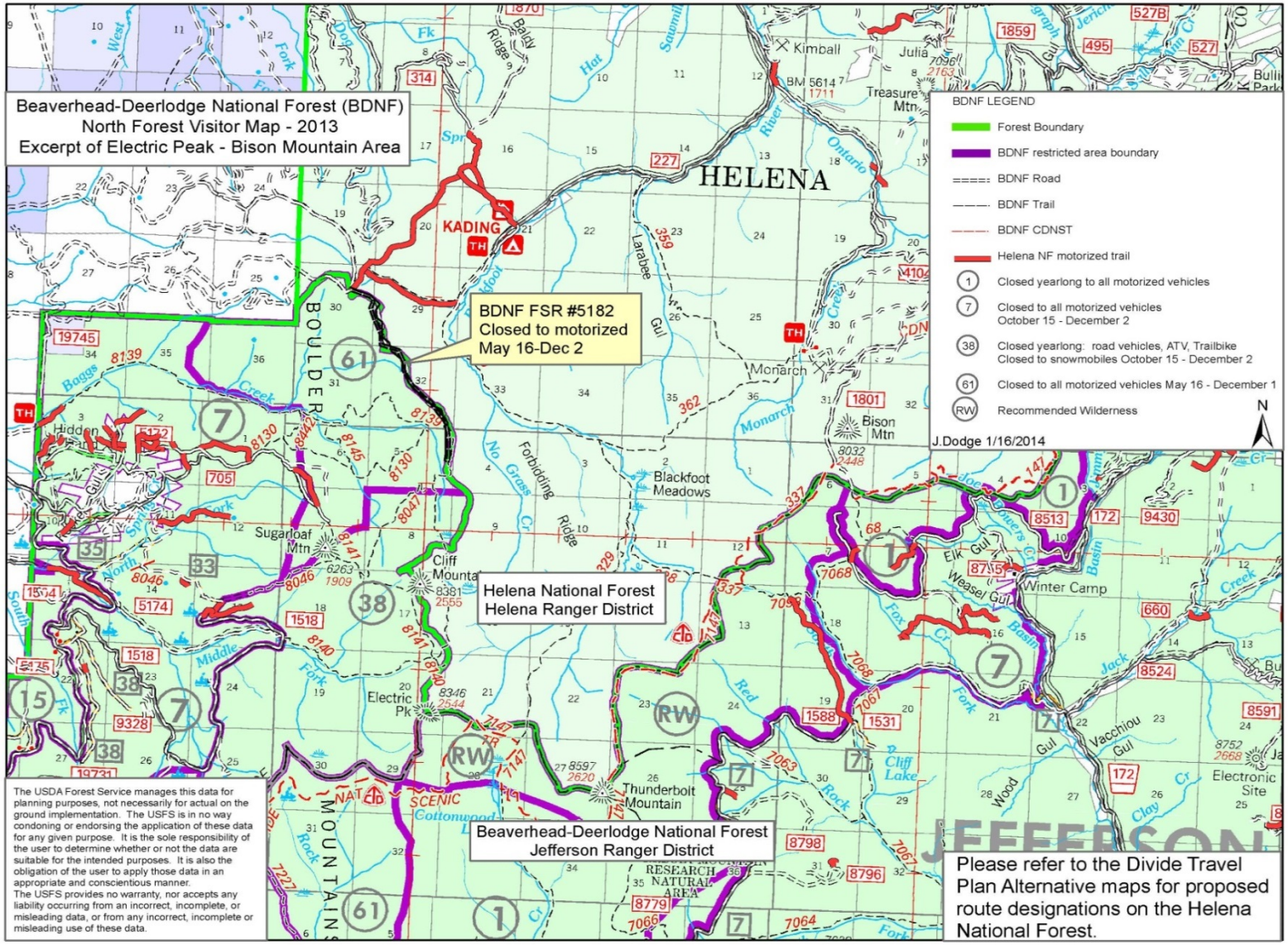

Figure 1: Beaverhead-Deerlodge National Forest – North Forest Visitor Map

Specialist Reports

Relevant resource components from each resource specialist's report are highlighted in this chapter. Components include the existing environment which is the baseline environmental condition as described under alternative 1 (No-Action) and the anticipated environmental effects of implementing the range of alternatives. Please see Appendix A for Forest Plan consistency for each resource.

This FEIS incorporates by reference the Resource Specialist Reports in the Project Record (40 CFR 1502.21). These reports contain the detailed data, executive summaries, regulatory framework, assumptions and methodologies, analyses, conclusions, maps, references and technical documentation that the resource specialists relied upon to reach their conclusions. These reports are summarized in this chapter.

The specialists reports for Lands/Rights of Way and Minerals have not been included in this document as they did not generate concerns from the public, would not be affected by the actions and would still meet Forest Plan consistency requirements. These resource reports have been filed in the project record and are available for review upon request.

Amendment to the Helena National Forest Plan

A proposed programmatic plan amendment to the "Helena National Forest Plan" (Forest Plan) is a component of this analysis as described in Chapter 2 and in full in Chapter 3. By law, the proposed actions must be consistent with the Forest Plan or the Plan must be changed. Amendments to the Forest Plan can have effects because they propose changes in the management of the forest.

Project Record

The Divide Travel Plan Project Record is referenced throughout this document in an effort to keep this document brief and concise as per 40 CFR 1502.21. The Project Record contains a variety of documents, including, but not limited to: specialists' reports, literature, supporting documents and other process-related documents.

RECREATION

Regulatory Framework

The Divide Travel Management Plan analysis and decision is made in accordance with regulations, direction and policy. The increased popularity and widespread use of Off-Highway Vehicles (OHVs) on public lands during the 1960's and early 1970's prompted development of unified federal policy that started with executive orders (EO) 11644 in 1972 and EO 11989 in 1977. Forest Service (FS) regulations, created to implement the above EO and govern the forest transportation system, are located in the 36 Code of Federal Regulations (CFR), Part 212.

Forest Service recreation management is guided by a Recreation Opportunity Spectrum (ROS), which provides the basic framework for inventorying, planning and managing recreation resources in accordance with the Forest and Rangeland Resources Planning Act of 1974 (RPA), as amended by the National Forest Management Act of 1978 (NFMA). ROS is a conceptual scheme that identifies seven categories which represent a mix or combination of recreational activities, settings and experience opportunities along a spectrum from Primitive to Urban. In addition, this report was developed by the principle elements from the Council on Environmental Quality (40 CFR parts 1500-1508).

Forest Plan

The Forest Plan (1986) directs management of all federal lands within the Divide Travel Planning Area. It establishes Forestwide goals, objectives and management area (MA) direction for multiple uses of the renewable resources as well as standards and guidelines to assure sustained land productivity and environmental protection.

The Forest Plan states that most existing roads would be left open. It further states generally, the Helena National Forest would be open to vehicles except for roads, trails or areas which have restrictions. Forestwide goals and objectives, pages II/1 and II/6 of the Forest Plan, discuss how roads and trails will help to meet forest land and resource objectives and visitor needs. Other forestwide resource goals and objectives identify how the transportation system can help meet those needs. Forestwide goal #15 on page II/2 in the Forest Plan directs development and implementation of a road management program with road uses and travel restrictions that are responsive to resource protection and public concerns.

The Helena National Forest has been divided into 23 management areas each with different management goals, resource potential and limitations. Travel plan decisions will be made in accordance with established goals and standards of each management area.

Forest Plan Amendment #20, derived from the 2001 Tri State OHV Record of Decision (ROD), allows wheeled motorized use on existing open routes or areas with all other National Forest System lands restricted from off-route motorized use. (reference section below)

Management policy and direction is also provided in Forest Service Manuals (FSM) and Handbooks (FSH). In particular, FSM 7700 (Travel Management) and FSM 2300 (Recreation, Wilderness and Related Resource Management) provide specific direction related to the management of Forest Service roads and trails.

Forest Service/BLM Off-Highway Vehicle Record of Decision 2001 (2001 Tri State OHV ROD)

In January 2001, the Forest Service (FS) and Bureau of Land Management (BLM) issued a joint off-highway vehicle decision which facilitated amendment #20 of the Helena Forest Plan. This decision restricted wheeled motor vehicles to existing roads, trails and designated areas; however, it allows motorized travel to access dispersed campsites up to 300 feet off existing motorized routes. The 2001 Tri-State OHV Decision also directed National Forests to establish a schedule for completing site-specific travel planning that would designate appropriate uses on all system and non-system roads and trails.

Until site-specific planning is accomplished, the OHV amendment restricts wheeled motorized vehicles to routes that existed prior to 2001. The OHV amendment provides guidance on motorized use extending from 4-wheel drive routes to single track motorcycle trails.

Travel Management Rule of November 2005 (2005 Travel Rule)

Federal Regulations identified in 36 CFR parts 212 and 295 were combined and clarified as 36 CFR part 212 under the *Travel Management Rule; Final Rule of November 2005*. The 2005 Travel Rule requires National Forests to designate those roads, trails and areas that are open to motor vehicle use on National Forest System (NFS) lands. The final rule prohibits the use of wheeled motor vehicles off the designated system. As a result, individual Forests are required to conduct a site-specific analysis to determine the designated motorized route system and areas (36 CFR, Part 212, Sub-part B).

Continental Divide National Scenic Trail Comprehensive Plan

On October 2, 1968 Congress enacted the National Trails System Act which established a nationwide trail system. On November 10, 1978 Congress amended the National Trails System Act to establish and designate the Continental Divide National Scenic Trail (CDNST). The Continental Divide Trail Comprehensive Plan was approved by the Chief of the Forest Service in 1985. The U.S. Forest Service goal of the Comprehensive Plan was to provide a uniform Trail Management Program, which reflected the purposes of the National Scenic Trail System and at the same time allowed for the use and protection of the natural and cultural resources found along the designated route on lands of all jurisdictions. In an effort to clarify the Comprehensive Plan Direction, the Deputy Chief of the Forest Service sent correspondence to Regional Foresters in 1997 that stated, "as the CNSDT is further developed, it is expected that the trail will eventually be relocated off of roads for its entire length". That memorandum further stated, "it is the intent of the Forest Service that the CDT will be for non-motorized recreation". CDT segments can be open to motorized use but only in limited situations and based upon specific criteria.

Additional direction for the CDNST was also provided in a Forest Service Manual Amendment (dated October 6, 2009). It provided the following guidelines applicable to this travel plan analysis which should be considered.

(1) Manage the CDNST to provide high-quality scenic, primitive hiking, pack and saddle stock opportunities. Backpacking, nature walking, day hiking, horseback riding, nature photography, mountain climbing, cross-country skiing and snowshoeing are compatible with the nature and purposes of the CDNST (FSM 2353.42). Use the Recreation Opportunity Spectrum (ROS) and the ROS Users Guide in delineating and integrating recreation opportunities in CDNST unit plans and managing the CDNST (FSM 2311.1). Where possible, locate the CDNST in primitive and semi-primitive non-motorized ROS classes to provide for continuous travel between the Montana-Canada and New Mexico-Mexico borders. Locate a CDNST segment on a road only where it is primitive and offers recreational opportunities comparable to those provided by a trail with a Designated Use of Pack and Saddle Stock, provided that the CDNST may have to be located on or across designated routes because of the inability to locate the trail elsewhere (FSM 2353.44b, paragraph 11).

(2) Motor vehicle use by the general public is prohibited on the CDNST, unless that use is consistent with the applicable CDNST unit plan and:
   (a) Is designated in accordance with 36 CFR Part 212, Subpart B and:
      (1) The designated vehicle class and width were allowed on that segment of the CDNST prior to November 10, 1978 and the use will not substantially interfere with the nature and purposes of the CDNST (FSM 2353.42) or
      (2) The designated segment was constructed as a road prior to November 10, 1978; or
   (b) In the case of over-snow vehicles, is allowed in accordance with 36 CFR Part 212, Subpart C and the use will not substantially interfere with the nature and purposes of the CDNST (FSM 2353.42).

Assumptions

Under all four action alternatives, existing snowmobile routes located on Forest roads would be closed to wheeled motorized vehicles when they are groomed.

The Divide Travel Plan decision will include only open or closed determinations – no decommissioning measures will be specified in this decision.

Any route designated 06; closed year-long to wheeled vehicles, may potentially be fully decommissioned in a separate NEPA analysis and decision.

Any existing route not identified as a Helena National Forest system route in this travel plan decision would be considered a non-system route and would be available for decommissioning.

OHV refers to all wheeled motorized vehicles 50 inches and less in width.

Undetermined roads and trails are the same as unclassified, unauthorized and/or user created, the terms are interchangeable. While these routes are not part of the National Forest System routes, as per the 2001 Tri-State OHV Decision, if a route was on the ground prior to 2001, it needs to be recognized as existing until a site-specific analysis is complete to determine if it should be incorporated into the National Forest System. This travel plan is a site-specific plan that will analyze the various undetermined roads and trails and determine if the route should be incorporated into the National Forest road and/or trail system or decommissioned as per the Tri-State Decision.

Information Used

Existing road and trail information was acquired from the Helena National Forest Transportation System in addition to Forest Service employee field observations, input from the public and user groups. This information coupled with GIS data was obtained to provide spatial information about designated system roads, trails, Inventoried Roadless Areas and the Recreation Opportunity Spectrum to reflect the existing motorized roads and trails for analyzing as per the 2001 Tri-State Decision.

Recreation use information has been obtained from a variety of sources. Research papers, publications and survey information relative to trends or estimated use was acquired for this analysis through the documents identified below. It should be noted that information referenced is not specific to the Divide Travel Management Area. The Helena Forest does not generally obtain or document visitor use except at developed recreation fee sites.

- National Visitor Use Monitoring Results FY 2008 for Helena National Forest
- Outdoor Recreation In America 2000 (Addressing Key Societal Concerns) by Roper Starch
- Off-Highway Vehicle Use on National Forests: Volume and Characteristics of Visitors (5 August 2004)
- Off-Highway Vehicle Recreation in the United States, Regions and States (June 2005) by USDA Southern Research Station
- Montana Tourism & Recreation Strategic Plan 2008 – 2012
- Statistics from the Department of Justice: Title & Registration Bureau
- Recreation Facility Analysis, Helena National Forest (2008)
- Recreation on Federal Lands, Congressional Research Service (February 25, 2009)
- Roads Analysis Report; Helena National Forest (2002-20004)
- 2008 Helena National Forest Recreation Facility Analysis

Information was also gathered from past and current travel plan efforts on the Helena National Forest. In 2008, the Forest received over 300 comments in response to the Divide Travel Proposal. This input was utilized to document public opinion about travel in the Divide Area and to develop additional alternatives.

Methodology and Scientific Accuracy

Data was gathered to describe the existing condition and for use as baseline information to analyze direct, indirect and cumulative effects among the alternatives.

NEPA effects analysis is both quantitative and qualitative. The status of available road and trail miles provides a quantitative view of project effects by alternative. The extent of effects on travel routes and other recreation opportunities is necessarily a qualitative assessment based on past forest visitor patterns, historical trends and the experience of the recreation specialists completing this analysis.

Recreation, Affected Environment

Introduction

The popularity and use of OHVs in Montana and in the Helena area continues to increase, as is evidenced by the number of those vehicles observed on the National Forest. With the exception of one year (2000), the number of registered OHVs in Montana increased annually from 1990 through 2008.

Motorized use of public roads and trails in the Divide Travel Plan Area is an important recreation activity for many. Motorized use is also an important administrative tool for: livestock management, spraying noxious weeds, minerals management and vegetation management. The perceived “best” allocation of recreation opportunities in the analysis area, including motorized travel, varies with the backgrounds, interests and personal biases of different forest users.

Analysis Area

The analysis area consists of National Forest System lands in the Divide Travel Management Area. This includes approximately 155,480 acres of public land located in Lewis & Clark and Powell counties. The area encompasses Black Mountain and extends from the Tenmile drainage west to the Little Blackfoot and Bison Mountain area.

The Divide Travel Plan Area, located on the Helena Ranger District, is popular for recreation throughout the year. This is due in large part to the proximity of local communities in Helena, Elliston, Avon, Montana City and Clancy.

Forest roads provide important access for and to a variety of recreation opportunities. Many forest visitors are primarily interested in viewing scenery and wildlife from the comfort of their vehicles. For others, roads provide access for hunting, camping, hiking, fishing and a variety of other recreation activities. Some of the existing national forest roads within the Divide Travel Plan Area are maintained routinely and provide motorized vehicle access. However, other roads are not maintained to passenger vehicle standards and require high clearance vehicles.

The Divide Travel Plan Area is a popular area for winter recreation, especially over-snow vehicle use. Designated snowmobile parking within the Divide travel planning area is located at Moose Creek, Sweeny Creek, Mullan Pass, Austin and the Little Blackfoot. The “Helena Snowdrifters” snowmobile club maintains and grooms snowmobile trails during the winter months. There is also a designated parking area that accesses approximately 10 miles of cross-country ski trails located on the east side of MacDonald Pass. The existing trail network is maintained primarily through the volunteer efforts of the Last Chance Nordic Ski Club.

Upland bird hunting, bow hunting and big game hunting season are also very popular with local residents during the fall months. It is not uncommon for hunters to camp at some of the dispersed camping sites within the planning area.

Popular recreation opportunities during the summer and early fall include: fishing, hiking, camping, horseback riding, OHV use, mountain biking and picnicking.

Overnight camping is very popular at the District's developed campgrounds in addition to numerous undeveloped sites within the Divide Travel Plan Area. Most of the frequently used dispersed campsites are located adjacent to a river or stream including: Tenmile Creek, Telegraph Creek and Little Blackfoot River. In many areas, impacts associated with dispersed camping are acceptable and limited to soil compaction, sanitation and litter. However, in several locations resource conditions at the campsites and/or access routes are badly degraded and require rehabilitation. Currently, off-route wheeled motorized travel up to 300 feet is allowed to access dispersed campsites, unless specifically prohibited.

Several developed recreation sites are located on the Helena Ranger District within the Divide Travel Plan Area. There are two trailheads located on MacDonald Pass: one for the cross-country ski trails and another for the Continental Divide National Scenic Trail (CDNST). Also located on the top of MacDonald Pass is the 15 unit Cromwell Dixon Campground. East of the divide are several developed sites located along the Rimini Road. Moose Creek Campground, Ten Mile Day Use Area, Moose Creek Winter Trailhead and Moose Creek Rental Cabin are all located within a short distance of each other and comprise the recreation complex in the Tenmile drainage. There are also developed sites located west of the divide near the Little Blackfoot River: Kading cabin and Kading campground.

Special Use Permits

In addition to the public recreation sites there are two residence tracts that have privately owned cabins located on National Forest lands within the Divide Travel Plan Area that are authorized under terms of a special use permit. The Moose Creek Villa Tract is located along the Rimini Road and consists of five recreation residences. The Forest Heights Tract, near the top of MacDonald Pass, has seven permitted recreation residences. Forest Heights contains two separate roads to provide access to the recreation residences and are only open to authorized cabin permit holders. Permittees cannot use their cabin as a permanent residence and are restricted to use of their site less than six months per calendar year.

The Forest also administers a special use permit to the Prickly Pear Sportsman's Association for a target range located east of MacDonald Pass which is utilized year-long.

West of the divide, along the Little Blackfoot River, is the Lion's Sunshine Camp that is authorized under the organizational camp authorities to the Helena Lion's Club. Use of the Sunshine Camp occurs primarily from May through September.

Designated system trails are also located within the Divide Travel Plan Area. With the exception of over-snow use, none of the trails are managed for motorized travel. All system trails are closed to wheeled motorized use with the exception of two short segments of the Continental Divide National Scenic Trail (see CDNST information below). Non-motorized trails within the analysis area include: Bison-Blackfoot Trail #328, Blackfoot Meadows Trail #329, Continental Divide Trail #337, Switchback Ridge Trail #348, Larabee Gulch Trail #359, Monarch Creek Trail #326, Cave Gulch Trail #371 and Ten Mile Environmental Trail #375.

Little Blackfoot Road #227 ends at a turn-around approximately ¼ mile south of Kading Cabin. At that location an un-improved native surface road (#227-E1) extends approximately 1 mile south to the Kading Grade and the termini of the Blackfoot Meadows Trail #329. Road #227-E1, which contains several large mud holes, is only accessible by high clearance vehicles. Observations by Forest employees suggest less than 50 percent of visitors who use Trail #329 drive vehicles to the end of Road #227-E1. There is existing non-system trails located west of Forest Road #227. These routes existed prior to 2001,

they therefore remain open to motorized vehicles (seasonally). Motorized routes #501, #502, #503 and #504 are open to vehicles less than 50 inches in width from May 16th through October 14th . These non-system trails have become increasingly more popular with individuals camping at Kading Campground and the dispersed sites adjacent to the Little Blackfoot River.

The Forest Plan identified several management areas which consist of large blocks (greater than 3,000 acres) of undeveloped land suited for dispersed recreation. One of those R1 management areas (Mount Helena) is located within the Divide Travel Planning Area. Portions of T9N, R4W, Section 16, 17 and 20 receive minimal recreation use as there are no designated roads or trails in this area.

In an effort to obtain visitor use information the U.S. Forest Service initiated a national visitor use monitoring project (NVUM). The information collected by this project is valid and applicable at the forest, regional and national level.

A growing trend through much of the Helena National Forest, including the Divide Travel Plan Area, is the construction of new residences on private in-holdings. Occupancy of private homes in and adjacent to the Divide Travel Plan Area impacts recreation use on National Forest lands. People residing within the National Forest boundary often use adjacent National Forest lands for their recreation activities. As a result, recreation use has increased in certain locations including the Little Blackfoot River, Telegraph Creek corridors and Sweeny Creek area. In addition, residents that live adjacent to the National Forest are usually concerned about management activities which occur nearby. Forest management and public recreation use can and frequently does impact adjacent homeowners who moved to a rural setting to get away from people and their influences. The increased influx of residents within the Forest boundary has created on-going conflicts in some locations, specifically the Sweeny Creek Area.

In the mid-1990s the Helena National Forest designated special areas for hunters with disabilities. That opportunity allowed qualified individuals with disabilities to hunt from roads that were otherwise closed to motorized travel. The practice was discontinued after several years due to conflicts and mixed public opinion. One of the areas included in the “Hunter Access Program” was the Hahn Creek Road (#1856) segment located behind a locked gate. Although that opportunity is no longer available on the Helena National Forest, employees still receive numerous requests to provide special motorized opportunities for the elderly and individuals with disabilities, especially during the big game hunting season. In addition, people also request designation of game retrieval routes in many areas which are not currently provided.

The area within the Divide travel plan offers opportunities for both motorized and non-motorized recreation across the Recreation Opportunity Spectrum (ROS). As stated under the Regulatory Framework section, the ROS provides the framework for inventorying, planning and managing the recreation resource. The distribution of the ROS classes in the Divide Travel Plan Area is outlined in the table below. The travel plan area predominately falls into the Roaded Natural, Semi-primitive Motorized and Semi-primitive Non-Motorized categories due to past and current development, such as roads and associated timber harvest, within and near the analysis area. The largest tracks of semi-primitive non-motorized areas are the Inventoried Roadless Areas.

Table 14: Summer ROS Distribution: 2009

Category	Acres	Percent
Semi-primitive Non-motorized	30,620	20 percent
Semi-primitive Motorized	28,532	18 percent
Roaded Natural	78,120	50 percent
Roaded Modified	15,260	10 percent
Rural	2,960	2 percent
Total	155,483	100 percent

Recreation Issues of Concern

Past travel plan analysis and public scoping identified several key issues specific to the Divide Travel Plan Area. Key emphasis issues and/or areas included: Motorized Use; the Continental Divide National Scenic Trail; Sweeny Creek area; and Kading area.

Motorized Use

It is very unlikely that forest visitors would travel long distances to seek motorized recreation opportunities in the Divide Travel Plan Area. Because potential motorized opportunities in the Divide Travel Plan Area are minimal, effects analysis will be limited to those applicable to the Helena National Forest.

Approximately 286 miles of designated roads within the analysis area are currently open to highway legal vehicles year-long. In contrast, there are 85 miles of Forest roads that are closed to all motorized vehicles year-long, including over-snow machines. The remaining 42 miles of road (not including county roads) within the analysis area are closed year-long to wheeled motorized travel but open to over-snow vehicles from December 2nd through October 14th. It's important to note that most Forest roads provide motorized access to a variety of recreation opportunities.

Of the approximately 85 miles of Forest roads closed to all motorized vehicles year-long, the areas adjacent to approximately 74 miles of these roads are currently open to over-snow vehicles. While it is currently illegal to operate an over-snow vehicle on these roads, it is perfectly legal to operate over-snow vehicles adjacent to the road prism. This has presented re-occurring management problems on the Forest, especially travel violations.

The Divide Travel Plan Area also contains approximately 140 miles of designated snowmobile trails. About 100 miles are regularly groomed and the other 40 miles are groomed occasionally. The majority of snowmobile trails in this area are located on existing roads. A current travel restriction, applicable within the analysis area and throughout the Helena Ranger District, prohibits wheeled motorized vehicles over 50 inches wide from operating on designated snowmobile trails when they are groomed. In addition, snowmobiling also occurs on National Forest lands within the Divide Travel Plan Area which are open to that use. Currently there are about 122,844 acres that are open to snowmobiling with no or only seasonal restrictions. This equates to approximately 79 percent of the total National Forest acres in the analysis area. As stated above, a current and unresolved travel restriction issue is the presence of Forest roads which are closed to over-snow vehicle travel located within areas open to that use.

Currently the Divide Travel Planning Area does not have any designated wheeled motorized trails identified on the Forest Transportation Inventory. However, there are approximately 12 miles of trail that are currently open year-long to wheeled motorized vehicles 50 inches in width or less. There are also seven miles of trail that are open to wheeled motorized vehicles 50 inches in width or less from

May 16th through October 14th. In addition, there about 16 miles of unauthorized roads and trails open to wheeled motorized travel.

The seven miles of trail noted above, occur on routes that were in existence prior to 2001. Wheeled motorized vehicle use occurs on the following routes near Kading campground: Road-501, MTR-502, MTR-503 and MTR-504 (please see the Kading area discussion below).

A popular area for off-highway vehicle use is Sweeny Creek. While use is currently managed in accordance with the Tri-State OHV Decision, there are concerns about the amount and type of motorized use occurring in the Divide Travel Planning Area and the associated impacts.

Although not formally documented, there are routine travel plan violations which occur in some areas. Located near Bison Mountain, NFSRs 1801-A1 and 1801-A3 are closed to over-snow motorized vehicles but continue to receive that use each winter. Those roads (once part of the CDNST) provide access to trails on the Beaverhead-Deerlodge National Forest.

Additionally, OHV's which are allowed on the Kading Grade from May 16th through October 14th also travel onto adjacent lands on the Beaverhead-Deerlodge National Forest which are closed to wheeled motorized travel.

Continental Divide National Scenic Trail

The Continental Divide National Scenic Trail (CDNST), which extends through the Divide Travel Plan Area, is nationally designated and recognized as an important recreation destination/opportunity. Travel planning in the analysis area may provide an opportunity to make CDNST travel decisions which would move the Helena Forest toward greater compliance with national direction for the trail. The current route on the Helena Ranger District extends approximately 56 miles from Nevada Mountain south to Thunderbolt Mountain. This portion of the CDNST is a combination of individual segments that are located on: jeep trails, single track trails, county roads, private roads, open Forest Service roads and roads closed to motorized travel. The CDNST on the Helena Ranger District consists primarily of roads (52 miles, all of which are in the planning area). About 19 miles of the existing CDNST road segments are closed to wheeled motorized travel. The CDNST is also comprised of several single track trail segments totaling approximately four miles in length. Although these single track trail segments are not managed for motorized use, that use is not prohibited. Due to the various locations of route segments and intersections it can be extremely difficult to follow the CDNST through the Helena Ranger District. Popularity and use of the CDNST on the Helena Forest is growing, both locally and with visitors who seek to travel longer segments of the trail. See CDNST map in the map packet at the end of the document.

Sweeny Creek Area

The Sweeny Creek area has been identified through public input (both written and verbal) as a specific area of concern. That area is adjacent to the Forest boundary and a growing number of privately owned homes. As a result, Sweeny Creek is important to local residents who recreate in that location and/or may be impacted by others recreating there. For many years the area provided recreation opportunities for: hiking, picnicking, camping, folfing (Frisbee golf), group use, nature study and hunting. During the past 10 years the Sweeny Creek area has grown increasingly popular for OHV use (ATVs and trail bikes), paint ball activities, mountain biking and horseback riding. Increased recreation use has displaced some recreationists and raised concerns with local residents about unacceptable resource and social impacts. In particular, residents have expressed frustration with the noise, dust, vandalism, litter, loss of vegetation and soil erosion that is occurring as a result of some recreation activities.

Wheeled motorized vehicles are used on constructed roads and other routes within the Sweeny Creek area. Those routes are designated as motorized trails (MTR) on Alternative Maps 1 and 2: MTR-001, MTR-004, MTR-008, MTR-011, MTR-016, MTR-017, MTR-018 and MTR-021. Other routes in the Sweeny Creek area were not carried forward in any of the alternatives as they didn't meet the definition of a route as per the 2001 Travel Decision. Twenty years ago motorized use on the Sweeny Creek routes was limited to an occasional high clearance vehicle and motorized trail bikes. With the increased popularity of OHVs, motorized use in Sweeny Creek has greatly expanded. It's a popular location for motorized use during the spring because it is snow-free earlier than many other areas on the Forest. While existing travel restrictions mandate wheeled motorized use on existing routes only, violations frequently occur and result in new unauthorized routes and resource damage. The Helena Forest Plan identified most of the Sweeny Creek area as Management Area (MA) T-1 or M-1. An identified management standard for MA T-1 states, "controls on motorized recreation will be implemented where necessary to protect the vegetation, soil and water resources and to prevent road damage". Although the Sweeny Creek area is open to over-snow vehicles, that use is limited due to the lack of a consistent snow base.

Kading Area

The Kading Grade was once a popular route providing motorized access from the Helena National Forest to private lands and the Beaverhead-Deerlodge National Forest. Motorized use on the Kading Grade route has declined. In addition, National Forest lands west of Kading Grade have been closed to OHV use, with the exception over-snow vehicles. NFSR 1868, Kading Grade (MTR-502) and routes 501, MTR-503 and MTR-504 are currently open to wheeled motorized vehicles from May 16th through October 14th. With the exception of the winter season, these routes are primarily used by wheeled motorized vehicles from the middle of summer through the fall hunting season.

Recreation, Environmental Consequences

Effects Common to All Alternatives

Because this is strictly an open or closed decision, future travel decisions would be necessary for actions such as: road or trail re-location, route obliteration and new road or trail construction. Implementation of any travel plan alternative may result in the displacement of an undetermined number of Forest visitors. There may be limited visitor displacement if alternative 1 or 2 are selected because that motorized use currently exists. However, if alternative 3 or 4 is selected, motorized enthusiasts currently using some routes could be displaced to other areas on the Helena National Forest. Alternative 5 is a response to public comment. Motorizes users will be displaced from some areas while at the same time gain long loop opportunities in other appropriate landscapes.

There would continue to be increased public demands for both motorized and non-motorized opportunities. Although it's impossible to predict future economic conditions or social trends, there is an existing demand for more motorized opportunities and additional areas which provide semi-primitive non-motorized recreation.

As per the Tri-State OHV decision site-specific planning at the local level would identify when and where individual roads and trails would be open and closed to various types of use, implementation of any alternative would result in the designation of motorized routes within the Divide Travel Plan Area. Through this decision unauthorized routes would either be closed to motorized travel or added to the Forest transportation inventory.

No motorized routes were designated solely for use by individuals with disabilities during the big game hunting season.

None of the alternatives would facilitate a large motorized trail network sought by some recreationists. Wheeled motorized travel would be restricted to existing routes designated for that use. Off-route travel by wheeled vehicles would be authorized for parking adjacent to existing roads. Wheeled off-route travel would also be allowed to access dispersed campsites but only within 300 feet of open roads/trails and only by taking the most direct route which does not result in resource damage.

The U.S. Forest Service recognizes that vehicles emit greenhouse gases that contribute to global climate change; however, this project does not determine "if" motorized activity occurs within the Divide Travel Plan Area but rather where it may occur. We have seen no evidence to indicate that the general public would meaningfully alter the amount of their motorized use because of the designation of routes on National Forest lands, whether their preferred use is to drive to a trailhead to hike, tour in a passenger vehicle, or to recreate with off-highway vehicles on or off the Forest. Under the action alternatives, fewer routes would be available for motorized use than are currently authorized, but there is no indication that would result in a different amount of motorized use by the general public.

Effects Common to All Action Alternatives

Although new travel restrictions would be less complex and more easily understood, changes would require a period of adjustment for Forest visitors. A change in travel restrictions may initially result in increased violations.

Alternative 1, No Action

Direct and Indirect Effects

Recreation access and opportunities would remain much as they currently exist.

This alternative would not designate any roads that would be open to wheeled motorized vehicles solely during the big game rifle season.

The use of motorized vehicles in some locations may have already displaced some Forest visitors who seek quiet recreation opportunities.

Approximately 16 miles of existing unauthorized routes currently used by motorized vehicles would be added to the Forest transportation inventory.

Motorized access on NFSR #227-D1 would provide limited wheeled motorized vehicle access (with a ford across the Little Blackfoot River) to a trailhead and Miller Cabin in Larabee Gulch. The existing ford is not safe for vehicle travel during most of the year. Although there is no road bridge across the Little Blackfoot River, the short spur road east of the river is currently open to motorized travel.

Motorized Use

The existing non-system motorized routes located in the Kading area would be authorized as designated motorized trails open from May 16th through October 14th. Designation of those routes would result in a need for routine maintenance and possibly reconstruction. These routes would be signed and maintained as system trails. It is reasonable to assume that improvements to those routes would increase motorized use.

Under this alternative approximately 16 miles of existing but non-system routes would remain open to wheeled motorized travel. These routes would need to be added to the Forest transportation system as roads or trails.

Wheeled motorized trails in the Kading area would continue to be restricted from use October 15th through May 15th. This area is currently open to wheeled motorized travel from May 16th through October 14th which could impact bow season and early fall hunting opportunities. For others, the wheeled motorized access offers motorized recreation opportunities. Motorized over-snow travel would remain prohibited on approximately 71 miles of existing Forest roads but would be allowed on land adjacent to those roads

Table 15: Miles of Motorized Travel Routes Under Alternative 1

Route Type	Miles
Roads Open to Hwy Legal Vehicles (No Restrictions)	286
Roads Closed to All Motorized Vehicles (Year-long)	85
Roads Closed to Wheeled Motorized Vehicles (Year-long). Open to Over-Snow Vehicles (12/2 – 10/14)	42
Trails Open to Vehicles 50 inches or Less (No Restrictions)	12
Trails Open to Vehicles 50 inches or Less (5/16 – 10/14)	7
CDNST Non-Motorized (Closed to Wheeled Motorized Vehicles)	19.2
CDNST Open to Wheeled Motorized Vehicles	24.6
CDNST located in an area open to over-snow motorized vehicles	8.0
Acres Open to Motorized Over-Snow Travel	122,844
Identified Unauthorized Roads & Trails Open	16

Continental Divide National Scenic Trail

There are approximately 29 miles of the CDNST in the planning area which are currently open to wheeled motorized travel. Per FSM direction (2300), motorized use should only be allowed on the CDNST if the route and type of use was in existence prior to November 10, 1978. Spur road 136-D1 was identified on the 1977 Helena Forest map as a trail open to motorized vehicles under 40 inches wide. As a result, any wheeled motorized vehicles exceeding 40 inches in width should not be authorized on NFSR 136-D1.

Other motorized segments of the CDNST are roads which existed prior to November 10, 1978. In accordance with recent direction, those routes could continue to serve as segments of the CDNST if they are primitive and motorized use does not substantially interfere with the nature and purposes of the CDNST. Most of the existing motorized segments of the CDNST are located on NFSR #136, 495, 622, 1802, 1802-B2 and 1855. Motorized use on existing CDNST segments would continue as per the current situation. Approximately 19 miles of the CDNST would be closed to wheeled motorized travel. The existing single track trail segments in the vicinity of Priest Pass and Mullan Pass would remain open to motorized trail bikes. In addition, NFSR #136–D1 would remain open to motorized use year-long.

Table 20 under the Conclusions section lists the Continental Divide National Scenic Trail (CDNST) by mileage and proposed designation for each segment within the Divide travel planning area for each alternative. The CDNST map in the map packet coincides with the segments listed on the table at the end of this section.

Sweeny Creek Area

Existing unauthorized motorized routes located in the Sweeny Creek area would become designated motorized trails. It's reasonable to assume that future improvements to those routes would increase motorized use. The designation of motorized routes in the Sweeny Creek area would anger some nearby residents who are concerned about the associated impacts. Conflicts between motorized and non-motorized recreationists could continue or increase.

Kading Area

Under this alternative, NFSR 1868, the Kading Grade (MTR-502) and routes 501, MTR-503 and MTR-504 would remain open to wheeled motorized vehicles 50 inches in width or less from May 16th through October 14th. This motorized activity would provide opportunities for OHV enthusiasts and hunters.

Continued use of several OHV trails in the Kading area may affect the amount and type of visitor use that occurs in Kading Campground, Kading Rental Cabin and at dispersed campsites located along the Little Blackfoot River.

Designation of motorized trails in the Kading area would most likely increase OHV use on portions of the Little Blackfoot Road #227. Rather than trailer OHVs or motor bikes to the trailheads, most motorized users would simply travel from their campsite at Kading Campground or a dispersed site adjacent to the Little Blackfoot Road. Even if those trail vehicles were licensed and street legal, that increased use of a popular Forest Road may present safety concerns that require additional management actions.

Irreversible and Irretrievable Commitments

There are no known irreversible or irretrievable commitments associated with this alternative.

Cumulative Effects

Analysis of cumulative effects on recreation considers the effects of past, present and reasonably foreseeable future activities on the recreation resource. The spatial boundary for the actions considered in cumulative effects is the planning area. For recreation, only activities within the planning area could be expected to add to the impact of the project's activities. Temporally, actions considered date back to pre-1960 actions that are known and date forward to all reasonably foreseeable planned future activities. A list of these actions considered is provided in Appendix B. They include timber harvesting, prescribed burning, road and trail reconstruction, recreational use, mining and private land development.

Prior to 2001, most Helena Forest lands were open to motorized travel unless specifically closed. Through the Tri State OHV decision, management direction changed to prohibit off-route wheeled motorized travel. There was sound resource rationale for that decision but it greatly altered opportunities for motorized recreation on the Helena National Forest. Wheeled motorized travel is now authorized on existing routes only.

The Divide travel decision will be considered in respect to projects within or near the Divide Travel Plan Area and especially to other travel decisions on the Helena National Forest. Past travel decisions made for the Big Belt Mountains, Elkhorn Mountains, Clancy-Unionville Treatment area and Soundwood Salvage area resulted in new motorized use restrictions. Those decisions and future travel decisions for the Lincoln Ranger District would determine not only the motorized trail opportunities provided but also public road access to the Forest.

Other past decisions that have/will contribute to cumulative effects on recreation in this analysis area include: Prickly Pear Sportsmen's Target Range, MacDonald Pass Nordic ski trails, Recreation Residence

Tracts (Forest Heights and Moose Creek Villa), routine use and maintenance of Forest trails, developed recreation sites, MacDonald Pass Vista Point, Tri Arabian Horse Trail Ride, Jericho Mountain CDNST re-route, CDNST reconstruction Phase I, Monarch Creek trail reconstruction, Treasure Mountain Snowmobile trail relocation, Austin snowmobile parking lot, Helena Lions Sunshine Camp, Minnehaha trail project and the EA for the Continental Divide National Scenic Trail. Reasonable Foreseeable projects would include the Ten Mile Road Improvement Project and the ongoing Forestwide Hazard Tree Removal Project (see appendix B). Impacts from the above identified projects are site-specific and would not affect travel restrictions.

Alternative 2

Direct and Indirect Effects

This alternative would designate about 10 miles of roads open to wheeled motorized vehicles solely during the big game rifle season. As a result, that motorized access opportunity would be available in the Divide Travel Plan Area as well as portions of the North Big Belt Mountains.

Prohibiting wheeled motorized travel on six miles of existing unauthorized routes could displace some Forest visitors to other locations on the Helena Forest or to other areas off the Forest. However, 10 miles of existing unauthorized routes currently used by motorized vehicles would be added to the Forest transportation inventory.

The use of motorized vehicles in some locations may have already displaced some Forest visitors who seek quiet recreation opportunities. Additional displacement would only be slightly different than alternative 1 because most of the associated motorized use already exists.

Increased use of several OHV trails in the Kading area may affect the amount and type of visitor use that occurs in Kading campground and rental cabin. The campground and cabin may become more popular with motorized trail enthusiasts. Increased motorized trail use in the area may detract from the existing setting in Kading campground and within the Little Blackfoot drainage.

Designation of motorized trails in the Kading area and on NFSR #4104-A1 would most likely increase OHV use on portions of the Little Blackfoot Road #227. Rather than trailer OHVs or motorcycles to the trailheads, most motorized users would probably travel from their campsite at Kading campground or a dispersed site adjacent to the Little Blackfoot road.

This alternative would provide motorized access to the Larabee Gulch Trailhead but only after a bridge is constructed across the Little Blackfoot River. Until such time as a bridge is constructed, Road #227-D1 would be closed to motorized use.

Alternatives 2 and 4 would designate NFSR #4104-A1 as a trail open to wheeled motorized vehicles 50 inches in width or less from May 16th through October 14th. As such it would provide an important link between the Little Blackfoot drainage and the Telegraph Creek area. Until such time as a bridge, bottomless arch or culvert is constructed, Road #4104-A1 would remain closed to wheeled motorized use.

Alternatives 2 and 4 would also designate two NFSRs (#4001 and #227-D1) open to wheeled motorized travel. Access to the Golden Anchor Mine area and Larabee Gulch trailhead would provide enhanced recreation opportunities. These routes would remain closed to wheeled motorized travel until a suitable crossing is constructed.

Motorized Use

Approximately 273 miles of designated roads would be open to highway legal vehicles year-long. This is approximately two miles less than what currently exists under Alternative 1.

Under this alternative approximately 114 miles of Forest roads would be closed to wheeled motorized vehicles year-long but open to over-snow motorized vehicles from December 2nd through May 15th. Currently, over-snow vehicle use is allowed adjacent to many of those roads but not on the roads. In addition, Alternative 1 would allow over-snow motorized vehicles from December 2nd through October 14th. Implementation of Alternative 2 could reduce both social and resource concerns associated with the use of over-snow motorized vehicles from mid-May through mid-October. If over-snow machines operate with a marginal amount of snow during the spring or fall, vegetation can be damaged and soils disturbed. In addition, the use of over-snow vehicles during the big game hunting season can cause user conflict.

About 15 miles of Forest roads would be closed to all motorized travel, including over-snow vehicles, year-long.

Approximately 10 miles of existing unauthorized routes currently used by motorized vehicles would be added to the Forest transportation inventory.

Under Alternative 2 there would be approximately 25 miles of trail open seasonally to motorized vehicles 50 inches in width or less. Under Alternative 2 there would be one mile of trail open to motorized travel year-long. Implementation of this alternative would provide seasonal motorized trail opportunities in two primary locations: Kading area and Sweeny Creek. This alternative would provide the greatest number of trail miles open to motorized vehicles.

The designation of NFSR #4104-A1 as a trail open to wheeled motorized vehicles 50 inches wide or less from May 16th through October 14th would provide additional motorized opportunities and access. Motorized enthusiasts would be able to travel from Ontario Creek to the Telegraph Creek area. If the vehicles were licensed and street legal, there would be expanded opportunities to travel on Forest roads in those areas.

This alternative would designate a total of approximately 10 miles of road open to wheeled motorized vehicles but from October 15th through December 1st. Those four routes, opened during the big game rifle season, would provide additional motorized access. NFSRs that would be included in this restriction code include: #335-A1 and #335-A2 (Priest Pass area), #314-J3 (Spotted Dog Creek area) and #1856 (Hahn Creek area). This feature of Alternative 2 responds to requests the Forest receives each fall for motorized access for hunting during the big game season.

This alternative would clearly designate motorized routes and simplify existing travel restrictions to foster a greater understanding of motorized regulations in the Divide Travel Plan Area.

Table 16: Miles of Motorized Travel Routes Under Alternative 2

Route Type	Miles
Roads Open to Hwy Legal Vehicles (No Restrictions)	284
Roads Closed to All Motorized Vehicles (Year-long)	16
Roads Closed to Wheeled Motorized Vehicles (Year-long) Open to Over-Snow Vehicles (December 2nd to May 15th)	112
Trails Open to Vehicles 50 inches or Less (No Restrictions)	1
Trails Open to Vehicles 50 inches or Less (May 16th to October 14th)	25
CDNST Non-Motorized (Closed to Wheeled Motorized Vehicles)	19.3
CDNST Open to Wheeled Motorized Vehicles	22.5
CDNST located in an area open to over-snow motorized vehicles	12.0
Acres Open to Motorized Over-Snow Travel	108,230
Identified Unauthorized Roads & Trails Open	10

Continental Divide National Scenic Trail

Under this alternative the majority of NFSR #136-D1 (2 miles) would be closed to wheeled motorized vehicles yearlong. The remaining 0.5 miles, which provides access to existing stock facilities and trailhead parking, would remain open to highway legal vehicles yearlong.

Existing single track trail segments would be closed to wheeled motorized travel year-long. This would prohibit the occasional wheeled motorized use that occurs on those trails and enhance non-motorized recreation opportunities.

Table 20 under the Conclusions section lists the Continental Divide National Scenic Trail (CDNST) by mileage and proposed designation for each segment within the Divide Travel Planning Area for each alternative. The CDNST map in the map packet coincides with the segments listed on the table at the end of this section.

Sweeny Creek Area

The existing unauthorized motorized routes located in the Sweeny Creek area would be designated as trails open to motorized vehicles 50 inches in width or less from May 16th through October 14th. Designation of those routes would result in a need for routine maintenance, possibly reconstruction and construction of a parking area to serve as a trailhead. Because those routes would be signed and maintained as system trails, additional funding would be needed for operation and maintenance. It's reasonable to assume that future improvements to those routes would increase motorized use in the area. Designation of these routes as system trails would provide another area on the Helena Forest specifically recognized for OHV use.

One notable change in the Sweeny Creek area under Alternatives 2, 3 and 4 is the winter closure to motorized travel. Approximately 5,700 acres in that area (including the motorized trails) would be closed to over-snow motorized travel from October 16th through May 14th. Although that area does not receive a great deal of over-snow vehicle use at the current time, it has become popular with OHV riders both during the winter and spring.

Kading Area

Similar to Alternative 1, NFSR 1868, the Kading Grade (MTR-502) and routes 501, MTR-503 and MTR-504 would remain open to wheeled motorized vehicles 50 inches in width or less from May 16th through October 14th. This motorized activity would provide opportunities for many OHV enthusiasts that camp

in the Little Blackfoot drainage. It would also be supported by hunters who seek motorized access to that area during the upland bird and big game bow season.

Increased use of several OHV trails in the Kading area may affect the amount and type of visitor use that occurs in Kading Campground and Kading Rental Cabin. The campground and cabin may become more popular with motorized trail enthusiasts. Increased motorized trail use in the area may detract from the existing setting in Kading campground and within the Little Blackfoot drainage.

Designation of motorized trails in the Kading area and on NFSR #4104-A1 would most likely increase OHV use on portions of the Little Blackfoot Road #227. Rather than trailer OHVs or motorcycles to the trailheads, most motorized users would probably travel from their campsite at Kading Campground or a dispersed site adjacent to the Little Blackfoot Road.

Irreversible and Irretrievable Commitments

There are no known irreversible or irretrievable commitments associated with this alternative.

Cumulative Effects

Past timber harvesting and road construction contributed to the existing condition of the recreation landscape, creating an area where human activity is evident and the recreation setting is primarily that of a working landscape. In addition, past road construction for those past harvest activities have made positive contributions to the accessibility of recreation activities in the area, such as access to hunting grounds, dispersed campsites and snowmobile routes. Trails improved over the past several years include sections of the CDNST and the Monarch Creek Trail and Trailhead. These past activities have contributed positively to the existing condition of recreation facilities in the planning area.

Present and reasonably foreseeable future activities include continued maintenance on open Forest roads, including improving road and surface drainage, clearing roadside vegetation and repairing and maintaining culverts. Ongoing roadside hazardous tree removal projects are also ongoing and will improve the access to and safety of the recreation setting. When combined with the long-term positive impact of the action alternatives on a healthy forest recreation setting, present and future activities would have a positive effect on recreation by improving the access and setting.

Alternative 3

Direct and Indirect Effects

This alternative would reduce existing opportunities for motorized recreation. It would also simplify travel restrictions and foster a greater understanding of motorized regulations in the Divide Travel Plan Area.

This alternative would not designate roads open to wheeled motorized travel solely during the big game rifle season (10/15 through 12/1) As a result, that opportunity would only be available in the Big Belt Mountains.

Prohibiting wheeled motorized travel on seven miles of existing unauthorized routes could displace some Forest visitors to other locations on the Helena Forest or to other areas off the Forest. Approximately nine miles of existing unauthorized routes currently used by motorized vehicles would be added to the Forest transportation inventory.

Prohibiting motorized use on NFSR #227-E1 would improve resource conditions because the existing road is rutted and contains several mud holes.

Approximately 251 miles of designated roads would be open to highway legal vehicles year-long. This is approximately 24 miles less than what currently exists under Alternative 1.

Under this alternative approximately 156 miles of roads would be closed to wheeled motorized vehicles year-long but open to over-snow motorized vehicles from December 2nd through May 15th. This is an increase of about 42 miles over Alternative 2. In contrast, Alternative 1 would allow over-snow motorized vehicles from December 2nd through October 14th. Implementation of Alternative 3 could reduce both social and resource concerns that are associated with the use of over-snow motorized vehicles from mid-May through mid-October.

Under Alternative 3 there would be no trails open to motorized vehicles 50 inches in width or less. Implementation of this alternative would provide no wheeled motorized trail opportunities in the Divide Travel Plan Area.

This alternative would not designate motorized opportunities on closed Forest roads during the big game hunting season.

Table 17: Miles of motorized travel routes under Alternative 3

Route Type	Miles
Roads Open to Hwy Legal Vehicles (No Restrictions)	262
Roads Closed to All Motorized Vehicles (Year-long)	21
Roads Closed to Wheeled Motorized Vehicles (Year-long) Open to Over-Snow Vehicles (12/2 – 5/15)	156
Trails Open to Vehicles 50 inches or Less (No Restrictions)	0
Trails Open to Vehicles 50 inches or Less (5/16 – 10/14)	0
CDNST Non-Motorized (Closed to Wheeled Motorized Vehicles)	19.3
CDNST Open to Wheeled Motorized Vehicles	20.6
CDNST located in an area open to over-snow motorized vehicles	10.1
Acres Open to Motorized Over-Snow Travel	105,230
Identified Unauthorized Roads & Trails Open	9

Continental Divide National Scenic Trail

Under this alternative the majority of NFSR #136-D1 (two miles) would be closed to wheeled motorized vehicles yearlong. The remaining 0.5 miles, which provide access to existing stock facilities, would remain open to highway legal vehicles yearlong. Approximately 0.6 additional miles of CDNST would be closed to wheeled motorized travel over Alternative 1.

Existing single track trail segments would be closed to wheeled motorized travel year-long. This would prohibit the occasional wheeled motorized use that occurs on those trails and enhance non-motorized recreation opportunities.

Table 20 under the Conclusions section lists the Continental Divide National Scenic Trail (CDNST) by mileage and proposed designation for each segment within the Divide travel planning area for each alternative. The CDNST map in the map packet coincides with the segments listed on the table at the end of this section.

Sweeny Creek Area

The existing unauthorized routes located in the Sweeny Creek area would be closed to motorized travel year-long. This would eliminate the existing motorized use and resulting resource damage, user conflicts and impacts to adjacent residents. Prohibiting motorized vehicles in the Sweeny Creek area

could facilitate increased non-motorized recreation opportunities such as: hiking, horseback riding, picnicking and nature study.

Similar to Alternative 2, approximately 5,700 acres in that area would be closed to over-snow motorized travel. Although that area does not receive a great deal of over-snow vehicle travel at the current time, this restriction would ensure quiet winter recreation opportunities for nearby residents.

Kading Area

Under this alternative, NFSRs 1868 and 501 would be closed to wheeled motorized travel year-long but open to over-snow vehicles from December 2nd through May 15th. That is also true for non-system trails MTR-502, MTR-503 and MTR-504. Current OHV travel for wheeled motorized vehicles 50 inches or less would be prohibited. Existing over-snow motorized travel on those routes would continue.

NFSR #227-D1 would be closed to motorized use.

Irreversible and Irretrievable Commitments

There are no known irreversible or irretrievable commitments associated with this alternative.

Cumulative Effects

Please see the discussion under Alternative 1.

Alternative 4

Direct and Indirect Effects

This alternative would reduce existing opportunities for motorized recreation. It would also simplify travel restrictions and foster a greater understanding of motorized regulations in the Divide Travel Plan Area

Under this alternative there would be no designated roads open to wheeled motorized travel solely during the big game hunting season (10/15 through 12/1).

Prohibiting wheeled motorized travel on six miles of existing unauthorized routes could displace some Forest visitors to other locations on the Helena Forest or to other areas off the Forest. However, 10 miles of existing unauthorized routes currently used by wheeled motorized vehicles would be added to the Forest transportation inventory.

Alternatives 2 and 4 would designate NFSR #4104-A1 as a trail open to wheeled motorized vehicles 50 inches in width or less from May 16th through October 14th. As such it would provide an important link between the Little Blackfoot/Ontario Creek drainages and the Telegraph Creek area. Until such time as a bridge, bottomless arch or culvert is constructed, Road #4104-A1 would remain closed to wheeled motorized use.

Alternatives 2 and 4 would also designate two NFSRs (#4001 and #227-D1) open to wheeled motorized travel. Access to the Golden Anchor Mine area NFSR #4001 and Larabee Gulch trailhead NFSR #227- would provide enhanced recreation opportunities. These routes would remain closed to wheeled motorized travel until a suitable crossing is constructed.

Motorized Use

Approximately 264 miles of designated roads would be open to highway legal vehicles year-long. This is approximately 11 miles less than what currently exists under Alternative 1. Under this alternative approximately 106 miles of roads would be closed to wheeled motorized vehicles year-long but open to

over-snow motorized vehicles from December 2nd through May 15th. This is a decrease of eight miles from Alternative 2. In contrast, Alternative 1 would allow over-snow motorized vehicles from December 2nd through October 14th.

Alternative 4 would designate four miles of trails open to wheeled motorized vehicles (50 inches in width or less) from May 16th through October 14th.

In addition to Alternative 1, under Alternative 4 NFSRs #4104-A1, #227-D1 and #4001 would remain closed until improved stream crossings are constructed.

One additional cumulative impact unique to Alternative 4 is the closure of the Microwave Tower Road (#1802) to all motorized travel yearlong. This would have several implications. That road would no longer provide wheeled motorized access for recreation opportunities during the summer or fall months. In the past that road has enabled wheeled motorized access to an area popular for hunting, firewood gathering and wildlife/scenery viewing. However, NFSR #1802 would still continue to serve as a segment of the CDNST. Because the road was in existence prior to 1978, motorized travel restrictions would not be implemented solely for benefit of the CDNST.

This alternative would designate a total of approximately three miles of road open to wheeled motorized vehicles but from October 15th through December 1st. These three routes, opened during the big game rifle season, would provide additional motorized access. NFSRs that would be included in this restriction code include: #335-A1 and #335-A2 (Priest Pass area). This feature of Alternative 4 responds to requests the Forest receives each fall for motorized access for hunting during the big game season.

This alternative would designate wheeled motorized opportunities on NFSR #335-A1, #335-A2 (Priest Pass Area) and NFSR #314-J3 located in the Spotted Dog Creek area for hunting during the big game rifle season.

Table 18: Miles of Motorized Travel Routes Under Alternative 4

Route Type	Miles
Roads Open to Hwy Legal Vehicles (No Restrictions)	265
Roads Closed to All Motorized Vehicles (Year-long)	25
Roads Closed to Wheeled Motorized Vehicles (Year-long) Open to Over-Snow Vehicles (12/2 – 5/15)	139
Trails Open to Vehicles 50 inches or Less (No Restrictions)	0
Trails Open to Vehicles 50 inches or Less (5/16 – 10/14)	4
CDNST Non-Motorized (Closed to Wheeled Motorized Vehicles)	21.9
CDNST Open to Wheeled Motorized Vehicles	18
CDNST located in an area open to over-snow motorized vehicles	12
Acres Open to Motorized Over-Snow Travel	105,230
Identified Unauthorized Roads & Trails Open	10

Continental Divide National Scenic Trail

Under this alternative, the majority of NFSR #136-D1 (two miles) would be closed to wheeled motorized vehicles yearlong. The remaining 0.5 miles, which provide access to existing stock facilities, would remain open to highway legal vehicles year-long. In addition Forest Road #1802 would be closed to motorized vehicles year-long.

Because NFSR #1802 existed prior to November 10, 1978, it should not be closed to wheeled motorized travel to meet agency direction for the CDNST. Under Alternative 4 approximately nine miles of the existing CDNST which allows some type of wheeled motorized use would become non-motorized.

Table 20 in the Conclusions section lists the Continental Divide National Scenic Trail (CDNST) by mileage and proposed designation for each segment within the Divide travel planning area for each alternative. The CDNST map in the map packet coincides with the segments listed on the table at the end of this section.

Sweeny Creek Area

Like Alternative 3, the existing unauthorized routes located in the Sweeny Creek area would be closed to motorized travel year-long. It's also possible this change could displace existing motorized use to other areas on the Forest. Similar to Alternatives 2 and 3 approximately 5,700 acres in that area would be closed to over-snow motorized travel. Although that area does not receive a great deal of over-snow vehicle use at the current time, this restriction might slightly enhance non-motorized winter recreation opportunities for nearby residents.

Kading Area

With the exception of over-snow vehicles during the winter, the unauthorized trails in the Kading area would be closed to wheeled motorized use. The prohibition of motorized travel on existing unauthorized trails could impact some hunters who currently use OHVs or motor bikes to access traditional hunting areas until October 15th.

This alternative could result in travel conflicts during the winter. If over-snow motorized travel is allowed on the Kading Grade (MTR-502) but prohibited on NFSR #227-E1 anyone traveling from the Beaverhead-Deerlodge Forest to the Helena Forest would not have access to over-snow motorized trails in the Little Blackfoot area.

Wheeled motorized travel on Forest Road #227-E1 would be prohibited.

Irreversible and Irretrievable Commitments

There are no known irreversible or irretrievable commitments associated with this alternative.

Cumulative Effects

Please see the discussion under Alternative 1.

Alternative 5

Direct and Indirect Effects:

Alternative 5 is a well thought out mix of multiple use recreation opportunities in the Divide Travel Plan Area. This proposed alternative was developed in response to public comment and field reviews and is designed to increase motorized loop trail opportunities and reduce the short spur and redundant parallel routes. It also improves big game security as well as addresses resource concerns relative to erosion and sedimentation from roads and stream crossings. Consideration was given to further align the Continental Divide National Scenic Trail (CDNST) with National Standards.

The selection of this alternative would result in the production of a Motor Vehicle Use Map which would identify motorized routes that are open for use along with corresponding restrictions and designations. In addition, this map would show restrictions regarding dispersed camping. Use of a motor vehicle

other than in accordance with specific designations would be prohibited. The authority for this action comes from 36 CFR 212 and 36 CFR 261.13.

Motorized Use

Under this alternative approximately 63 miles of existing routes would be converted to trails open to motorized use 50 inches or less. These routes would need to be added to the Forest transportation system as trails.

Designation of those routes would result in a need for routine maintenance and possibly reconstruction. These routes would be signed and maintained as system trails. It is reasonable to assume that improvements to those routes would increase motorized use.

Wheeled motorized trails in the Kading area would be restricted from use September 1st through May 15th. This area is currently open to wheeled motorized travel from May 16th through October 14th which could impact bow season and early fall hunting opportunities. For others, the wheeled motorized access offers motorized recreation opportunities.

Table 19: Alternative 5 – Miles of Each Type of Use

Type of Use (Corresponding designation on Alternative Maps)	Alt. 1 Existing Condition	Alt. 5
Roads open to highway legal vehicles, no seasonal restrictions (OPEN-HWY-LEGAL)	286	159
Roads closed to motorized vehicles yearlong, including over-snow motorized vehicles (01-Res)	85	60
Roads open to highway legal vehicles 12/2-10/14 (02-Res) Open to over-snow motorized vehicles 12/2-10/14 (02-Res)	8	0
Roads open to highway legal vehicles 5/16-12/1 (03-Res)	4	0
Open to over-snow motorized vehicles 12/2-5/15 (03-Res)	4	0
Roads open to highway legal vehicles 5/16-10/14 (05-Res) Open to over-snow motorized vehicles 12/2-5/15 (05-Res)	0	3
Roads closed to wheeled motorized vehicles yearlong (06-Res)	42	167
Open to over-snow motorized vehicles 12/2-10/14 (06-Res)	42	167
Open to over-snow motorized vehicles 12/2-5/15 (Alt 3) (06-Res)	0	0
Roads open to wheeled motorized vehicles 6/1-8/31 (13-Res) Open to over-snow motorized vehicles 12/1-8/31 (13-Res)	8	0
Roads open to wheeled motorized vehicles 5/16-4/14 (15-Res) Open to over-snow motorized vehicles, no seasonal restrictions (15- Res)	7	0
Trails open to vehicles 50 inches or less in width 5/16-10/14	7	2.5
Trails open to vehicles 50 inches or less in width 5/16-8/31	0	47.3
Trails open to vehicles 50 inches or less in width, no seasonal restriction	12	14.5
Trails closed to motorized vehicles yearlong (MT-01-Res)	0	19

Type of Use (Corresponding designation on Alternative Maps)	Alt. 1 Existing Condition	Alt. 5
Open non-system roads and trails (UOPEN-HWY-LEGAL)	16	0
Non-system roads, closed to motorized vehicles yearlong (NS-01- Res)	0	5
Non-motorized system trail (NO MTR) (not including CDNST segments)	20	20
CDNST Non-Motorized (closed to wheeled motorized vehicles)	19.2	32.7
CDNST open to wheeled motorized vehicles	24.6	14
CDNST located in an area open to over-snow motorized vehicles	8.0	6.9
CDNST located on State or County Jurisdiction	4.4	4.4
CDNST (Old Trail) Proposed to be Re-routed	0	14.53
P=NM – Proposed Non-Motorized Trail in an area that allows over- snow motorized use	0	4.2

Seasonal Trail (route) Dates

All motorized trails with seasonal use open to wheeled motorized vehicles 50 inches and less in width would be open from May 16th to August 31st with the exception of the Lava Mountain connector trail # 4009-A1 which would be open from May 16th to October 14th. Individuals who currently use the Divide Travel Plan area for OHVs use in the fall would be displaced to other areas. Persons who favor non-motorized recreation activities would have additional opportunities. There are approximately 14.5 miles of motorized trails that would have no seasonal restrictions.

Kading-Limburger Springs Area

National Forest System Route (NFSR) #227 would remain open to Kading campground. Beyond Kading campground, NFSR #227-E1 would become part of non-motorized trail 329. The trailhead parking area on NFSR #227 past Kading campground where the route would change to non-motorized use would be expanded to accommodate day use vehicles and horse trailers.

Motorized Trail #501 would remain open to motorized vehicles of 50 inches and less in width from May 16th to August 31st. The prohibition of motorized travel on existing trails could impact some hunters who currently use OHVs or motor bikes to access traditional hunting areas until October 15th.

Over-snow motorized travel would be allowed in areas north and west of NFSR #227 from December 2nd to May 15th. Refer to the Alternative 5 map for detailed over-snow motorized travel in this area.

Sweeny Creek Area

With the exception of the Priest Pass road, all routes in the Sweeny Creek area would be closed yearlong to motorized use including over-snow vehicles. As a mitigation measure to closing Sweeny Creek there will be development of an OHV trail system in the Austin area will provide motorized trails that are close to town and easily accessible throughout the year. This area will be accessible for use for family gatherings and short rides close to town.

Continental Divide National Scenic Trail (CDNST)

NFSR #136-D1 would be closed to wheeled motorized vehicles yearlong. Approximately, one mile of the CDNST trail located north of NFSR #136 and just south and east of Meyers Hill, would be rerouted and designated as a non-motorized section of the CDNST. A parallel motorized route is identified. Refer to the CDNST map for information on motorized and non-motorized segments of the CDNST.

Table 20: Summary Table for CDNST - Alternative 5 Only

Route #	Beginning Mile Post	Ending Mile Post	Alternative 5	Miles
136	0	1.338	OLD TRAIL	1.338
622	0	2.593	OLD TRAIL	2.593
337	0	5.526	NOMTR	5.526
495	0	11.936	OLD TRAIL	11.936
337	5.526	6.122	NM	0.596
337	6.122	6.28	OPEN-HWY LEGAL	0.158
337	6.28	7.558	P-NM	1.278
337	7.558	12.308	OPEN-HWY LEGAL	4.75
337	12.308	16.005	CO	3.697
337	16.005	16.136	OPEN-HWY LEGAL	0.131
337	16.136	18.153	P-NM	2.017
337	18.153	21.139	NM	2.986
337	21.139	21.426	NM	0.287
337	21.426	22.746	NM	1.32
337	22.726	26.675	NOMTR	3.949
337	26.675	29.322	05-RES	2.647
337	29.322	30.063	STATE	0.741
337	30.063	30.676	OPEN-HWY LEGAL	0.613
337	30.676	36.097	NOMTR	5.421
337	36.097	37.097	NM	1
337	37.097	42.712	P-OPEN-HWY LEGAL	5.615
337	42.712	43.595	P-NM	0.883
337	43.595	51.001	NOMTR	7.406

Larabee Crossing and Golden Anchor Crossing – Little Blackfoot Area

The crossing at Larabee (227-D1) would be closed to wheeled motorized travel. In addition, a foot/stock bridge would be constructed to connect to the non-motorized Larabee Trail #359. A trailhead would be designated nearby on NFSR #227.

The stream crossing located on Golden Anchor NFSR #4100 is currently a ford. This alternative proposed to replace the ford with a bridge, bottomless culvert, or structure installed to accommodate wheeled motorized vehicles 50 inches in width and less and over-snow motorized vehicles. The ford would remain open for motorized use until the structure is in place or two years from the start of the implementation phase of this project, whichever is less. If a structure is not installed during this timeframe, the ford crossing would be closed to vehicle travel until a structure is in place. The area

beyond this crossing would remain open to wheeled vehicles 50 inches in width and less in addition to over-snow motorized vehicles.

Unauthorized Routes

Alternative 5 would designate approximately 1.4 miles of identified unauthorized routes to be added to the Forest Transportation System for non-motorized use. All routes, including unauthorized routes, not identified or included in this alternative as part of this planning effort, as well as any future created routes, would be considered closed and would be physically closed without additional NEPA.

Parking

Parking would be allowed up to 30 feet from the edge of a designated route.

Access to Dispersed Campsites up to 70 Feet from a Designated Route

Parking and motor vehicle use associated with dispersed camping would be allowed up to no more than 70 feet from the edge of a designated route as long as:

- No new permanent routes are created by this activity;
- No damage to existing vegetation, soil, or water resources i.e., damage to live trees and shrubs, rutting and eroding of streambanks or bare soil;
- Travel off-route does not cross streams;
- Travel off-route does not traverse riparian or wet areas; and
- Travel to and parking associated with dispersed campsites would be limited to no closer than 30 feet of a stream or body of live water.

Access to Dispersed Campsites further than 70 feet from a designated route

Dispersed campsites located more than 70 feet from the edge of a designated route that are identified on the alternative 5 map would remain open for dispersed camping and parking associated with dispersed camping. The five items identified under the access to dispersed campsites up to 70 feet from a designated route section are applicable for this as well.

Other Features

- NFSR #314 would be open to wheeled motorized vehicles 50 inches in width and less from May 16th to August 31st, past the gate in Section 7;
- NFSRs #314-J1 and #314-J3 would be closed year-long to motorized travel;
- Motorized Trails #502, #503 and #504 in the Kading/Limburger Springs area and NFSR #1868 would be closed to wheeled motorized use year-long;
- NFSR #1870 and NFSR #1871-A2 are currently closed yearlong; however, alternative 5 would open them to wheeled motorized vehicles 50 inches and less in width from May 16th to August 31st. This route would connect to NFSR #1871 to create a loop trail. The road spurs within this area that dead-end would be closed yearlong to wheeled motorized vehicles.
- Two fords on NFSR # 495-D1 would remain open to motorized vehicles to provide access to Motorized Trail 4101-A1 which will be open to vehicles 50 inches and less in width from May 16th to August 31st.
- Approximately ½ mile of NFSR #1805-A1 (accessed from NFSR #1805) would be open to wheeled highway legal vehicles from May 16th to October 14th. A motorized vehicle trailhead would be developed at this location where it would connect to a one-mile loop

trail open to wheeled motorized vehicles 50 inches and less in width from May 16th to October 14th.

Irreversible and Irretrievable Commitments:

There are no known irreversible or irretrievable commitments associated with this alternative.

Cumulative Effects:

Analysis of cumulative effects on recreation considers the effects of past, present and reasonably foreseeable future activities on the recreation resource. The spatial boundary for the actions considered in cumulative effects is the project boundary. For recreation, only activities within the project area could be expected to add to the impact of the project's activities. Temporally, actions considered date back to pre-1960 actions that are known and date forward to all reasonably foreseeable planned future activities They include timber harvesting, prescribed burning, road and trail reconstruction, recreational use, mining and private land development.

Past timber harvesting and road construction contributed to the existing condition of the recreation landscape, creating an area where human activity is evident and the recreation setting is primarily that of a working landscape. In addition, past road construction for those past harvest activities have made positive contributions to the accessibility of recreation activities in the area, such as access to hunting grounds, dispersed campsites and snowmobile routes. Trails improved over the past several years include sections of the CDNST and the Monarch Creek trail and trailhead. These past activities have contributed positively to the existing condition of recreation facilities in the project area.

Present and reasonably foreseeable future activities include continued maintenance on open forest roads, including improving road and surface drainage, clearing roadside vegetation and repairing and maintaining culverts. Ongoing roadside hazardous tree removal projects are also ongoing and will improve the access to and safety of the recreation setting. When combined with the long-term positive impact of the action alternatives on a healthy forest recreation setting, present and future activities would have a positive effect on recreation by improving the access and setting.

Conclusions

All alternatives would cause a certain degree of motorized vehicle travel restrictions, primarily expected during the summer, fall and winter. Alternative 5 the most impactive to recreation, offers a blend of motorized recreation opportunities while at the same time maintaining wildlife security. As a result of public comments long OHV loop trails where identified as mitigation to short dead end routes. Alternative 5 also tries to limit the negative impact of unmanaged recreation buy identifying some control measure on dispersed recreation. The actions proposed by all alternatives are consistent with Forest Plan direction. Therefore, the impacts of the proposed activities on the recreation resource will remain within Forest Plan standards because the actions proposed are consistent with recreation standards, both Management Area specific and Forestwide.

Alternative 1

Under this alternative the existing condition would continue. Existing unauthorized routes currently being used by wheeled motorized vehicles would be designated and become part of the Forest transportation inventory. This would include two existing trail segments and one road segment of the Continental Divide National Scenic Trail.

An existing over-snow motorized travel discrepancy would continue. Although 71 miles of Forest Roads would remain closed to over-snow vehicles, National Forest lands adjacent to those roads would remain open to that use.

Alternative 2

Alternative 2 would add fewer existing unauthorized routes to the Forest transportation system than Alternative 1. These routes are currently open for that use under the Tri State Off-Highway Vehicle Decision of 2001. It's also likely that motorized use on those routes would increase as the trails are improved.

This alternative would result in a 4.5 mile decrease of CDNST currently open to wheeled motorized use.

This alternative identified three routes open to wheeled motorized vehicles during the big game rifle season. Because this alternative would end the existing restriction that prohibits over-snow motorized travel on about 71 miles of roads in areas open to over-snow motorized travel, it would be easier for the public to understand and follow winter travel regulations.

Alternative 3

Because Alternatives 3 and 4 feature no miles of wheeled motorized trail, these alternatives would have a greater impact upon existing recreation use. Individuals who currently use the Divide Travel Plan Area for OHVs would be displaced to other areas. There would be additional recreation opportunities for non-motorized activities.

This alternative would result in a 6.1 mile decrease of CDNST currently open to wheeled motorized use.

This alternative has fewer acres open to motorized over-snow travel than Alternatives 1 and 2 and could enhance the non-motorized recreation experience during the winter.

Alternative 4

Because Alternatives 3 and 4 feature no miles of wheeled motorized trail, they would have a greater impact upon existing recreation use. Individuals who currently use the Divide Travel Plan Area for OHVs use would be displaced to other areas. Persons who favor non-motorized recreation activities would have additional opportunities.

This alternative would close (25) road miles to wheeled motorized travel year-long. As a result, it would have a greater impact on existing recreation opportunities associated with wheeled motorized travel than the previous alternatives.

This alternative would result in an 8.8 mile decrease of CDNST currently open to wheeled motorized use.

Unique to this alternative is the closure of wheeled motorized travel on the Microwave Road #1802. This route would only be open to wheeled motorized travel for administrative use and permit holders authorized to access the electronic site on MacDonald Pass. Individuals who currently utilize this road to collect firewood, pick berries, hunt and view wildlife would be displaced.

Alternative 5

All alternatives would cause a certain degree of motorized vehicle travel restrictions, primarily expected during the summer, fall and winter. Alternative 5 offers a blend of motorized recreation opportunities

while at the same time maintaining wildlife security. Alternative 5 also tries to limit the negative impact of unmanaged recreation buy identifying some control measure on dispersed recreation. The actions proposed by all alternatives are consistent with Forest Plan direction. Therefore, the impacts of the proposed activities on the recreation resource will remain within Forest Plan standards because the actions proposed are consistent with recreation standards, both Management Area specific and Forestwide.

Table 20 below compares the segments of Continental Divide National Scenic Trail (CDNST) by mileage within the Divide Travel Planning Area with Alternative 1 being the No Action alternative in comparison to the action alternatives with the proposed designations for each segment. The FEIS map packet has a map of the CDNST that identifies the location of each segment listed in the table below.

Forest Plan Consistency

All alternatives would be consistent with Forest Plan goals, objectives and standards. Please refer to recreation standards contained in the Forest Plan Consistency Table (appendix A).

UNROADED and ROADLESS

Regulatory Framework

Direction for the evaluation of unroaded lands for potential wilderness can be found in Forest Service Handbook (FSH) 1909.12(72). This handbook direction specifically defines wilderness characteristics for potential wilderness and how they should be evaluated.

There are no Forest Service regulations or laws that prohibit development of unroaded areas. In addition, there are no Forestwide or management area standards specific to unroaded areas. Although the unroaded areas are not designated as wilderness or located within Inventoried Roadless Areas, the effects of the Divide Travel Plan project will be assessed using the wilderness attributes identified in Forest Service Handbook 1909.12 and the 1964 Wilderness Act. Because the Left Hand Fork Cottonwood Gulch unroaded area is contiguous with the Nevada Mountain inventoried roadless area, the effects of the proposed actions on the inventoried roadless area itself will also be analyzed.

Forest Plan Direction

Portions or all of the four inventoried roadless areas (Nevada Mountain, Jericho Mountain, Lazyman and Electric Peak) are within the planning area. These unroaded areas were identified as inventoried roadless areas. For more details on each of these Inventoried Roadless Areas, please see appendix C of the Helena National Forest Plan Final EIS. There is also management direction in the Forest Plan that applies to these Inventoried Roadless Areas. In addition to the four identified inventoried roadless areas, there are contiguous unroaded lands within the planning area that also might potentially be affected by this proposal.

Approximately 50 percent of the project area is within the “Roaded Natural” Recreation Opportunity Spectrum category, meaning that timber harvest or other surface use practices are evident and motorized vehicles are permitted on all parts of the road system.

Management areas H1, H2, L1, L2, M1, P3, T1, T3, T4, T5, W1 and W2 cover the four inventoried roadless areas and the one contiguous unroaded area.

Roadless Area Review and Evaluation (RARE II)

The RARE II inventory was completed in anticipation of development of the Forest Plan which was completed in 1986. Appendix C of the Forest Plan analyzed all of the inventoried roadless areas and rated them for wilderness suitability. Some of the lands were ultimately selected in the Forest Plan decision for Forest Plan recommended wilderness (P-3 management areas totaling 32,900 acres). These were in addition to the designated wilderness areas (Scapegoat and Gates of the Mountains totaling 111,600 acres). Some inventoried lands were not recommended for wilderness but instead have Forest Plan direction to maintain their unroaded character for semi-primitive non-motorized recreation and for wildlife values (R-1 totaling 34,300 acres and E-2 totaling 22,200 acres). There is an R-1 area within the project boundary – Mount Helena. This R-1 area is an area that has been designated as undeveloped land suited for dispersed recreation. It provides opportunities for semi-primitive non-motorized recreation and is characterized predominantly by natural or natural appearing environments where there is a high probability of isolation from man's activity.

2001 Roadless Rule

The 2001 Roadless Rule provides management direction for timber cutting, sale, or removal and road construction/reconstruction (36 CFR 294 Subpart B [66 FR 3244] January 12, 2001). The Rule has been subject to continuous litigation. At the writing of this report the Rule is in effect. The Rule does not apply to motorized or non-motorized trails (66 FR 3251).

Assumptions

The Divide Travel Plan would not authorize construction of new routes or decommissioning of existing routes. This analysis is focused on determining whether existing roads and trails would be open to motorized vehicles, the type of vehicle and season of use.

There is an increased emphasis and public demand for both undeveloped areas and motorized routes on National Forest lands.

Generally, the sight and sound of motorized vehicles would diminish the recreation experience for most visitors who seek solitude and/or undeveloped recreation opportunities.

Although the presence of motorized routes does not preclude the possibility of designating National Forest System lands for wilderness, the amount and type of that use could influence that decision.

Information Used

Helena National Forest GIS data, aerial photos and local resource-specific knowledge of the Divide Travel Plan project area were used in this analysis.

Methodology & Scientific Accuracy

The collection of recreation use data, including the National Visitor Use Monitoring survey done in 2003, personal contacts with Forest visitors and local recreation club(s) were used to develop this report.

Forest Service Handbook 1909.12 (72) identifies potential characteristics that can be used to identify an unroaded area's capability to be considered for future wilderness. The Divide Travel Plan project uses these five characteristics as a way of measuring the effects of the project on the inventoried roadless areas and contiguous unroaded lands within the project area.

Natural – the general condition of the ecological function of the natural environment.

Undeveloped – the degree to which the area is without permanent improvements or human habitation.

Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation - Solitude is a personal, subjective value defined as the isolation from sights, sounds and presence of others and from

developments and evidence of humans. Primitive recreation is characterized by meeting nature on its own terms, without comfort and convenience of facilities

Special Features – the capability of the area to provide other unique values.

Manageability – the ability to manage the area as potential future wilderness.

This analysis focuses on the potential effects of project activities on wilderness characteristics as defined in FSH 1909.12. It is recognized that expanses of inventoried roadless areas and other unroaded lands provide other resource values as well. Potential project effects to other values are evaluated elsewhere as they relate to specific resources. This analysis concentrates on wilderness characteristics and compares any changes to the existing conditions of the identified inventoried roadless areas, as well as any other contiguous unroaded lands, with potential wilderness characteristics within the project area boundary.

Unroaded and Roadless, Affected Environment

The affected environment is within the project area boundary for the Divide Travel Plan – extending from the Nevada area in the northwest, south to the Little Blackfoot and Bison Mountain area and east to the Tenmile drainage. This area is managed by the Helena Ranger District of the Helena National Forest.

Introduction

This report discusses four discrete IRA's and one discrete unroaded area which is contiguous with the Nevada Mountain IRA.

There are four inventoried roadless areas and one smaller area of unroaded lands (which do not have special designation) contiguous to the Nevada Mountain in the Divide Travel Plan area. The four IRA's are: Nevada Mountain, Jericho Mountain, Lazyman Gulch and Electric Peak. These four IRA's were analyzed using the same characteristics of the roadless area inventory (RAREII).

The one small unroaded area located outside of but contiguous to one of the IRA's was analyzed using the same characteristics as were used in the roadless area inventory (RAREII).

The Helena Forest Plan established forestwide multiple-use goals, objectives and management requirements as well as management area prescriptions. The analysis of roadless lands, documented in appendix C of the FEIS for the Plan, described each roadless area, the resources and values considered, the range of alternative land uses studied and the effects of management under each alternative. As a result of the analysis some roadless areas were recommended for inclusion in the National Wilderness Preservation System and others were assigned various non-wilderness prescriptions. The four IRA's were assigned to management areas. The unroaded land contiguous to the roadless areas was assigned to management area T-1. The proposed activities tied to the action alternatives would occur within the "T" lands (available and suitable for timber management) management areas.

The purpose of this analysis is to evaluate the environmental consequences of the proposed action and alternatives on the wilderness characteristics of the IRA's and roadless area expanse.

Semi-primitive motorized recreation is recognized as an acceptable roadless characteristic under the Forest Plan. Motorized trails were not prohibited in IRAs under the 2001 Roadless Rule (66 CFR 3251).

Analysis Area

The analysis area is within the project area boundary for the Divide Travel Plan – extending from the Nevada area in the northwest, south to the Little Blackfoot and Bison Mountain area and east to the Tenmile drainage. This area is managed by the Helena Ranger District of the Helena National Forest.

The analysis area for the unroaded areas of the Divide Project area includes those portions of the IRA's within the project area boundary as well as the contiguous unroaded areas outside of the IRA's that may have contributing characteristics to future wilderness designation in the area.

Recreation Opportunity Spectrum

Forest Service recreation management is guided by the Recreation Opportunity Spectrum (ROS), which allocates and manages outdoor recreation opportunities and activities by natural resource setting. The distribution of summer ROS classes in the Divide Travel Plan area is shown in the following table. The acres displayed include the four IRA's and the one unroaded area analyzed in this report.

Table 21: Summer ROS Distribution

Category	Acres	Percent of Area
Semi-primitive Non-motorized	30,620	20
Semi-primitive Motorized	28,532	18
Roaded Natural	78,120	50
Roaded Modified	15,260	10
Rural	2,960	2
Total	155,483	100

The roaded natural, semi-primitive motorized and semi-primitive non-motorized categories predominate because of past and current development, such as roads and associated mining and timber harvest within and near the analysis area. The largest tracts of semi-primitive non-motorized areas are the IRA's.

See the recreation report for additional descriptions of the motorized and non-motorized uses within the project area found in the project file.

Inventoried Roadless

The Helena Forest Plan, appendix C (1986) contains the evaluation of inventoried roadless areas on the Helena National Forest. This evaluation assessed the wilderness suitability of each IRA using the characteristics identified in the Wilderness Act of 1964 to define wilderness. The project area includes four IRA's within the project area as indicated on the alternative maps attached to this report. However, no ground disturbance or vegetation treatment is proposed within these roadless areas.

Located within the project area are the following four inventoried roadless areas: Electric Peak, Jericho Mountain, Lazyman and Nevada Mountain. In total, these inventoried roadless areas comprise approximately 1,107 acres of private land and 56,204 acres of National Forest lands within the Divide Travel Plan area. Currently there are motorized travel routes located within three of the Inventoried Roadless Areas as indicated in the following table and shown on alternative maps. The characteristics of each inventoried roadless areas are described below. Additional information pertaining to the IRAs is found in the Helena Forest Plan Environmental Impact Statement appendices A, B and C.

Table 22: Inventoried Roadless Areas

Inventoried Roadless Area	Appx. Acres of NF in Planning Area	Miles of Motorized Routes (w/n Planning Area) & w/n Inventoried Roadless Area	Acres Open to Over-snow Motorized Vehicles w/n IRA
Nevada Mountain	8,435	2*	8,435
Jericho Mountain	8,439	4.11	8,439
Lazyman	11,569	0.08	0
Electric Peak	27,857	7.2	9,550

*These 2 miles are within the IRA, but located on the Lincoln Ranger District, outside of this planning area boundary.

Nevada Mountain (1606)

The Nevada Mountain inventoried roadless area straddles the Continental Divide approximately 30 miles northwest of Helena, Montana in both Lewis & Clark and Powell Counties. A portion of this IRA is located on the Lincoln Ranger District. Local roads access the IRA and a wheeled motorized trail is located on the north end (Lincoln Ranger District). Topography includes steep slopes capped with broad rounded ridges on the main divides. Elevations vary from about 5,500 feet in Jefferson Creek to 8,330 feet at the summit of Black Mountain. This IRA includes the following management areas; M1, T1, T3 and W1.

The only portion of the Nevada Mountain IRA considered within this analysis area is that which is located on the Helena Ranger District, approximately 8,435 acres or 17 percent of the IRA. The Lincoln Ranger District is currently analyzing the Blackfoot Non-Winter Travel Plan which incorporates the remainder of the IRA. Therefore, from this point on, unless otherwise noted, when this IRA is discussed, it will only pertain to that portion of the IRA within the Helena Ranger District.

Wilderness Attributes

Natural

Evidence of past mining activity can be found along stream bottoms near the edge of the area. Although there are almost two miles of road within the IRA open to motorized vehicles, the roads are not located within the planning area. Hunting is the most popular recreation activity within the Nevada Creek area. The Continental Divide National Scenic Trail passes through the area and provides opportunities primarily for hiking and horseback riding. An old jeep road (#136-D1) extends from Ophir Road #136 to a scenic bench near Black Mountain. A segment of this route is currently open to wheeled motorized vehicles yearlong but only to the middle of Section 5 in T11N, R7W. It is occasionally used by OHV's, four wheel drive vehicles, trail bikes and snowmobiles. Currently all National Forest lands in the IRA are open for snowmobiling.

Undeveloped

The Nevada Mountain inventoried roadless area is about 30 miles northwest of Helena in both Lewis and Clark and Powell counties. The undeveloped attribute describes the degree to which developments and uses are apparent to most visitors. Factors that contribute to the level of development include:

- Presence of roads and trails;
- Presence of developments (campgrounds, dams, structures, facilities); and
- Use of motorized equipment, mechanical transport, landing of aircraft.

Inventoried Roadless Areas lands on the Helena Ranger District are currently open for cross-country snowmobile travel.

With the exception of a few existing roads and trails, the area is undeveloped. The Cellar Ogilvie Trail #312, which is located in the northeast corner of the IRA and outside of this planning area, is managed seasonally for OHVs.

Outstanding opportunities for solitude or primitive unconfined recreation

Solitude is a personal, subjective value defined as the isolation from sights, sounds and presence of others and from developments and evidence of humans. Primitive recreation is characterized by meeting nature on its own terms, without comfort and convenience of facilities. Factors that add to solitude within the IRA area are:

- Distance from roads and trails;
- Topographic features, including screening from sights and sounds; and
- Experiences available (with and without developments).

In the southeast portion several roads exist, but are closed yearlong. An old jeep road (136D) bisects the southeast section of the IRA. Private land exists along the southern boundary. There are limited opportunities for visitors to enjoy solitude and unconfined recreation unless they are within about ½ mile of the Continental Divide.

Special Features

A section of the Continental Divide Trail runs along the eastern boundary of the planning area.

Manageability

The current IRA boundary on the Helena Ranger District does not follow any topographic features or roads. As a result, the eastern IRA boundary located within the planning area is difficult to identify on the ground.

Jericho Mountain (1607)

The Jericho Mountain inventoried roadless area straddles the Continental Divide and is approximately 10 air miles southwest of Helena, Montana in both Lewis and Clark and Powell Counties. It encompasses approximately 8,439 acres. This IRA includes the following management areas: H1, H2, L1, M1, T1, T4, T5 and W1.

The area is easily accessible from adjacent roads and one open road (# 1863) extends from Bullion Parks into the IRA. The eastern boundary of the area runs along the Tenmile and Minnehaha Creek Roads. Topography changes from the 5,200 foot valley floor to an elevation of 7,200 feet on the divide. There are several parcels of private land (with evidence of past mining activity) located within the IRA. Due to the close proximity of Helena, the Jericho Mountain IRA is popular for hiking, hunting and some mountain biking. There have been a few reports of motorized incursions in this area. Currently, all National Forest lands within the Jericho Mountain IRA and Divide Travel Plan area are open for snowmobiling.

The IRA is bordered by private land, roads and mining claims. Therefore, there are no contiguous unroaded areas adjacent to the IRA that would be suitable to analyze.

Wilderness Attributes

Natural

The impacts of human activity are present in much of the area. Past mining has created access roads throughout the area. There are many roads that provide access to private land. Mining claims and cabins are scattered throughout the area.

Undeveloped

The Jericho Mountain inventoried roadless area is about 10 miles southwest of Helena in both Lewis and Clark and Powell counties. The land is open for cross-country snowmobile travel.

Outstanding opportunities for solitude or primitive unconfined recreation

This IRA is long and narrow. The Continental Divide splits the area – creating most of the topographic screening. People traveling along the higher open ridges on the north end can see human activities and development within the area or adjacent areas.

Special Features

A key feature within this area is the Continental Divide National Scenic Trail (CDNST) which extends from MacDonald Pass to Road #1863. This segment of the CDNST was closed to any type of motorized use in a special order signed September 2004.

Manageability

The northern boundary is just south of U.S. Highway 12. The east and south sides are bordered by the Tenmile-Minnehaha Road – this road accesses the Forest and a subdivision.

The boundaries are defined by forest roads, private land and topographic features.

Lazyman (1608)

The Lazyman Gulch inventoried roadless area is approximately 10 air miles southwest of Helena, Montana in Lewis and Clark County. It encompasses approximately 11,569 acres. This IRA includes the following management areas: H1, L1, L2, M1, R1, T1, T4, T5, W1 and W2.

The northern boundary runs adjacent to private land. The west side of this area is easily accessible off the Rimini Road #695 and the east side is accessible from a county road. Non-motorized access into the IRA from the south is available off a former road (#578) which extends between Travis Creek and the Chessman Road. An old roadbed (#4177), which is closed to motorized travel, also extends to the top of Colorado Mountain. That road was used to access a fire lookout tower which was removed many years ago. Elevation varies from approximately 4,800 feet on the north to about 7,223 feet on Colorado Mountain. Sounds associated with human activity are evident throughout most of the area.

The IRA is bordered by private land and roads. Therefore, there are no contiguous unroaded areas adjacent to the IRA that would be suitable to analyze.

Wilderness Attributes

Natural

Highway 12 is approximately one mile to the north and the Tenmile Road, which is heavily-used, runs along the western boundary. The impacts of human activities are present in much of the area. Past mining and logging activities have created access roads throughout the area. There are many roads that

provide access to private land. Homes are easily visible from high points. Private lands account for more than 500 acres. Sounds due to human activity can be heard throughout most of this IRA.

Undeveloped

The Lazyman Mountain inventoried roadless area is about 10 miles southwest of Helena in Lewis and Clark County. All National Forest lands within the Lazyman IRA are currently closed to snowmobiles.

Outstanding opportunities for solitude or primitive unconfined recreation

The area is dissected with tributaries of Colorado Gulch and Tenmile Creek and is used for hiking, hunting and camping. Hiking within the IRA is popular near the Ten Mile Picnic area and in Black Hall Meadows. Because the IRA is close to Helena and residents in the Rimini area, it's a popular area for big game hunting. Visitors from the Feathered Pipe Ranch frequent the north end of the IRA on existing non-system trails. Again, human activities are easily seen and heard within this area.

Special Features

Colorado Mountain is the highest point in this inventoried roadless area. It sits at 7,223 feet. Major topographic features, in addition to Colorado Mountain, include Black Mountain and Black Hall Meadows.

Manageability

The northern boundary is approximately one mile south of U.S. Highway 12. The northern boundary runs along private land. The eastern boundary is defined by the road to Park City and the Travis Creek Road. The southern boundary runs just south of Black Mountain and then turns north along the Tenmile Creek Road.

Public access in the north is restricted by private land adjacent to the IRA. Much of the private land was acquired by historic patented mining claims.

Electric Peak IRA (1609)

The Electric Peak inventoried roadless area is located in Powell and Jefferson Counties, approximately 30 air miles southwest of Helena, Montana. Approximately 60 percent of it is on the Helena National Forest, the remainder is on the Beaverhead-Deerlodge National Forest. The Little Blackfoot Road (227) and Kading Campground, which are in the north end, are excluded from the inventoried acres. Approximately 27,857 acres of the IRA is on the Helena National Forest. This IRA includes the following management areas: L1, M1, P3, T1, T3, T4, T5 and W1.

The Record of Decision (ROD) for the Forest Plan (FP) determined that the lower two-thirds (approximate) of this IRA is suitable for wilderness designation and thereby designated it as management area P3 (Forest Plan proposed wilderness). Activities in accordance with FSM 2300 and Forest Plan direction are allowed in proposed wilderness.

The Helena National Forest portion of the IRA is bordered by private land and roads. Therefore, there are no contiguous unroaded areas adjacent to the IRA included in this analysis.

Wilderness Attributes

Natural

People recreating along the higher ridgelines may view human activities and development within the IRA. Signs of past mineral and logging activities are found throughout the area.

Recreation activity in the Electric Peak IRA is extensive and includes both motorized and non-motorized trail use including: OHV's, trail bikes, snowmobiles, horseback riding, mountain bikes and hiking. However, there is an exception – the portion of the Electric Peak IRA that is proposed wilderness excludes motorized vehicle use including over-snow vehicles. Dispersed camping is popular along the Blackfoot River corridor and near Blackfoot Meadows. Most of the IRA is extremely popular for big game hunting, during the bow and rifle seasons.

An extension of the Little Blackfoot Road (#227–E1) proceeds from just south of the campground to an undeveloped trailhead located in Section 29. Two additional roads, closed to wheeled motorized travel, are also located in the IRA. There are four non-system trails (501, MTR-502, MTR-503 and MTR-504) currently open to wheeled motorized vehicles located within the area, all in the vicinity of Kading Cabin.

The inventoried roadless area also contains about 530 acres of private land.

Forest Road #1870–A1, which provides access to private land, is located in the northern portion of the IRA.

Forest Road 1801-A1 is closed to all motorized vehicles yearlong.

Undeveloped

The Blackfoot Meadows area is popular for a variety of dispersed recreation such as: hiking, hunting, camping and fishing.

Outstanding opportunities for solitude or primitive unconfined recreation

In the northern portion of the IRA, recreation activities tend to be concentrated along the Little Blackfoot River. Associated road noise can be heard near the Little Blackfoot River Road (#227) and the Ontario Creek Road (#123).

There are several non-motorized trails in the IRA located on the Helena National Forest, which include: Bison-Blackfoot #328, Blackfoot Meadows #329, Continental Divide #337, Larabee Gulch #359 and Monarch Creek #362. Segments of three designated snowmobile trails are located within the planning area and Electric Peak IRA. It should be noted snowmobiling is allowed on approximately 34 percent (9,550 acres) of the Electric Peak IRA within the Divide Travel Plan area. An area restriction which prohibits motorized vehicles within part of the Electric Peak Roadless Area was signed in December of 1997.

The best opportunities for solitude and/or primitive recreation are located within the interior of the IRA, especially near Blackfoot Meadows.

Special Features

Approximately 10 miles of the Continental Divide National Scenic Trail are located within or adjacent to the Electric Peak IRA. The IRA also includes other special features such as: Bison Mountain, Thunderbolt Mountain, Electric Peak and Cliff Mountain. These mountains are over 8,000 feet in elevation.

Eleven miles of the Little Blackfoot River located within the IRA have been classified as eligible for Wild and Scenic River designation. A suitability study for these segments is the next step in the designation process.

Manageability

Many of the IRA boundaries are well-defined by topographic features (such as roads) along more than half of the perimeter.

Divide Unroaded Areas Contiguous to Inventoried Roadless Areas

The analysis evaluates the effects to areas that have not been previously roaded, otherwise referred to as "unroaded" areas that are contiguous to IRA's. One area was identified within the Divide Travel Plan area.

Defining Unroaded Areas

The analysis evaluates the effects to areas that have not been previously roaded, otherwise referred to as "unroaded" areas that are contiguous to IRA's. One area was identified within the Divide Travel Plan area.

Unroaded areas were defined by identifying areas within the Divide Travel Plan area that appeared to be unroaded, where unroaded was described as areas without classified roads that weren't already inventoried as roadless and of a size and configuration that may be sufficient to protect the inherent characteristics associated with its unroaded condition. One area was identified using this approach. The area contiguous to the southeast border of the Nevada Mountain IRA.

The area was analyzed to determine if it might have some of the "wilderness characteristics" normally attributed to the IRA's. The same five characteristics that were used for IRA's were used for this contiguous unroaded area.

- Natural – The extent to which long-term ecological processes are intact and operating;
- Undeveloped – The degree to which the impacts documented in natural integrity are apparent to most visitors;
- Outstanding opportunities for solitude or primitive unconfined recreation – Solitude is a personal, subjective value defined as the isolation from sights, sounds and presence of others and from developments and evidence of humans. Primitive recreation is characterized by meeting nature on its own terms, without comfort and convenience of facilities;
- Special features and values – Unique ecological, geographical, scenic and historical features of an area; and
- Manageability – The ability to manage an area for wilderness consideration and maintain wilderness attributes.

The affected environment of the unroaded area was determined based on team member knowledge and interaction. The area is described using the attributes and characteristics identified above. As part of the planning area, other characteristics of the unroaded areas were considered in the other resources analyzed for this project, though the other resources did not address them individually as discrete entities.

The majority of the Divide Travel Plan area was determined to have a Recreation Opportunity Spectrum (ROS) classification of Roaded Natural which means the area has a mostly natural appearance with access by conventional motorized vehicles.

Rationale for inclusion/exclusion of areas to be considered as Contiguous Unroaded

When looking at the Divide Travel Plan area for contiguous unroaded areas, several features were considered. The Divide Travel Plan area is already heavily developed with roads, private land, mining and developed recreation sites. All of these features play into the wilderness characteristics that were

evaluated. These features produce sights and sounds that are not conducive to wilderness experiences. These features were found to be prevalent throughout most of the planning area except in one location. This location is an area that is adjacent to the southeast part of the Nevada Mountain IRA.

Nevada Mountain IRA and Contiguous Unroaded Lands (Left Hand Fork Cottonwood Gulch)

Federal land in the planning area of the Nevada Mountain IRA is 8,435 acres. When combined with the approximate 480 acre Left Hand Fork unroaded area, the area encompasses 8,915 acres. The unroaded area runs along the southeast boundary of the Nevada Mountain IRA in T11N R9W Section 1. This land was analyzed for its capabilities as part of the Forest Plan analysis and was given a T-1 (timber production emphasis) management allocation.

In assessing the wilderness capability of the Nevada Mountain IRA, appendix C of the 1986 Helena Forest Plan states under the heading "Natural Integrity and Appearance":

"Roads and trails on the ridges, mining and irrigation ditches are the disturbances to the natural appearance. When away from these relatively small scale disturbances, the area appears quite natural." (p. C/115.)

The Record of Decision for the Plan designated this unroaded area as a T-1 management area (Forest Plan timber management). Again, this unroaded area is contiguous with the Nevada Mountain IRA which is not considered suitable for management as wilderness.

The Left Hand Fork Cottonwood Gulch unroaded area is small (about 480 acres), but it is contiguous to the southeastern portion of the Nevada Mountain Roadless Area (1606). The northwest part of the area can be accessed by a two-track road (Forest Road #774-B1) which originates to the north, in Section 36. There is also access to the northeast part of the section via another two-track road that originates in Section 31. This two track road runs parallel to the Right Hand Fork of Dry Creek. The southern boundary runs parallel to Forest Road #136. The western boundary is defined by the Nevada Mountain IRA. As was common during the RAREII inventory, this unroaded parcel defined a narrow buffer between the inventoried roadless area and an existing road.

Natural

This unroaded area is entirely located on National Forest System lands. There has been no previous management within this area. The coniferous vegetation component has recently been subject to high levels of mountain pine beetle mortality. Native vegetation predominates in this area. The Left Hand Fork of Cottonwood Gulch runs along the northeast part of the area.

Undeveloped

Although this area is small, it does retain a natural appearing landscape in the areas between the IRA and the existing roads: #136, #774 and #4036. When this unroaded area is combined with the IRA to the north, it provides approximately 480 additional acres of landscape in a natural appearance.

Outstanding opportunities for solitude or primitive unconfined recreation

The ROS classification for this unroaded area is semi-primitive motorized. The ROS for the Nevada Mountain IRA is also semi-primitive motorized. Semi-primitive motorized indicates there are moderate opportunities for solitude, tranquility and closeness to nature. There is a high degree of self-reliance, challenge and risk in using motorized equipment. There is a predominantly natural appearing environment. There is a low concentration of users but there is also often evidence of other users on

trails. On site controls and restrictions are minimum and subtle. Vegetative alterations are very small in size and number and are widely dispersed.

Special Features and Values

There are no special features or values within this unroaded area. It is primarily used during the big game hunting season. Other than it being adjacent to the inventoried roadless area and near the CDNST, there are no other special features.

Manageability

This area would not incorporate additional readily identifiable topographic boundaries per the manageability discussion of the contiguous Nevada Mountain IRA. Due to its adjacency to a portion of the IRA not considered manageable as wilderness, it does not lend itself to management as wilderness. It could be considered for management as an extension of the Nevada Mountain IRA, though this would not be consistent with the Forest Plan management direction for the area.

Unroaded and Roadless, Environmental Consequences

This effects analysis considers the four IRA's as well as the contiguous unroaded piece adjacent to the Nevada Mountain IRA. The Nevada Mountain IRA and the contiguous unroaded lands in the Left Hand Fork Cottonwood Gulch are combined so as to evaluate the impacts of proposed actions on the entire unroaded expanse.

This section describes the environmental consequences of implementing alternative 1 and four other alternatives. Effects are disclosed by tracking the following indicators: changes to the wilderness attributes of the unroaded areas, specifically:

- ***Natural*** – The extent to which long-term ecological processes are intact and operating;
- ***Undeveloped*** – The degree to which the impacts documented in natural integrity are apparent to most visitors;
- ***Outstanding opportunities for solitude or primitive unconfined recreation*** – Solitude is a personal, subjective value defined as the isolation from sights, sounds and presence of others and from developments and evidence of humans. Primitive recreation is characterized by meeting nature on its own terms, without comfort and convenience of facilities;
- ***Special features and values*** – Unique ecological, geological, scenic and historical features of an area; and
- ***Manageability*** – The ability to manage an area for wilderness consideration and maintain wilderness attributes.

There are no thresholds of significance for any of the indicators because there are no pertinent laws or Forest Plan standards that place any absolute threshold on effects to otherwise undesignated unroaded areas. It is, however, important for the decision-maker and the public to be aware of the potential for changes in the indicators. Also, the effects analysis was prepared with the premise that mitigations identified in Chapter Two would be implemented.

Effects Common to All Action Alternatives

Under all action alternatives, impacts to wilderness attributes 1 through 3 (Natural, Undeveloped and Remoteness/Solitude) would occur during the timeframes when open motorized routes are being traveled on. The effects to Natural and Undeveloped in particular would persist in the long-term as well, perhaps 50 years. This effects analysis focuses on assessing effects to the unroaded resource following implementation of the selected alternative.

Alternative 1 - No Action

The No Action Alternative would leave the current unroaded character unchanged from the descriptions presented in the Affected Environment section.

Alternative 2

Nevada Mountain IRA and contiguous unroaded lands (Left Hand Fork Cottonwood Gulch)

The portion of the Nevada Mountain IRA that is being analyzed in this report is approximately 8,435 acres in extent. When combined with the approximate 480 acre Left Hand Fork Cottonwood Gulch contiguous unroaded area, the area encompasses approximately 8,915 acres. The contiguous unroaded area is approximately one mile south of the Forest boundary.

Table 23: Nevada Mtn IRA and Alternative 2

Road, Trail, or General Area	Changes Alternative 1	Alternative 2
Road 4044 E1	Roads closed to motorized vehicles yearlong including OSMV	Roads closed to wheeled motorized use yearlong, open to OSMV 12/2 – 5/15
Road 136 D1 (portion of)	Roads open to highway legal vehicles, no seasonal restrictions	Roads closed to wheeled motorized use yearlong, open to OSMV 12/2 – 5/15
Trail 136-007 (not in IRA, but adjacent to it)	Unauthorized road/trail	Trail open to vehicles 50 inches or less in width, no seasonal restrictions
Over-snow Motorized Vehicles (southwest portion of IRA)	Open to OSMV	Area restriction to OSMV except on open or designated routes

Access into the southeast part of the IRA via route 774 would remain the same.

Direct access into the contiguous unroaded does not currently exist and would not change under alternative 2.

Natural

The natural attribute describes the extent to which long-term ecological processes are intact and operating.

While long-term ecological processes would be expected to continue operating following the changes proposed under alternative 2, the new presence of over-snow motorized vehicles accessing the area via

Road 4044-E1 could reduce the apparent naturalness of this part of the IRA during the winter – visually from the tracks. Over-snow motorized vehicles could temporarily change the natural characteristics of the area from the visual appearance of snowmobile tracks. However, it should not change the physical characteristics. This would provide an additional 1.7 miles of road available to over-snow motorized vehicles. However, at the same time, acres available to over-snow motorized vehicles would be reduced by approximately 1,005. This would occur in the southwest part of the IRA, adjacent to the private land boundary. This decrease in acres would improve the natural integrity of the IRA. Therefore, in regards to over-snow motorized vehicles, the newly available route #4044-E1 would provide access into the IRA, but at the same time the number of acres available to this type of use would be reduced.

In regards to Road #136-D1, the reduction in the numbers of motorized vehicles would enhance the naturalness of the IRA. However, the presence of over-snow motorized vehicles could reduce the natural integrity of the area during the winter.

In addition, trail #136-007 would be open to motorized vehicles 50 inches or less in width with no seasonal restrictions. This could increase use along the southern part of the IRA, thereby reducing the naturalness of the area.

Increased use of motorized vehicles also poses an indirect risk of noxious weed establishment. While Alternative 2 would potentially prevent and/or address this problem, invasive species would compromise the natural integrity of the area. Please refer also to the noxious weed specialist report for this project.

The approximate 480 additional acres landscape in a natural appearance would directly serve to enhance this quality within the adjacent Nevada Mountain IRA. However, indirectly, the additional potential for increased access into the area via over-snow motorized vehicles could reduce this quality.

Undeveloped

While route #4044-E1 would provide over-snow motorized vehicle access into the IRA, the number of acres available to this type of use would be reduced. The undeveloped character would remain the same.

Outstanding opportunities for solitude or primitive unconfined recreation

As noted in the discussion of the Nevada Mountain IRA, the IRA perimeter offers a somewhat reduced opportunity for a primitive experience. The contiguous unroaded area abuts and extends the perimeter of the IRA. Access into the IRA on existing routes would not be changed. However, access into the IRA via over-snow motorized vehicles would be enhanced. This use could greatly reduce the opportunities for solitude. While at the same time, the number of acres available to over-snow motorized vehicles would be reduced, thereby possibly increasing the opportunities for solitude. Therefore, the overall change to the opportunities for solitude would be negligible.

Special Features and Values

A portion of the Continental Divide National Scenic Trail (CDNST) is located within the Nevada Mountain IRA. The closure of 2.5 miles of Road # 136-D1 to wheeled motorized vehicles may enhance the special values associated with this nationally designated trail.

Manageability

The contiguous unroaded area adjacent to the Nevada Mountain IRA does not have any additional readily identifiable topographic features. It does not lend itself to management as wilderness. It could

be considered for management as an extension of the Nevada Mountain IRA, though this would not be consistent with the Forest Plan management direction for the area.

Because this unroaded area does not meet the criteria for potential wilderness designation, alternative 2 would not reduce the existing capability of this area's suitability for wilderness recommendation. In other words, neither this unroaded area nor the portions of the adjacent inventoried roadless area indirectly affected by the activities are considered suitable for future wilderness designation and both would remain unsuitable after project implementation.

Jericho Mountain IRA (1607)

The portion of the Jericho Mountain IRA that is being analyzed in this report is approximately 8,415 acres.

Table 24: Jericho Mtn IRA and Alternative 2

Road, Trail, or General Area	Changes Alternative 1	Alternative 2
Over-snow Motorized Vehicles	Open to OSMV	Open to OSMV 12/2 – 5/15
Over-snow Motorized Vehicles (northeast 1/3)	Open to OSMV	Restricted except on open or designated routes
Road 527 B1	Road open to highway legal vehicles, no seasonal restrictions	Road closed to wheeled motorized use yearlong, open to OSMV from 12/2 – 5/15
General Access Into IRA via 1017 and 1016	Roads open to wheeled motorized vehicles 5/16 – 4/14, open to OSMV, no seasonal restrictions	Roads open to highway legal vehicles 5/16 – 12/1, open to OSMV 12/2 – 5/15

Natural

The reduced presence of highway and wheeled vehicles due to fewer miles of wheeled motorized routes would enhance the apparent naturalness of the IRA. In addition, the reduction of approximately 6,050 acres open to over-snow motor vehicles would add to the apparent naturalness.

Undeveloped

Because there would be no physical changes to the landscape, the undeveloped character would remain the same.

Outstanding opportunities for solitude or primitive unconfined recreation

The reduced presence of highway and wheeled vehicles due to fewer miles of wheeled motorized routes (about 1.7 miles) would enhance the opportunities for solitude in the IRA. In addition, the reduction in acres open to OSMV would add to the opportunities for solitude.

Special Features and Values

The CDNST runs through the west side of this IRA. There are no changes proposed to the CDNST. The area is comprised of forested slopes similar to many other areas on the Helena Ranger District, so there would be no effect from implementation of alternative 2 for this portion of wilderness criteria.

Manageability

Because much of this IRA is already bordered by roads, private lands and trails, the proposed changes under alternative 2 would not affect the manageability of the IRA.

Lazyman (1608)

Alternative 2 proposes no changes to the existing condition. Please see the description above.

Natural

There would be no change to motorized routes or the acres available to over-snow motorized vehicles. Therefore, the effects to the apparent naturalness would not change.

Undeveloped

Because there would be no physical changes to the landscape, the undeveloped character would remain the same.

Outstanding opportunities for solitude or primitive unconfined recreation

There would be no change to motorized routes or the acres available to over-snow motorized vehicles. Therefore, the effects to the opportunities for solitude or primitive recreation would remain the same.

Special Features and Values

Access to the Black and Colorado Mountain areas would remain the same.

Manageability

The majority of this IRA in the project boundary is bordered by roads and topographic features. The proposed changes under alternative 2 would not affect the manageability of the IRA.

Electric Peak IRA (1609)

Table 25: Electric Peak IRA and Alternative 2

Road, Trail, or General Area	Changes	
	Alternative 1	Alternative 2
Road 227 C1	Roads closed to motorized vehicles yearlong including OSMV	Roads closed to wheeled motorized use yearlong, open to OSMV 12/2 – 5/15
Road 227D1	Roads open to highway legal vehicles with no seasonal restriction	Roads closed to motorized vehicles yearlong including OSMV
Road 1801A	Roads closed to motorized vehicles yearlong including OSMV	Roads closed to wheeled motorized use yearlong, open to OSMV 12/2 – 5/15
Road 1870 (portion)	Roads open to wheeled motorized vehicles 6/1 – 8/31, open to OSMV 12/1 – 8/31	Roads open to highway legal vehicles 5/16 – 10/14, open to OSMV 12/2 – 5/15
Road 1870 A1	Roads open to highway legal vehicles with no seasonal restrictions	Roads closed to wheeled motorized use yearlong, open to OSMV 12/2 – 5/15
Road 1870 B1	Roads closed to motorized vehicles yearlong including OSMV	Roads closed to wheeled motorized use yearlong, open to OSMV 12/2 – 5/15
Road 501	Road open to vehicles 50 inches or less in width, no seasonal restrictions	Trails open to 50 inches or less in width 5/16 – 10/14
MTR 504	Trails open to vehicles 50 inches or less in width 5/16 – 10/14	Trails closed to motorized vehicles yearlong, except in areas open to OSMV

Natural

The reduced presence of highway and wheeled vehicles due to fewer miles of wheeled motorized routes (about 2.3) would enhance the apparent naturalness of the IRA. There would be no change in the

number of acres available to over-snow motorized vehicles. Therefore, the effects to the apparent naturalness would not change.

Undeveloped

Because there would be no physical changes to the landscape, the undeveloped character would remain the same.

Outstanding opportunities for solitude or primitive unconfined recreation

The reduced presence of highway and wheeled vehicles due to fewer miles of wheeled motorized routes would enhance the opportunities for solitude in the IRA. Since the number of acres available to over-snow motorized vehicles would remain the same, the impacts from those types of vehicles would not change.

Special Features and Values

Access into the Bison Mountain area and Blackfoot Meadows would remain the same. As a result there would be no change to existing special features and values.

There are no changes proposed to the CDNST.

The area is comprised of forested slopes similar to many other areas on the Helena Ranger District, so there would be no effect from implementation of alternative 2 on this wilderness criterion.

Manageability

The majority of this IRA in the project boundary is bordered by roads and topographic features. The proposed changes under alternative 2 would not affect the manageability of the IRA.

Alternative 3

Nevada Mountain IRA and contiguous unroaded lands (Left Hand Fork Cottonwood Gulch)

The portion of the Nevada Mountain IRA that is being analyzed in this report is approximately 8,435 acres in extent. When combined with the approximate 480 acre Left Hand Fork Cottonwood Gulch contiguous unroaded area, the area encompasses approximately 8,915 acres. The contiguous unroaded area is approximately one mile south of the Forest boundary.

Table 26: Nevada Mtn IRA and Alternative 3

Road, Trail, or General Area	Changes Alternative 1	Alternative 3
Road 4044 E1	Roads closed to motorized vehicles yearlong including OSMV	Roads closed to wheeled motorized use yearlong, open to OSMV 12/2 – 5/15 (same as Alt.2)
Road 136 D1 (portion of)	Roads open to highway legal vehicles, no seasonal restrictions	Roads closed to wheeled motorized use yearlong, open to OSMV 12/2 – 5/15 (same as Alt.2)
Trail 136-007 (not in IRA, but adjacent to it)	Unauthorized road/trail	Trail open to vehicles 50 inches or less in width, no seasonal restrictions (same as Alt.2)
Over-snow Motorized Vehicles (southwest portion of IRA)	Open to OSMV	Area restriction to OSMV except on open or designated routes

Access into the southeast part of the IRA via route #774 would remain the same.

Direct access into the contiguous unroaded does not currently exist and would not change under Alternative 3.

Natural

Over-snow motorized vehicles would only be authorized on 682 acres within the IRA. This is a reduction of approximately 6,748 additional acres closed to over-snow motorized vehicles over alternatives 2 and 4. The reduction of over-snow motorized vehicles use within the IRA could enhance the natural character of the area during the winter months.

One other difference is that trail #136-007 would be closed yearlong. With this closure, the natural integrity of the IRA would be slightly improved. Fewer motorized vehicles would use this as a way to access the IRA.

Undeveloped

Because the actions are the same as alternative 2, the effects would also be the same as alternative 2.

Outstanding opportunities for solitude or primitive unconfined recreation

Over-snow motorized vehicles would be prohibited on all but 682 acres within the IRA. This would provide about 6,748 additional acres closed to over-snow motorized vehicles over alternatives 2 and 4. The reduction of over-snow motorized vehicles use within the IRA could enhance the opportunities for solitude and primitive recreation during the winter months.

Because trail #136-007 would be closed yearlong to motorized use, the opportunities for solitude would be slightly improved.

Special Features and Values

The Continental Divide National Scenic Trail (CDNST) is located within the Nevada Mountain IRA. The closure of 2.5 miles of Road # 136-D1 to wheeled motorized vehicles may enhance the special values associated with this nationally designated trail.

Manageability

There would be no change and the effects would be the same as alternative 2.

Jericho Mountain IRA (1607)

Table 27: Jericho Mountain IRA and Alternative 3

Road, Trail, or General Area	Changes Alternative 1	Alternative 3
Over-snow Motorized Vehicles (southern half)	Open to OSMV	Open to OSMV 12/2 – 5/15
Over-snow Motorized Vehicles (northern half)	Open to OSMV	Restricted except on open or designated routes
Road 527 B1	Road open to highway legal vehicles, no seasonal restrictions	Road closed to wheeled motorized use yearlong, open to OSMV from 12/2 – 5/15 (same as Alt.2)
General Access Into IRA via 1017 and 1016	Roads open to wheeled motorized vehicles 5/16 – 4/14 and open to OSMV with no seasonal restrictions	Roads open to highway legal vehicles 5/16 – 12/1, open to OSMV 12/2 – 5/15 (same as Alt.2)
Road 1856 H1	Roads closed to wheeled motorized vehicles yearlong, open to OSMV 12/2 – 10/14	Roads closed to motorized vehicles yearlong including OSMV

Natural

The reduced presence of highway and wheeled vehicles due to fewer miles of wheeled motorized routes would enhance the apparent naturalness of the IRA. In addition, the reduction of approximately 6,050 acres open to over-snow motorized vehicles would add to the apparent naturalness.

Undeveloped

Because there would be no physical changes to the landscape, the undeveloped character would remain the same.

Outstanding opportunities for solitude or primitive unconfined recreation

The reduced presence of highway and wheeled vehicles due to fewer miles of wheeled motorized routes (about 1.7 miles) would enhance the opportunities for solitude in the IRA. In addition, the reduction of approximately 6,050 acres open to over-snow motorized vehicles would add to the opportunities for solitude.

Special Features and Values

The Continental Divide National Scenic Trail runs through the west side of this IRA. There are no changes proposed to the CDNST. The area is comprised of forested slopes similar to many other areas on the Helena Ranger District, so there would be no effect from implementation of alternative 3 on this portion of wilderness criteria.

Manageability

Because much of this IRA is already bordered by roads, private lands and trails, the proposed changes under alternative 3 would not affect the manageability of the IRA.

Lazyman (1608)

Alternative 3 proposes no changes to the existing condition. Please see the description above.

Natural

Alternative 3 proposes no changes to the existing condition and therefore the effects to the apparent naturalness would not change.

Undeveloped

Because there would be no physical changes to the landscape, the undeveloped character would remain the same.

Outstanding opportunities for solitude or primitive unconfined recreation

There would be no change to motorized routes or acres available to over-snow motorized vehicles. Therefore, the effects to the opportunities for solitude or primitive recreation would remain the same.

Special Features and Values

A portion of the Continental Divide National Scenic Trail runs through the west side of this IRA. There are no changes proposed to the CDNST. The area is comprised of forested slopes similar to many other areas on the Helena Ranger District, so there would be no effect from implementation of alternative 3 for this portion of the wilderness criteria.

Manageability

Because much of this IRA is already bordered by roads, private lands and trails the proposed changes under alternative 3 would not affect the manageability of the IRA.

Electric Peak IRA (1609)

Table 28: Electric Peak IRA and Alternative 3

Road, Trail, or General Area	Changes Alternative 1	Alternative 3
Road 227 C1	Roads closed to motorized vehicles yearlong including OSMV	Roads closed to wheeled motorized use yearlong, open to OSMV 12/2 – 5/15 (same as Alt.2)
Road 227D1	Roads open to highway legal vehicles with no seasonal restriction	Roads closed to motorized vehicles yearlong including OSMV (same as Alt.2)
Road 227 E1	Roads open to highway legal vehicles with no seasonal restrictions	Road closed to motorized vehicles yearlong including OSMV
Road 1801A	Roads closed to motorized vehicles yearlong including OSMV	Roads closed to wheeled motorized use yearlong, open to OSMV 12/2 – 5/15 (same as Alt.2)
Road 1870 (portion)	Roads open to wheeled motorized vehicles 6/1 – 8/31, open to OSMV 12/1 – 8/31	Roads closed to wheeled motorized vehicles yearlong, open to OSMV 12/ - 5/15
Road 1870 A1	Roads open to highway legal vehicles with no seasonal restrictions	Roads closed to wheeled motorized use yearlong, open to OSMV 12/2 – 5/15 (same as Alt.2)
Road 1870 B1	Roads closed to motorized vehicles yearlong including OSMV	Roads closed to wheeled motorized use yearlong, open to OSMV 12/2 – 5/15 (same as Alt.2)
Road 501	Road open to vehicles 50 inches or less in width 5/16 – 10/14	Trails closed to motorized vehicles yearlong except in areas open to OSMV
Trail MTR 502	Trails open to vehicles 50 inches or less in width 5/16 – 10/14	Trails closed to motorized vehicles yearlong except in areas open to OSMV
Trail MTR 503	Trails open to vehicles 50 inches or less in width 5/16 – 10/14	Trails closed to motorized vehicles yearlong except in areas open to OSMV
Trail MTR 504	Trails open to vehicles 50 inches or less in width5/16 – 10/14	Trails closed to motorized vehicles yearlong except in areas open to OSMV (same as Alt.2)

Natural

The reduced presence of highway and wheeled vehicles due to fewer miles of wheeled motorized routes would enhance the apparent naturalness of the IRA. There would be no change in the number of acres available to over-snow motorized vehicles. Therefore, the effects to the apparent naturalness would not change.

Undeveloped

Because there would be no physical changes to the landscape, the undeveloped character would remain the same.

Outstanding opportunities for solitude or primitive unconfined recreation

The reduced presence of highway and wheeled vehicles due to fewer miles of wheeled motorized routes would enhance the opportunities for solitude in the IRA. Since the number of acres available to over-snow motorized vehicles would remain the same, the impacts from those types of vehicles would not change.

Special Features and Values

Access into the Electric Peak IRA for over-snow motorized vehicles would not change.

There are no changes proposed to the Continental Divide National Scenic Trail.

The area is comprised of forested slopes similar to many other areas on the Helena Ranger District, so there would be no effect from implementation of alternative 3 on this portion of wilderness criteria.

Manageability

The majority of this IRA in the project boundary is bordered by roads and topographic features. The proposed changes under alternative 3 would not affect the manageability of the IRA.

Alternative 4

Nevada Mountain IRA and contiguous unroaded lands (Left Hand Fork Cottonwood Gulch)

The portion of the Nevada Mountain IRA that is being analyzed in this report is approximately 8,435 acres in extent. When combined with the approximate 480 acre Left Hand Fork Cottonwood Gulch contiguous unroaded area, the area encompasses approximately 8,915 acres. The contiguous unroaded area is approximately one mile south of the Forest boundary.

Table 29: Nevada Mountain IRA and Alternative 4

Road, Trail, or General Area	Changes From (Existing Condition)	To (Alt. 4)
Road 4044 E1	Roads closed to motorized vehicles yearlong including OSMV	Roads closed to wheeled motorized use yearlong, open to OSMV 12/2 – 5/15 (same as Alt.2)
Road 136 D1 (portion of)	Roads open to highway legal vehicles, no seasonal restrictions	Roads closed to wheeled motorized use yearlong, open to OSMV 12/2 – 5/15 (same as Alt.2)
Trail 136-007 (not in IRA, but adjacent to it)	Unauthorized road/trail	Trail open to vehicles 50 inches or less in width from 5/16 – 10/14
Over-snow Motorized Vehicles (southwest portion of IRA)	Open to OSMV	Area restriction to OSMV except on open or designated routes

Access into the southeast part of the IRA via route #774 would remain the same.

Access into the contiguous unroaded does not currently exist and would not change under alternative 4.

Natural

The direct effects of alternative 4 would be very similar to alternative 2, with the exception of the change of 136-007 from an unauthorized trail to a trail (with seasonal restrictions) open to motorized vehicles 50 inches or less. During the open season, this trail would see increased use, as compared to the past. Because of the decrease in availability of authorized trails in other areas on the Forest, use on the trail could increase. This increase would affect the natural integrity of the IRA and the contiguous unroaded area.

Increased use of motorized vehicles also poses an indirect risk of noxious weed establishment. While alternative 4 would potentially prevent and/or address this problem, invasive species would compromise the natural integrity of the area. Please refer also to the noxious weed specialist report for this project which can be found in the project file.

Undeveloped

Physical changes to the landscape would include the development of the unauthorized trail to an authorized trail. This would include disturbing the trail/road bed, making it usable for motorized vehicles 50 inches or less in width. Therefore, the undeveloped character would be slightly reduced.

Outstanding opportunities for solitude or primitive unconfined recreation

As noted in the discussion of the Nevada Mountain IRA, the IRA perimeter offers a somewhat reduced opportunity for a primitive experience. The contiguous unroaded area abuts and extends the perimeter of the IRA. Access into the IRA on existing routes and via over-snow motorized vehicles would be similar to alternative 2.

In addition, converting the unauthorized trail to one available to motorized vehicles 50 inches or less in width (seasonally) could reduce the opportunity for solitude. Although the trail isn't located within the IRA, it is adjacent to the southern border and those individuals looking for solitude in that portion of the IRA could be affected by the additional presence and noise of motorized vehicles.

Special Features and Values

The Continental Divide National Scenic Trail (CDNST) is located within the Nevada Mountain IRA. The closure of 2.5 miles of Road # 136-D1 to wheeled motorized vehicles may enhance the special values associated with this nationally designated trail.

Manageability

The contiguous unroaded area adjacent to the Nevada Mountain IRA does not have any additional readily identifiable topographic features. It does not lend itself to management as wilderness. It could be considered an extension of the Nevada Mountain IRA, though this would not be consistent with the Forest Plan management direction for the area.

Because this unroaded area does not meet the criteria for potential wilderness designation, alternative 4 would not reduce the existing capability of this area's suitability for wilderness recommendation. In other words, neither this unroaded area nor the portions of the adjacent inventoried roadless area indirectly affected by the activities are considered suitable for future wilderness designation and both would remain unsuitable after project implementation.

Jericho Mountain IRA (1607)

Table 30: Jericho Mountain IRA and Alternative 4

Road, Trail, or General Area	Changes Alternative 1	Alternative 4
Over-snow Motorized Vehicles (southern half)	Open to OSMV	Open to OSMV 12/2 – 5/15 (same as Alt.3)
Over-snow Motorized Vehicles (northern half)	Open to OSMV	Restricted except on open or designated routes (same as Alt.3)
Road 527 B1	Road open to highway legal vehicles, no seasonal restrictions	Road closed to wheeled motorized use yearlong, open to OSMV from 12/2 – 5/15 (same as Alt.2)
General Access Into IRA via 1017 and 1016	Roads open to wheeled motorized vehicles 5/16 – 4/14 and open to OSMV with no seasonal restrictions	Roads open to highway legal vehicles 5/16 – 12/1, open to OSMV 12/2 – 5/15 (same as Alt.2)
Road 1856 H1	Roads closed to wheeled motorized vehicles yearlong, open to OSMV 12/2 – 10/14	Roads closed to motorized vehicles yearlong including OSMV (same as Alt.3)

Natural

The reduced presence of highway and wheeled vehicles due to fewer miles of wheeled motorized routes (2.4 miles) would enhance the apparent naturalness of the IRA. In addition, the reduction in acres open to over-snow motorized vehicles would add to the apparent naturalness.

Undeveloped

Because there would be no physical changes to the landscape, the undeveloped character would remain the same.

Outstanding opportunities for solitude or primitive unconfined recreation

The reduced presence of highway and wheeled vehicles due to fewer miles of wheeled motorized routes would enhance the opportunities for solitude in the IRA. In addition, the reduction in acres open to over-snow motorized vehicles would add to the opportunities for solitude.

Special Features and Values

The Continental Divide National Scenic Trail passes through the west side of this IRA. There are no changes proposed to the CDNST. The area is comprised of forested slopes similar to many other areas on the Helena Ranger District, so there would be no effect from implementation of alternative 4 on this portion of wilderness criteria.

Manageability

Because much of this IRA is already bordered by roads, private lands and trails, the proposed changes under alternative 4 would not affect the manageability of the IRA.

Lazyman (1608)

Alternative 4 proposes no changes to the existing condition. Please see the description above.

Electric Peak IRA (1609)

Table 31: Electric Peak IRA and Alternative 4

Road, Trail, or General Area	Changes Alternative 1	Alternative 4
Road 227 C1	Roads closed to motorized vehicles yearlong including OSMV	Roads closed to wheeled motorized use yearlong, open to OSMV 12/2 – 5/15 (same as Alt.2)
Road 227 E1	Roads open to highway legal vehicles with no seasonal restrictions	Road closed to motorized vehicles yearlong including OSMV
Road 1801A	Roads closed to motorized vehicles yearlong including OSMV	Roads closed to wheeled motorized use yearlong, open to OSMV 12/2 – 5/15 (same as Alt.2)
Road 1870 (portion)	Roads open to wheeled motorized vehicles 6/1 – 8/31, open to OSMV 12/1 – 8/31	Roads open to highway legal vehicles 5/16 – 10/14, open to OSMV 12/2 – 5/15
Road 1870 A1	Roads open to highway legal vehicles with no seasonal restrictions	Roads closed to wheeled motorized use yearlong, open to OSMV 12/2 – 5/15 (same as Alt.2)
Road 1870 B1	Roads closed to motorized vehicles yearlong including OSMV	Roads closed to wheeled motorized use yearlong, open to OSMV 12/2 – 5/15 (same as Alt.2)
Road 501	Road open to vehicles 50 inches or less in width 5/16 – 10/14	Trails closed to motorized vehicles yearlong except in areas open to OSMV
Trail MTR 502	Trails open to vehicles 50 inches or less in width 5/16 – 10/14	Trails closed to motorized vehicles yearlong except in areas open to OSMV
Trail MTR 503	Trails open to vehicles 50 inches or less in width 5/16 – 10/14	Trails closed to motorized vehicles yearlong except in areas open to OSMV
Trail MTR 504	Trails open to vehicles 50 inches or less in width 5/16 – 10/14	Trails closed to motorized vehicles yearlong except in areas open to OSMV (same as Alt.2)

Natural

The reduced presence of highway and wheeled vehicles due to fewer miles of wheeled motorized routes would enhance the apparent naturalness of the IRA. There would be no change in the number of acres

available to over-snow motorized vehicles. Therefore, the effects to the apparent naturalness would not change.

Undeveloped

Because there would be no physical changes to the landscape, the undeveloped character would remain the same.

Outstanding opportunities for solitude or primitive unconfined recreation

The reduced presence of highway and wheeled vehicles due to fewer miles of wheeled motorized routes would enhance the opportunities for solitude in the IRA. Since the number of acres available to over-snow motorized vehicles would remain the same, the impacts from those types of vehicles would not change.

Special Features and Values

Access into the Electric Peak IRA for over-snow motorized vehicles would not change.

There are no changes proposed to the Continental Divide National Scenic Trail.

The area is comprised of forested slopes similar to many other areas on the Helena Ranger District, so there would be no effect from implementation of alternative 4 on this portion of wilderness criteria.

Manageability

The majority of this IRA in the project boundary is bordered by roads and topographic features. The proposed changes under alternative 4 would not affect the manageability of the IRA.

Alternative 5

Nevada Mountain IRA and contiguous unroaded lands (Left Hand Fork Cottonwood Gulch)

The portion of the Nevada Mountain IRA that is being analyzed in this report is approximately 8,435 acres in extent. When combined with the approximate 480 acre Left Hand Fork Cottonwood Gulch contiguous unroaded area, the area encompasses approximately 8,915 acres. The contiguous unroaded area is approximately one mile south of the Forest boundary.

Table 32: Nevada Mtn IRA and Alternative 5

Road, Trail, or General Area	Changes Alternative 1	Alternative 5
Road 136 D1 (portion of)	Roads open to highway legal vehicles, no seasonal restrictions	Roads closed to motorized vehicles yearlong, including over-snow motorized vehicles
Trail 136-007 (not in IRA, but adjacent to it)	Unauthorized road/trail	CDNST
Road 774-A1	Roads open to highway legal vehicles, no seasonal restrictions	Roads closed to wheeled motorized vehicles yearlong
Over-snow Motorized Vehicles (southwest portion of IRA)	Open to OSMV	Area restriction to OSMV except on open or designated routes, except for 1,082 acres in the most southeastern corner where there is a portion open to over-snow motorized between 12/2-5/15.

Access into the southeast part of the IRA via route #774 would remain the same.

Access into the contiguous unroaded does not currently exist and would not change under alternative 5.

Natural

The direct effects of alternative 5 would be very similar to alternative 2, with the exception of the change of 136-007 from an unauthorized trail to a trail (with seasonal restrictions) open to motorized vehicles 50 inches or less in width. During the open season, this trail would see increased use, as compared to the past. Because of the decrease in availability of authorized trails in other areas on the Forest, use on the trail could increase. This increase would affect the natural integrity of the IRA and the contiguous unroaded area.

Increased use of motorized vehicles also poses an indirect risk of noxious weed establishment. While alternative 5 would potentially prevent and/or address this problem, invasive species would compromise the natural integrity of the area. Please refer also to the noxious weed specialist report for this project which can be found in the project file.

Undeveloped

Physical changes to the landscape would include the development of the unauthorized trail to an authorized trail. This would include disturbing the trail/road bed, making it usable for motorized vehicles 50 inches or less in width. Therefore, the undeveloped character would be slightly reduced.

Outstanding opportunities for solitude or primitive unconfined recreation

As noted in the discussion of the Nevada Mountain IRA, the IRA perimeter offers a somewhat reduced opportunity for a primitive experience. The contiguous unroaded area abuts and extends the perimeter of the IRA. Access into the IRA on existing routes and via over-snow motorized vehicles would be similar to alternative 2.

In addition, converting the unauthorized trail to one available to motorized vehicles 50 inches or less in width (seasonally) could reduce the opportunity for solitude. Although the trail isn't located within the IRA, it is adjacent to the southern border and those individuals looking for solitude in that portion of the IRA could be affected by the additional presence and noise of motorized vehicles.

Special Features and Values

The Continental Divide National Scenic Trail (CDNST) is located within the Nevada Mountain IRA. The closure of 2.5 miles of Road # 136-D1 to wheeled motorized vehicles may enhance the special values associated with this nationally designated trail.

Manageability

The contiguous unroaded area adjacent to the Nevada Mountain IRA does not have any additional readily identifiable topographic features. It does not lend itself to management as wilderness. It could be considered an extension of the Nevada Mountain IRA, though this would not be consistent with the Forest Plan management direction for the area.

Because this unroaded area does not meet the criteria for potential wilderness designation, alternative 5 would not reduce the existing capability of this area's suitability for wilderness recommendation. In other words, neither this unroaded area nor the portions of the adjacent inventoried roadless area indirectly affected by the activities are considered suitable for future wilderness designation and both would remain unsuitable after project implementation.

Jericho Mountain IRA (1607)

Table 33: Jericho Mountain IRA and Alternative 5

Road, Trail, or General Area	Changes Alternative 1	Alternative 5
Over-snow Motorized Vehicles	Open to OSMV	Area restriction to OSMV except on open or designated routes, except for 1,222 acres in the most southern portion where it is open to over-snow motorized between 12/2-5/15.
Road 527 B1	Road open to highway legal vehicles, no seasonal restrictions	Roads closed to motorized vehicles yearlong, including over-snow motorized vehicles
General Access Into IRA via 1017 and 1016	Roads open to wheeled motorized vehicles 5/16 – 4/14 and open to OSMV with no seasonal restrictions	Roads open to highway legal vehicles, no seasonal restrictions

Natural

The reduced presence of highway and wheeled vehicles due to fewer miles of wheeled motorized routes (2.7 miles) would enhance the apparent naturalness of the IRA. In addition, the reduction in acres open to over-snow motorized vehicles would add to the apparent naturalness.

Undeveloped

Because there would be no physical changes to the landscape, the undeveloped character would remain the same.

Outstanding opportunities for solitude or primitive unconfined recreation

The increased access to the area by Roads 1017 and 1016, although they are outside the IRA, provide increased motorized access to the IRA perimeter which could result in a reduced sense of solitude in the northern portion of this IRA. The closure of Road 527-B1, would reduce the presence of highway and wheeled vehicles within the IRA boundary itself, due to fewer miles of wheeled motorized routes would enhance the opportunities for solitude in the IRA the further one moved into the interior of the IRA. In addition, the reduction in acres open to over-snow motorized vehicles would add to the opportunities for solitude.

Special Features and Values

The Continental Divide National Scenic Trail passes through the west side of this IRA. There are no changes proposed to the CDNST. The area is comprised of forested slopes similar to many other areas on the Helena Ranger District, so there would be no effect from implementation of alternative 5 on this portion of wilderness criteria.

Manageability

Because much of this IRA is already bordered by roads, private lands and trails, the proposed changes under alternative 5 would not affect the manageability of the IRA.

Lazyman Gulch (1608)

Alternative 5 proposes no changes to the existing condition. Please see the description above.

Electric Peak IRA (1609)

Table 34: Electric Peak IRA and Alternative 5

Road, Trail, or General Area	Changes Alternative 1	Alternative 5
Road 123-013	Road open to highway legal vehicles, no seasonal restrictions	Roads closed to motorized vehicles yearlong, including over-snow motorized vehicles
Road 227 D1	Road open to highway legal vehicles, no seasonal restrictions	Non-motorized system trail
Road 227 E1	Roads open to highway legal vehicles with no seasonal restrictions	Roads closed to motorized vehicles yearlong, including over-snow motorized vehicles
Road 1870 (portion)	Roads open to wheeled motorized vehicles 6/1 – 8/31, open to OSMV 12/1 – 8/31	Roads open to highway legal vehicles 5/16 – 8/31, open to OSMV 12/2 – 5/15
Road 1870 A1	Roads open to highway legal vehicles with no seasonal restrictions	Roads closed to motorized vehicles yearlong, including over-snow motorized vehicles
Trail MTR 501	Road open to vehicles 50 inches or less in width 5/16 – 10/14	Trails open to wheeled motorized 5/16 – 8/31, except in areas open to OSMV
Trail MTR 502	Trails open to vehicles 50 inches or less in width 5/16 – 10/14	Trails closed to motorized vehicles yearlong except in areas open to OSMV
Trail MTR 503	Trails open to vehicles 50 inches or less in width 5/16 – 10/14	Trails closed to motorized vehicles yearlong except in areas open to OSMV
Trail MTR 504	Trails open to vehicles 50 inches or less in width 5/16 – 10/14	Trails closed to motorized vehicles yearlong except in areas open to OSMV
Trail MTR 505	Trails open to vehicles 50 inches or less in width 5/16 – 10/14	Trails closed to motorized vehicles yearlong except in areas open to OSMV

Natural

The reduced presence of highway and wheeled vehicles due to 4.2 miles fewer miles of wheeled motorized routes would enhance the apparent naturalness of the IRA. There would be no change in the number of acres available to over-snow motorized vehicles. Therefore, the effects to the apparent naturalness would not change.

Undeveloped

Because there would be no physical changes to the landscape, the undeveloped character would remain the same.

Outstanding opportunities for solitude or primitive unconfined recreation

The reduced presence of highway and wheeled vehicles due to fewer miles of wheeled motorized routes would enhance the opportunities for solitude in the IRA. In addition, the reduction in acres open to over-snow motorized vehicles would add to the opportunities for solitude.

Special Features and Values

There are no changes proposed to the Continental Divide National Scenic Trail.

The area is comprised of forested slopes similar to many other areas on the Helena Ranger District, so there would be no effect from implementation of alternative 5 on this portion of wilderness criteria.

Manageability

The majority of this IRA in the project boundary is bordered by roads and topographic features. The proposed changes under alternative 5 would not affect the manageability of the IRA.

Cumulative Effects

Cumulative Effects in the Divide Travel Plan area include past, present and reasonably foreseeable actions. The cumulative effects analysis area boundary for the unroaded analysis is the same as the project area boundary.

The activities proposed by all of the action alternatives are not consumptive. Roads and trails are being proposed for opening/closing, along with timing restrictions. None of the actions are ground disturbing. As described below, the effects would be common to all of the action alternatives.

None of the alternatives would directly affect the roadless character of the four IRAs and the one identified contiguous unroaded area. Under the action alternatives, the feeling of naturalness and sense of solitude could be affected. However, cumulatively, these effects are expected to be short-term. In the long-term, Forest Plan standards would still be met.

Livestock grazing

Grazing affects wilderness character by the presence of structures used to manage the livestock – gates, fences and water improvements. The presence of livestock also affects the characteristics of remoteness and solitude. In addition, as a result of the grazing, landscapes may appear to have shorter grasses. However, overall, these impacts would have minimal effects to the wilderness characteristics of the IRA's.

Noxious Weed Treatments

Noxious weeds are typically treated along roads using mechanized equipment. Hand treatments can occur in patches that are off the roads. Livestock and biological agents may also be used. The presence of mechanized equipment and livestock could affect a user's sense of remoteness and solitude. Using hand treatments and biological agents would have a minimal effect. The sight of dead weeds, regardless of treatment type, may also affect ones sense of remoteness and solitude. However, overall, these effects would have minimal impacts to the wilderness characteristics of the IRAs.

Hazard Tree Removal

Roadside hazard tree removal would open the road corridor, visually making the road(s) more visible from within and around the IRAs. The sights and sounds of the mechanized equipment used during operations could also have a short-term impact. These could affect the sense of naturalness and solitude. Over time, as the vegetation grows back and fills in this space, the effects would lessen.

Hazard tree removal in existing developed recreation sites would also visually change the areas. As with roadside hazard tree removal, this could affect ones sense of solitude and remoteness. However, while these sites may be within sight of an IRA, the effects would be minimal and over time as the vegetation grows and fills in these areas, the effects would be even less.

Road Maintenance

There are numerous roads within and adjacent to the IRAs. Periodic road maintenance activities would not change the roads or add to them. The sight and sound of equipment when maintenance activities occur may indirectly affect ones sense of solitude or remoteness. However, these effects are short-term and overall; the wilderness character would not be affected by these activities.

Trail Maintenance/Reconstruction

Routine maintenance and reconstruction of non-motorized and motorized trails could incorporate the use of mechanized equipment and hand tools. This could indirectly affect ones sense of solitude and naturalness. At the same time, these trails are often considered to be the unique features found in the IRAs and often used to access the IRAs. Overall, these effects would be short-term and would have minimal impacts to the wilderness characteristics.

Private Timber Harvest

Private timber harvest on lands within sight distance of IRAs would further reduce the natural integrity and feelings of solitude and remoteness. Private harvest has occurred in the past within the Jericho Mountain IRA. The harvest activities including the associated hauling would have had an impact to the natural integrity and sense of solitude and remoteness. These characteristics have since improved over the past 15+years due to re-vegetation.

Private Roads/Special Use Permit Roads

There are several private roads/special use permit roads in the Lazyman Gulch and Jericho Mountain IRAs due to private lands and mining claims. The presence of these roads already affects the naturalness and solitude of the IRAs. When combined with the actions proposed in any of the alternatives, the effects would have a minimal impact to the overall wilderness characteristics of the IRAs.

Conclusions

Table 35: IRAs and Acres Open to Over-Snow Vehicles

Inventoried Roadless Area	Appx. Acres of NF in Planning Area	Acres Open to Over-snow Motorized Vehicles within IRA				
		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Nevada Mountain	8,435	8,435	7,430	682	7,430	1,082
Jericho Mountain	8,439	8,438	2,390	2,390	2,390	1,222
Lazyman	11,569	0	0	0	0	0
Electric Peak	27,857	9,550	9,550	9,550	9,550	6,374

Table 36: IRAs and Miles of Wheeled Motorized Routes

Inventoried Roadless Area	Appx. Acres of NF in Planning Area	Miles of Wheeled Motorized Routes within IRA				
		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Nevada Mountain	8,435	2	0.07	0.01	0.07	0.0
Jericho Mountain	8,439	4.11	2.4	2.4	2.4	1.45
Lazyman	11,569	0.08	0.08	0.08	0.08	0.08
Electric Peak	27,857	7.2	4.93	0.08	0.49	3.02

Alternative 1 would not alter the existing conditions of the four IRAs and the one contiguous unroaded area.

All the action alternatives would improve the five wilderness characteristics of the unroaded areas in some of the IRAs. Reducing the number of acres open to over-snow motorized vehicles and the number of miles of wheeled motorized routes would improve the perception of natural integrity, undeveloped characteristics, opportunities for solitude and special features. The manageability of the areas would not substantially change because of the existing roads, private lands, mining claims and topography. However, alternative 3 would reduce the number of wheeled motorized routes within the IRAs more than any of the other alternatives – including alternative 1. In summary, all of the action alternatives would improve the overall roadless character of unroaded lands.

Forest Plan Consistency

As previously stated, the Divide Travel Plan area was assigned management area designations which allow for wheeled motorized routes and over-snow motorized vehicles. All alternatives are consistent with the Forest Plan in this regard. All alternatives are consistent with Forest Plan forestwide and management area standards. All effects were found to be consistent with Forest Plan standards and would not harm or erode the identified wilderness characteristics of these unroaded areas.

This analysis would also be consistent with the 2001 Roadless Rule in that it does not propose or authorize the construction or reconstruction of roads within designated IRAs. The analysis only evaluates the opportunities to designate existing routes for motorized travel.

TRANSPORTATION

Regulatory Framework

Transportation management regulations for the National Forest System are located in the 36 Code of Federal Regulations parts 212 (forest transportation system) and 261 (use of motor vehicles off forest roads). Management policy direction and guidelines are contained in Forest Service Manuals (FSM) and Handbooks (FSH), including FSM 7700 (transportation system) and FSH 7709 (transportation). Management direction specific to the Helena National Forest is also provided by the 1986 Helena Forest Plan.

Assumptions

The transportation system in the Divide Travel Planning Area has evolved from a variety of past activities including mining, logging, grazing and recreational use. Over the past 30 years the majority of new road construction has been driven by timber harvest. It is assumed that these activities will continue to shape the transportation system with recreation, commercial and administrative uses being the primary drivers for change.

It is assumed that the use of the transportation system will trend upward. There are no firm numbers to confirm this trend, but personal observations, comments by forest users and adjacent landowners as well as the increasing population in the area indicate that use will increase. It is also assumed that maintenance on the transportation system would continue to lag behind needs.

Very little new road construction is anticipated in the future. Any new construction would be completed using current design practices in compliance with the National BMP standards (2012).

Management Activities: Past management activities within the analysis area such as timber and grazing management, fire and watershed restoration, drainage improvements and bridge replacement efforts have affected the transportation system in the short term by temporarily closing a section of road for several days or weeks. Upon opening the roads, the effects disappeared immediately. Management activities would continue, as they have in the past and are projected to be the same for all alternatives.

Motorized Mixed Use: Motorized mixed use is defined as designation of a NFS road for use by both highway-legal and non-highway-legal motor vehicles. Designating NFS roads for motorized mixed use requires an engineering analysis and must be completed by a qualified engineer. The assumption is made that engineering analysis of roads in the analysis for the purposes of addressing motorized mixed use would be completed on a case by case basis upon completion of the planning process and implemented over time.

Completed Travel Plans-Several Travel Plans on nearby/adjacent Forests have been completed, reducing motorized travel. These would potentially impact use of the Divide Travel Planning Area as visitors modify how and where they use the forest and adjacent areas.

Any action resulting from the implementation of any alternative selected would be fully implemented.

Information Used

The roads and trails in the Divide Travel Planning Area are identified on a GIS spatial layer. Information about the system roads and trails is stored in a database that is linked to the spatial layer. Non-system roads and trails have basic information stored in a data table linked to the spatial layer.

Information about the transportation system was derived from the following sources:

- 36 CFR 212 Travel Management
- Helena NF Roads Analysis, Final August 2004
- Helena – Travel Analysis Report- 2014
- Helena NF Travel Routes INFRA 2009
- Off-Highway Vehicles EIS for MT, MD and SD, 2001
- Off-Highway Vehicle Program Route and Area Designation Implementation Guide April 2012
- Elkhorn Mountains Travel Plan, 1995
- North Belts Travel Plan, 2005
- South Belts Travel Plan, 2008
- USFS Travel Routes Data Dictionary
- Professional experience by Helena National Forest personnel.
- Spreadsheets of Roads/Trails data developed by the Helena National Forest
- Guidelines for Engineering Analysis of Motorized Mixed-Use on National Forest System Roads December 2005
- United States Department of Agriculture, Forest Service, FS-990a, National Best Management Practices for Water Quality Management on National Forest System Lands, April 2012
- Streamside Management Zone Law 77-5-301
- Guide to Streamside Management Zone Law (November 2006)
- Forest Service handbook and manual direction FSM 7700, FSH 7709.55 and FSH 7709.56

- USDA National Best Management Practices for Water Quality Management on National Forest Land (April 2012) USDA
- Guidelines for Engineering Analysis of Motorized Mixed-Use on National Forest System Roads December 2005
- Spreadsheets of Roads/Trails data developed by the Helena National forest – Data July 05, 2012, adjusted November 22, 2012 to trails information and June 6, 2012 (adjustments to CDNST only)
- Field reviews conducted by Interdisciplinary team (IDT) members

In this report the description "unauthorized" road or route is equivalent to "non-system" route in INFRA. Much of the information presented in this analysis comes directly from field examination of the planning area and the surrounding region.

Roads Analysis Process (RAP)

The Helena NF Roads Analysis Process divided all of the roads in the area into nine categories (combinations of high, medium or low value and high, medium or low concern). A map showing the roads by category for the Divide Travel Planning Area is in the roads analysis document (Final, August 2004). In addition to categorizing the roads in the Divide area, the Roads Analysis Process identified a minimal roads system necessary for Helena National Forest operation. The minimal roads system identifies the roads necessary to meet the agency mission of protecting resources, providing adequate access for the public while considering impacts on global climate change. One aspect of the Divide travel planning process is to verify the information in the Roads Analysis Process as well as determine appropriate long-term management of undetermined and user created routes that may not have been identified during the Roads Analysis Process. Necessary changes to the minimum roads system were made in conjunction with the additional analysis completed as part of this travel planning effort.

The roads analysis recommends that roads rated low value-high concern (LVHC) be removed from the road system. There are two roads in this area that were classified in the roads analysis as LVHC – Road 527-C1 and road 4044 E-1.

Methodology and Scientific Accuracy

The transportation system existing condition was developed using transportation planning data from the sources listed previously. This data was used to evaluate the effects of each alternative. Information in the roads inventory is constantly being updated and corrected. All mileages in this report are approximate.

Alternatives were evaluated on the following basis:

- Transportation System - how the alternative changes the open transportation system and ability to conduct maintenance, including management of unauthorized (non-system) roads.
- Road Conditions - how the alternative affects conditions on the roads and trails.
- Enforcement issues - complexity of travel maps due to seasonal closures and vehicle types, areas of enforcement problems and conflicts between uses and the differences between the alternatives.

Transportation, Affected Environment

Introduction

The Divide Travel Planning Area is accessed by an extensive road and trail system. Most of the early roads were developed primarily for mining and grazing activities. Many of these roads were first used in the mid-1800's as wagon roads and then improved in the early 1900's to accommodate motorized vehicles. Since the 1950's, roads have been built to access forest stands for commercial timber sales. These roads have been built to a higher standard than the old mining and grazing roads. The road system now consists of a mixture of old and new roads, with many of the older roads in disrepair. See the Heritage Resources Specialists Report for more detailed information regarding historical development of the areas road and trail network.

Analysis Area

The analysis area is presented both in terms of the condition of the transportation system as well as specifics as they relate to certain geographic areas within the Divide Travel Planning Area.

Transportation System

The majority of the roads are single-lane, native surface roads. Within the analysis area, there are roads under the jurisdiction of counties, the State, private landowners and the Forest Service. These roads are included as part of the analysis and on the maps where they are the connectors between other primary forest roads.

Road Maintenance

Road maintenance is performed annually on the main county/state and NFSR's and sporadically on all of the other roads. Some of the roads are in poor locations (i.e. narrow canyon bottoms which increase both maintenance needs and the risk that sediment from the road surface could enter adjacent streams). Many of the local and collector roads in the area receive little maintenance.

Maintenance Level

There are five levels of maintenance identified by the Forest Service on National Forest System Roads (NFSR).

- **Maintenance Level 1** These are roads that have been placed in storage between intermittent uses. The period of storage must exceed one year. Basic custodial maintenance is performed to prevent damage to adjacent resources and to perpetuate the road for future resource management needs.
- **Maintenance Level 2** Assigned to roads open for use by high clearance vehicles. Passenger car traffic, user comfort and user convenience are not considerations.
- **Maintenance Level 3** Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities.
- **Maintenance Level 4** Assigned to roads that provide a moderate degree of user comfort and convenience at moderate speeds. Most roads are double lane and aggregate surfaced. However, some roads may be single lane.
- **Maintenance Level 5** Assigned to roads that provide a high degree of user comfort and convenience. These roads are normally double lane, paved facilities. Some may be aggregate surfaced and dust abated.

Many of the roads in the Divide Travel Planning Area lie in and out of private jurisdiction. In many cases where the private land intersects National Forest land the assigned maintenance level is carried through uninterrupted in the database. That may or may not be accurate in all cases. ROW information is currently being reviewed.

In the Divide area there are approximately 36 miles of maintenance level 4 roads maintained by the Forest Service and one maintenance level 5 road which is located in a campground. Maintenance level 4 roads on the forest include the Ten Mile road, Little Blackfoot, Priest Pass, Elliston-Spotted Dog, Frontier Town and Moose Creek campground and McDonald Pass Vista. There are approximately 87 miles of maintenance level 3 roads, which include Snowshoe, Greenhorn Mountain, Dog Creek, Banner Creek and Clarks Canyon. There are approximately 209 miles of maintenance level 2 roads in the project area.

Functional Class

The roads are divided by Functional Class where an arterial road is a high capacity forest road that is used to deliver traffic to and from collector roads throughout the national forest, a collector road is a road that is used to deliver traffic to and from local roads to arterial roads and local roads are low capacity roads that carry low volumes of traffic to and from collector roads. The miles of roads by Functional Class in the Divide Travel Planning Area are as follows:

- Arterial- Road 218-Ten Mile Road is classified as an arterial (6.759 Miles)
- Collector - Approximately 213.87 miles are classified as collector roads
- Local - Approximately 363 miles are classified as local.

Unauthorized Roads

There were approximately 16 miles of non-system roads in the Divide Travel Planning Area identified by the interdisciplinary team or by permittees and other users during collaborative field review activities in 2008. Most of the routes identified were made by full size vehicles. Many of these routes originate from private land and therefore are not accessible to forest users. As part of the travel planning process these roads are being considered for inclusion in the National Forest System of Roads. Those roads and corresponding proposed travel restrictions are identified in Table 4 of the Transportation specialist report.

Continental Divide National Scenic Trail (CDNST)

The CDNST is a route within this travel planning area made up of a combination of both motorized and non-motorized routes. A map showing how the CDNST lays on the land is located in the map packet and a table describing the alternatives is included in the recreation section of this chapter.

Road Closures

Since adoption of the Helena Forest Plan in 1986, roads have been closed across the forest and in the Divide area for a variety of reasons. Closures are often with gates but have also been done by contouring, barrier placement and ripping/seeding. Currently, many National Forest System roads (NFSR) in the Divide areas are closed yearlong (about 126 miles) to wheeled motorized vehicles. These closures have occurred in the past 25 years almost entirely associated with timber harvest. Other NFS roads in the area are closed to motor vehicle use for at least a portion of the year. These seasonal closures are either spring closures to protect the road surface from rutting during the wet time of the year, or hunting season closures to provide big game security. With the adoption of the Multi-State OHV decision in 2001, wheeled motorized vehicles are restricted to existing roads and trails within the analysis area.

Road Conditions

Road conditions vary across the analysis area with many factors influencing road surfaces including amount of use, type of use, maintenance level, type of surface and weather. Forestwide maintenance plans are developed annually and maintenance funding applied in accordance with targets assigned and other priorities set by engineering and line officers. Level of Service (formally referred to as Traffic Service Levels) for the analysis area are adequate for the amount of traffic occurring and are expected to continue to provide adequate service into the future, accounting for area population growth and potential displacement. Levels of Service are evaluated and adjusted as necessary as part of normal management activities. Maintenance is performed in accordance with the Forest Annual Maintenance Plan which is reviewed annually. All action alternatives propose for an increase in the number of road miles to be closed. It is assumed that the current maintenance and reconstruction activities would continue as they have in the recent past and in accordance with management direction. Project specific work as well as partnerships would continue to provide opportunities for additional road maintenance and improvements.

Enforcement

User compliance of Forest regulations on roads and trails is generally related to the level of user understanding of the sign system and available maps. The Helena National Forest has identified that the complexity of its current visitor use map is high, resulting in confusion for forest users and violations of regulations.

Specific travel plan related law enforcement issues include off road use by OHVs and full size vehicles, woodcutting road proliferation, dropping bug kill logs within the road prism and leaving limbs causing drainage problems, youth party areas, garbage and damage to sites. Off route use and woodcutting road proliferation are the more problematic issues tied to travel planning.

Specific Geographic Areas within the Divide Planning Area

The analysis area is also presented in four distinct geographic areas, with specifics pertaining to each area. The areas are:

- Area 1 - Northwest-Dog Creek-Ophir Cave Area
- Area 2 - North Central-Sweeny Creek Area
- Area 3 - Southwest – Kading Area-West of Telegraph Road
- Area 4 - Southeast-Banner-Rimini Area- East of Telegraph Road

Northwest-Dog Creek-Ophir Cave Area

Transportation System

The main road through the west side of Area 1 is National Forest System Road (NFSR) 136 Ophir Cave. This is a maintenance level 3 road that is open with no restrictions. There are many spur roads along Ophir Cave road that are closed year-long. These spur roads were originally constructed for timber harvest. Ophir Cave road also provides access to the Continental Divide National Scenic Trail (CDNST) as well as private land.

The primary road on the east side of Area 1 is NFSR 1855, Dog Creek Road, which is also a maintenance level 3 road. The majority of the roads in the Dog Creek Area are open with no restrictions; however, many of the roads in this area that cross private land do not have easements in place. The Dog Creek road and spurs also provide access to the CDNST and private land within the National Forest boundary.

Road Conditions

The majority of the open and closed roads in Area 1 are in adequate surface and drainage condition. Most of the road miles in this area are single lane with turnouts. The road locations are generally good and the roads were designed with drainage features.

Enforcement

There are no major enforcement problems in the Ophir Cave-Dog Creek Area. There is evidence of OHV/pickup use on some closed roads and trails, but few user created routes have been observed in this area.

North Central-Sweeny Creek Area

Transportation System

NFSR 335-Priest Pass Road provides access to the Continental Divide National Scenic Trail. There are unauthorized roads in this area. Road 1860 Sweeny Creek Road crosses a small section of private land. There is a Forest Service easement in place for this area.

Road Conditions

With the exception of Road 335-Priest Pass (a maintenance level 4 road) and the maintenance level 3 road 1898 Gravel Pit Road (access to the shooting range), the open roads in this area are maintenance level 2. The roads in this area were constructed with drainage features. Most of the road miles in this area are single lane with turnouts.

Enforcement

The major law enforcement issue in this area is wood cutting. There has been an increase of woodcutters in this area dropping trees within the road prism due to the prevalence of dead and dying trees.

Southwest – Kading Area-West of Telegraph Road

Transportation System

The Kading area has an extensive system of roads with the primary roads being NFSR 1870-Baldy Ridge (ML 2), 227-Little Blackfoot (ML 4) and 495-Telegraph (ML 3). These roads access the Continental Divide National Scenic Trail as well as a system of non-motorized trails in the Little Blackfoot Meadows area. All three of the main roads travel in and out of private and county jurisdiction. The first 3.96 miles of NFSR 227 and the first 2.305 miles of NFSR 495 are county jurisdiction, maintained by Lewis and Clark County. The majority of the roads passing through private land in this area do not have easements in place. In addition, there are several spur roads that were built for timber harvest that are closed year round.

Road Conditions

The primary roads in this area are in good condition.

Enforcement

There is a significant amount of dispersed camping in this area. There is evidence of minor OHV/pickup use on some closed roads and trails. Few user created routes have been observed in this area.

Southeast-Banner Creek-Rimini Area- East of Telegraph Road

Transportation System

In the Banner Creek-Rimini area the primary roads are 495-Telegraph and County Road 695- Rimini Road. These roads access the Rimini town site and multiple active and abandoned mine sites on the forest. The majority of the roads in this area are open with no restrictions. Spurs off Road 495 provide access to the Continental Divide National Scenic Trail (CDNST).

Road Conditions

The primary roads in this area are in good condition. The Rimini road is maintained by Lewis & Clark County. The roads are constructed with drainage features and are maintained through a maintenance program.

Enforcement

There is a considerable amount of dispersed camping that takes place in this area with resource damage becoming more significant over time. There is evidence of minor OHV/pickup use on some closed roads and trails, but few user created routes have been observed in this area.

Transportation, Environmental Consequences

Alternatives were evaluated on the following basis:

- Transportation System - how the alternative changes the open transportation system and ability to conduct maintenance, including management of unauthorized (non-system) roads.
- Road Conditions – whether or not the alternative affects road/trail conditions.
- Enforcement issues - complexity of travel maps due to seasonal closures and vehicle types, areas of enforcement problems and conflicts between uses and the differences between the alternatives.

Effects Common to All Alternatives

Road Use Trends

Past travel management decisions in the surrounding National Forest areas have closed many roads and trails on public land to motorized vehicles. The road and trail closures in the Elkhorn Mountains, North Belts and in surrounding National Forest have resulted in an increase in some non-local users including Gallatin and Lewis and Clark counties using the Divide area of the Helena National Forest for recreational purposes. In addition, the increase in local populations and enhanced dependability of trucks and other OHV's has also resulted in increased use on the roads and trails in this area, but at this time, the traffic increase has not adversely affected the traffic service levels on any of the forest roads or trails. Traffic use tends to be higher during summer holiday weekends and around the opening of big game rifle season. The Multi-State OHV Decision of 2001 restricted wheeled motorized vehicles to existing roads and trails. This decision did not affect the traffic service levels in the planning area.

Past management activities within the Divide area such as timber and grazing management, fire and watershed restoration efforts have affected the transportation system in the short term by temporarily closing a section of road for several days or weeks. Upon opening the roads, the effects disappeared immediately. Some roads in the Divide area have been closed as mitigation for timber sales, but since

there are alternate routes to most of the areas accessed by the closed roads, the loss of public access to National Forest Land has been limited.

None of the routes are currently operating near capacity. There are several factors that could result in an increase in road use in the Divide area. For example:

- The Divide area is easily accessible. An increase in use may eventually trigger a need for a higher traffic service level on some roads attributed to continued population growth in the Helena area.
- Closures resulting from planning efforts on other parts of the Helena National Forest may shift some traffic to the Divide area.

Right of Way Concerns-common to all alternatives: In all alternatives, there are roads and trails identified as travel routes that cross private land where there is no recorded easement. To ensure that these routes remain open to both administrative and public use, easements would need to be obtained from the appropriate parties. Efforts are ongoing in this area.

Ensure access for future resource management including vegetation management and roads as an investment in meeting resource management objectives: In all alternatives there are few changes proposed to any of the main roads leaving intact a road system that accesses every area of the forest. All alternatives provide for adequate future vegetation management therefore this is not discussed by alternative.

Motorized Mixed-Use - None of the alternatives provide for Mixed Motorized-Use on NFSR for Off Highway Vehicles (OHV) that are not street legal. Motorized Mixed-Use requires an engineering evaluation and recommendation, not an environmental evaluation (NEPA). Motorized Mixed-Use evaluations would be conducted following the project decision and would occur incrementally.

Effects Common to All Action Alternatives

Transportation System-Effects common to all action alternatives- Alternatives 2, 3, 4 and 5 increase the number of miles that are closed, increase the over-snow opportunities and provide clarification regarding currently unclassified routes.

Road Conditions – common to all action alternatives: in all action alternatives it is expected that the condition of open roads will gradually improve due to the increase in closures in Alternatives 2, 3, 4 and 5.

Off Route Travel – is clarified in all action alternatives.

Alternative 1, No Action

Transportation System Description – Alternative 1

System Roads-Under the no action alternative there would continue to be approximately 313 miles of road open to highway legal vehicles either year-round or seasonally.

Table 37: Summary Comparison of Roads and Trails (in miles)

Type of Use (Corresponding designation on Alternative Maps)	Alternative 1 Existing Condition
Roads open to highway legal vehicles, no seasonal restrictions (All Alternatives) (OPEN-HWY-LEGAL)	286
Private roads within planning area boundary (All Alternatives) (PVT)	99
State or County Road (CO)	70
State or County Road (STATE)	34
Roads closed to motorized vehicles yearlong, including over-snow motorized vehicles (01-Res)	85
Roads open to highway legal vehicles 12/2-10/14 (02-Res) Open to over-snow motorized vehicles 12/2-10/14 (02-Res)	8
Roads open to highway legal vehicles 5/16-12/1 (03-Res)	4
Roads open to highway legal vehicles 5/16-12/1 (03-Res) Open to over-snow motorized vehicles 12/2 – 5/15 (03-Res)	4
Open to over-snow motorized vehicles 12/2-5/15 (03-Res)	0
Roads open to highway legal vehicles 5/16-10/14 (05-Res) Open to over-snow motorized vehicles 12/2-5/15 (05-Res)	0
Roads closed to wheeled motorized vehicles yearlong (06-Res)	42
Open to over-snow motorized vehicles 12/2 - 5/15 (06-Res)	42
Open to over-snow motorized vehicles 12/2 - 5/15 (06-Res)	0
Open designated routes to over-snow motorized vehicles 12/2-5/15 (06-Res-Spc)	0
Roads open to highway legal vehicles 10/15-12/1(07-Res) Open to over-snow motorized vehicles 12/2-5/15 (07-Res)	0
Roads open to wheeled motorized vehicles 6/1-8/31 (13-Res) Open to over-snow motorized vehicles 12/1-8/31 (13-Res)	8
Roads open to wheeled motorized vehicles 5/16-4/14 (15-Res) Open to over-snow motorized vehicles, no seasonal restrictions (15-Res)	7
Trails open to vehicles 50 inches or less in width, no seasonal restriction	12
Trails open to vehicles 50 inches or less in width 5/16-10/14	7
Trails open to vehicles 50 inches or less in width 5/16 – 8/31	0
Trails closed to motorized vehicles yearlong (ATM MT-01-Res)	0
Open non-system roads and trails (Alt 1) (UOPEN-HWY-LEGAL)	16
Non-system roads, closed to motorized vehicles yearlong (01-Res)	0

Type of Use (Corresponding designation on Alternative Maps)	Alternative 1 Existing Condition
Non-motorized system trail (NO MTR) (not including CDNST segments)	20
CDNST Non-Motorized (closed to wheeled motorized vehicles)	19.3
CDNST open to wheeled motorized vehicles	24.6
CDNST located in an area open to over-snow motorized vehicles	8.0
CDNST located on State or County Jurisdiction	4.4
CDNST (Old Trail) Proposed to be Re-routed	0
P-NM – Proposed Non-Motorized Trail in an area that allows over-snow motorized use	0

Closures – Alternative 1

Spring closures would continue to occur resulting in road closures being in place until as late as June 1st regardless of road conditions. Table 37 for specific information regarding numbers of miles closed in this alternative. Specific route management in key areas is as follows:

- Designated Routes in parts of Area 1 near the Sweeny Creek area would be open year long.
- Routes in parts of Area 3 near the Limburger Spring/Kading area are open to over-snow motorized vehicles from December 1st to October 14th. Routes 314, 314-J3 and 314-J1 (Area 3) have seasonal restrictions.
- Continental Divide National Scenic Trail (CDNST) – Routes 1802-B2 (Area 4) and 136-D1 (Area 1) are open to motorized use year-long.
- Hunting Season Access – Routes 335-A1 and A2 (Area 2), 1856 (Area 4) and 314-J3 (Area 3) are closed year-long to wheeled vehicles.

Winter Closures – Alternative 1

There are seasonal closures for over-snow use on roads in areas such as the Telegraph, Mullan Pass and the Microwave area.

There is a winter closure from October 15th to December 2nd for the Limburger Springs/Spotted Dog Area. The Little Blackfoot area has a seasonal closure of October 15th to December 2nd for everything south of the Little Blackfoot Road and west of the Ontario Creek Road.

Unauthorized Roads – Alternative 1

Under Alternative 1 there are 16 miles of road that are unauthorized and open year-round to highway legal vehicles. Non-system routes in Alternative 1 would keep their current status as open to travel in accordance with the 2001 Tri-State OHV environmental impact statement for Montana, North Dakota and South Dakota. Exclusive access across forest routes to access private land would continue under a special use agreement. Creation of new unauthorized routes would likely occur at a low rate with violators subject to citation. New unauthorized routes would be considered closed.

Off Route Travel – Alternative 1

Off Route travel would continue to be allowed as established in the 2001 Tri-State OHV environmental impact statement for Montana, North Dakota and South Dakota.

MVUM Production – Alternative 1

No MVUM would be produced as part of this alternative.

Road Conditions – Alternative 1

Most routes are in fair to good condition with some individual routes in poor condition. Trends for future maintenance dollars do not show significant change from the current amount, however, future proposed projects may provide additional opportunities for road improvements.

Enforcement/Complexity – Alternative 1

Travel management for this alternative is moderately complex. There are several restriction codes governing the use of the roads and trails in this area and in many instances all existing roads and trails are open to motorized vehicles, including unauthorized routes, based on the 2001 Tri-State OHV Decision. Effective enforcement of the existing travel plan is difficult due to complexity of closure types and lack of a site specific road-trail decision.

Direct and Indirect Effects – Alternative 1

Table 38: Direct and Indirect Effects

Resource Element	Resource Indicator	Measure	Alt 1 Existing Condition
Quality Motorized Route System	Miles of routes open for motorized use and relationship to currently used or popular areas	Miles	333
Quality Motorized Route System	Miles of routes open for motorized over-snow use	Miles	69
Quality Motorized Route System	Miles of roads available for possible motorized mixed use	Miles	333
Quality Motorized Route System	Overall ease of use of the MVUM	Number of closure codes	No MVUM would be created

Irreversible and Irretrievable Commitments – Alternative 1

There are no irreversible and irretrievable commitments associated with alternative 1.

Cumulative Effects – Alternative 1

The general cumulative effects are listed in the section Effects Common to All Alternatives. Specific cumulative effects include the slow natural reclamation process of roads that see infrequent use or are closed. While natural reclamation would likely occur over time the road prism would remain on the landscape. Roads that are unauthorized may not meet current design standards and could possibly contribute to resource damage over time. Off-road use would continue at the current rate as allowed for under the 2001 Tri-State OHV rule with the option available to put in place closures to minimize resource damage as necessary.

The cumulative effects of this project in relation to the Cumulative Effects table “Past, Present and Reasonably Foreseeable Projects within or Near the Divide Travel Boundary” are projected to be as follows:

- The Divide area is currently being managed for the removal of Hazard Trees. This involves removal of beetle killed trees within one and one-half tree length along the major roads as well as along some of the spur roads throughout the project area.
- The foreseeable action to improve the Ten Mile Complex roads (including Rimini Road) could potentially result in an increase in cumulative effects in this area because an improvement to the condition of the roads will result in an increase in traffic to this area.

Summary of Effects – Alternative 1

The number of miles of roads as well as road conditions would remain unchanged in alternative 1. Maintenance would continue in accordance with the forest maintenance plan. Additional maintenance opportunities would continue to be capitalized on through the development of other projects in the analysis area and through partnership activities. No MVUM would be produced. This would potentially increase maintenance needs because roads that would be designated as open but were not originally designed using the National best management practice standards (2012) would require some degree of maintenance to address environmental concerns and bring them up to current design standards. Enforcement would continue to be complicated with a number of miles of short, dead end roads staying open and therefore requiring attention as part of the patrolled area. This alternative meets the purpose and need from the perspective that it continues to provide a manageable transportation system and access to the national forest. It does, however; leave a number of miles of the road template on the ground not considered necessary for the management of the national forest.

Off-road vehicle travel would continue to occur within 300 feet of the designated route as allowed for in the 2001 Tri-State OHV decision. The potential impacts of this would be greater than that of any of the action alternatives because there are a greater number of roads that would continue to be open for public use. Parking safely next to the side of a road within 30 feet from the edge of the road is also permitted as part of alternative 1.

Alternative 2

The biggest change from alternative 1 to alternative 2 is the substantial reduction in the number of roads that are closed year long. Most of the roads that would be closed yearlong are classified as open to over-snow vehicles use during the winter in alternative 2 but are closed to all other motorized vehicles. Motor vehicle use maps that identify routes and designations for motorized use within the planning area would be available to the public.

The roads analysis recommends that roads rated low value-high concern (LVHC) be removed from the road system. Road 4044-E1 would remain closed in Alternative 2.

Direct and Indirect Effects

Open/Closed Routes

Table 39: Direct and Indirect Effects

Resource Element	Resource Indicator	Measure	Alt 2
Quality Motorized Route System	Miles of routes open for motorized use and relationship to currently used or popular areas	Miles	321
Quality Motorized Route System	Miles of routes open for motorized over-snow use	Miles	139
Quality Motorized Route System	Miles of roads available for possible motorized mixed use	Miles	321
Quality Motorized Route System	Overall ease of use of the MVUM	Number of closure codes	5

Alternative 2 - Closures

Spring closures would be implemented as needed rather than the current closures until June 1st. The public would be informed by signage and information published by the Forest. Alternative 2 has a significant increase in the number of roads open for over-snow vehicle use when compared to Alternative 1. Under Alternative 1, the area on either side of the closed road prism is open to cross-country over-snow motorized vehicle travel. Alternative 2 identifies these roads as open for over-snow motorized vehicles to be consistent with the designated use of the surrounding landscape. All other motorized use would continue to be restricted from routes when groomed. The majority of these roads are located north of route 136 in the upper northwest corner of the project area.

Table 40: Summary Comparison of Roads and Trails (in miles)

Type of Use (Corresponding designation on Alternative Maps)	Alternative 1 Existing Condition	Alternative 2
Roads open to highway legal vehicles, no seasonal restrictions (All Alternatives) (OPEN-HWY-LEGAL)	286	284
Private roads within planning area boundary (All Alternatives) (PVT)	99	99
State or County Road (CO)	70	70
State or County Road (STATE)	34	34
Roads closed to motorized vehicles yearlong, including over-snow motorized vehicles (01-Res)	85	16
Roads open to highway legal vehicles 12/2-10/14 (02-Res) Open to over-snow motorized vehicles 12/2-10/14 (02-Res)	8	0
Roads open to highway legal vehicles 5/16-12/1 (03-Res)	4	7
Roads open to highway legal vehicles 5/16-12/1 (03-Res) Open to over-snow motorized vehicles 12/2 – 5/15 (03-Res)	4	0

Type of Use (Corresponding designation on Alternative Maps)	Alternative 1 Existing Condition	Alternative 2
Open to over-snow motorized vehicles 12/2-5/15 (03-Res)	0	7
Roads open to highway legal vehicles 5/16-10/14 (05-Res) Open to over-snow motorized vehicles 12/2-5/15 (05-Res)	0	10
Roads closed to wheeled motorized vehicles yearlong (06-Res)	42	110
Open to over-snow motorized vehicles 12/2 - 5/15 (06-Res)	42	0
Open to over-snow motorized vehicles 12/2 - 5/15 (06-Res)	0	110
Open designated routes to over-snow motorized vehicles 12/2-5/15 (06-Res-Spc)	0	2
Roads open to highway legal vehicles 10/15-12/1(07-Res) Open to over-snow motorized vehicles 12/2-5/15 (07-Res)	0	10
Roads open to wheeled motorized vehicles 6/1-8/31 (13-Res) Open to over-snow motorized vehicles 12/1-8/31 (13-Res)	8	0
Roads open to wheeled motorized vehicles 5/16-4/14 (15-Res) Open to over-snow motorized vehicles, no seasonal restrictions (15-Res)	7	0
Trails open to vehicles 50 inches or less in width, no seasonal restriction	12	1
Trails open to vehicles 50 inches or less in width 5/16-10/14	7	25
Trails open to vehicles 50 inches or less in width 5/16 – 8/31	0	0
Trails closed to motorized vehicles yearlong (ATM MT-01-Res)	0	2
Open non-system roads and trails (Alt 1) (UOPEN-HWY-LEGAL)	16	10
Non-system roads, closed to motorized vehicles yearlong (01-Res)	0	6
Non-motorized system trail (NO MTR) (not including CDNST segments)	20	20
CDNST Non-Motorized (closed to wheeled motorized vehicles)	19.3	19.3
CDNST open to wheeled motorized vehicles	24.6	20.6
CDNST located in an area open to over-snow motorized vehicles	8.0	12.0
CDNST located on State or County Jurisdiction	4.4	4.4

Type of Use (Corresponding designation on Alternative Maps)	Alternative 1 Existing Condition	Alternative 2
CDNST (Old Trail) Proposed to be Re-routed	0	0
P-NM – Proposed Non-Motorized Trail in an area that allows over-snow motorized use	0	0

Refer to Table 40 for specific information regarding numbers of miles closed under this alternative. Some specifics in key areas are as follows:

Sweeny Creek – The designated trail system would be open from May 15th to October 15th for wheeled motorized vehicles 50 inches or less in width.

Limburger Spring/Kading/Elliston – The connection between Road 314 and 1870 would be open to motorized use May 15th to October 15th. Road 314-J3 would be open October 15th to December 1st. Road 314-J1 would be open year-long. Trails 501, MTR's 503, 502 and 1868 and road 1871-002 would be open to wheeled motorized vehicles less than 50 inches in width from May 15th to October 15th.

Negro Mountain – Road 1857-A1 would be open from May 15th to October 15th; Road 1857-B1 would be closed year-long. Roads 1857 D-1 and 1859-D4 and E1 would be open year-long.

Ontario Creek – A connection for wheeled motorized vehicles 50 inches or less in width would be open from the 491-D1 road to the 4104-A1 road. This route would be open from May 15th to October 15th.

Continental Divide National Scenic Trail – Roads 1802-B2, 335-B2 and 136-D1 would be closed to wheeled motorized vehicles.

Hunting Season Access – Roads 335-A1 & A2, 1856 and 314-J3 would be open to wheeled motorized vehicle use October 15th to December 1st.

Winter Use – Additional winter closures in the Sweeny Creek and Hahn Creek areas (Area 4), as well as lower elevation west facing slopes Clarks Canyon north to Threemile Creek (Area 2). Those areas that remain open have a season of December 2nd to May 15th for over-snow motorized vehicle travel.

Unauthorized Routes – Alternative 2

Alternative 2 would incorporate approximately 10 of the 16 miles of non-system routes into the forest's system of roads and trails. These roads will be assigned travel management codes. The remaining roads would continue to be classified as closed non-system roads. Table 40 for general information and Table 4 of the transportation specialist report for specific information, which can be found in the project file.

MVUM – Alternative 2

An MVUM would be produced as part of this alternative.

Road Conditions – Alternative 2

Most routes are in fair to good condition with some individual routes in poor condition. There are four roads that cross live streams. Under this alternative these fords would be closed until suitable crossings are in place. Trends for future maintenance dollars do not show significant change in the current dollar amounts being allocated; however, future proposed projects within the planning area may provide additional opportunities for road improvements.

Enforcement/Complexity – Alternative 2

The enforcement for this alternative will be slightly different then Alternative 1. Summer type wheeled vehicle use restrictions have been reduced but there is an added layer of over-snow motorized vehicle use restrictions.

Irreversible and Irretrievable Commitments – Alternative 2

There are no irreversible or irretrievable commitments as a result of implementing this alternative.

Cumulative Effects – Alternative 2

The biggest change from alternative 1 to alternative 2 is the substantial reduction in the number of roads that are closed year around. Most of these roads that were closed year around are classified as open to over-snow vehicles use during the winter in alternative 2 but are closed to all other motorized vehicles. The cumulative effects for this alternative are the same as those listed under the section "Cumulative Effects Common to all Alternatives" except that there would be an increased need for law enforcement in the short-term to patrol the roads that would be closed to wheeled motorized use. Motor vehicle use maps that identify routes and designations for motorized use within the planning area would be available to the public.

Summary – Alternative 2

This alternative meets the purpose and need by providing a manageable system of designated public motorized access routes and by providing detailed analysis of every road on the system to determine the effective management of that road. This alternative is in compliance with the Planning Rule by providing clarity to the 2001 Tri-State OHV decision, establishing a road by road plan that provides for efficient management of the forest through a responsible transportation system that provides for recreational opportunities throughout the forest. Effects on the ground would be continued maintenance on the existing high-use roads and capitalizing on opportunities for road improvements when presented as part of other projects. All roads that are considered not necessary for long term forest management and fail to provide public access would be placed in storage.

Alternative 3

Direct and Indirect Effects

Table 41: Direct and Indirect Effects

Resource Element	Resource Indicator	Measure (Quantity)	Alternative 3
Quality Motorized Route System	Miles of routes open for motorized use and relationship to currently used or popular areas	Miles	281
Quality Motorized Route System	Miles of roads open for motorized over-snow use	Miles	164
Quality Motorized Route System	Miles of roads available for possible motorized mixed use	Miles	281
Quality Motorized Route System	Overall ease of use of the MVUM	Number of road closure codes	3

Alternative 3 - Closures

Alternative 3 increases the number of miles that are closed year-long in comparison to alternatives 1 and 2. Similar to Alternative 2, it opens road prisms to over-snow motorized vehicle use as to be consistent with the area surrounding the road that is already open for that type of use. Table 42 for specific information regarding miles of roads affected.

Table 42: Summary Comparison of Roads and Trails (in miles)

Type of Use (Corresponding designation on Alternative Maps)	Alternative 1 Existing Condition	Alternative 3
Roads open to highway legal vehicles, no seasonal restrictions (All Alternatives) (OPEN-HWY-LEGAL)	286	262
Private roads within planning area boundary (All Alternatives) (PVT)	99	99
State or County Road (CO)	70	70
State or County Road (STATE)	34	34
Roads closed to motorized vehicles yearlong, including over-snow motorized vehicles (01-Res)	85	23
Roads open to highway legal vehicles 12/2-10/14 (02-Res) Open to over-snow motorized vehicles 12/2-10/14 (02-Res)	8	0
Roads open to highway legal vehicles 5/16-12/1 (03-Res)	4	7
Roads open to highway legal vehicles 5/16-12/1 (03-Res) Open to over-snow motorized vehicles 12/2 – 5/15 (03-Res)	4	0
Open to over-snow motorized vehicles 12/2-5/15 (03-Res)	0	7
Roads open to highway legal vehicles 5/16-10/14 (05-Res) Open to over-snow motorized vehicles 12/2-5/15 (05-Res)	0	3
Roads closed to wheeled motorized vehicles yearlong (06-Res)	42	154
Open to over-snow motorized vehicles 12/2 - 5/15 (06-Res)	42	0
Open to over-snow motorized vehicles 12/2 - 5/15 (06-Res)	0	154
Open designated routes to over-snow motorized vehicles 12/2-5/15 (06-Res-Spc)	0	0
Roads open to highway legal vehicles 10/15-12/1(07-Res) Open to over-snow motorized vehicles 12/2-5/15 (07-Res)	0	0
Roads open to wheeled motorized vehicles 6/1-8/31 (13-Res) Open to over-snow motorized vehicles 12/1-8/31 (13-Res)	8	0
Roads open to wheeled motorized vehicles 5/16-4/14 (15-Res) Open to over-snow motorized vehicles, no seasonal restrictions (15-Res)	7	0
Trails open to vehicles 50 inches or less in width, no seasonal restriction	12	0
Trails open to vehicles 50 inches or less in width 5/16-10/14	7	0

Type of Use (Corresponding designation on Alternative Maps)	Alternative 1 Existing Condition	Alternative 3
Trails open to vehicles 50 inches or less in width 5/16 – 8/31	0	0
Trails closed to motorized vehicles yearlong (ATM MT-01-Res)	0	19
Open non-system roads and trails (Alt 1) (UOPEN-HWY-LEGAL)	16	9
Non-system roads, closed to motorized vehicles yearlong (01-Res)	0	7
Non-motorized system trail (NO MTR) (not including CDNST segments)	20	20
CDNST Non-Motorized (closed to wheeled motorized vehicles)	19.3	19.3
CDNST open to wheeled motorized vehicles	24.6	22.5
CDNST located in an area open to over-snow motorized vehicles	8.0	10.1
CDNST located on State or County Jurisdiction	4.4	4.4
CDNST (Old Trail) Proposed to be Re-routed	0	0
P-NM – Proposed Non-Motorized Trail in an area that allows over-snow motorized use	0	0

Specific status of key areas under alternative 3 is as follows:

Sweeny Creek – Roads and trails would be closed year-long to wheeled motorized vehicles.

Limburger Spring/Kading – Little Blackfoot Road (NFSR 227) would be closed just past the campground and under this alternative NFSR 227-E1 would become a non-motorized trail. Road 314 would be closed year-long to wheeled vehicles past the gate in Section 7. Roads 314-J1 and J3 would also be closed year-long to wheeled vehicles. Trails 501, MTR's 503, 502 and 1868 and road 1871-002 would be closed year-long to wheeled motorized vehicles.

Negro Mountain – 1857 –D2 and 1859 D4 and E1 would be closed yearlong.

Ontario Creek – The connection from 491-D1 and 4104-A1 would be closed year-long to wheeled vehicles.

Hunting Season Access – Routes 335-A1 and A2 (Area 2), 1856 (Area 4) and 314-J3 (Area 3) would be closed year-long to wheeled motorized vehicles.

Continental Divide National Scenic Trail – Roads 1802-B2 (Area 2), 335-B2 (Area 2) and 136-D1 (Area 1) would be closed to wheeled motorized vehicles yearlong.

Winter Use – The area south of MacDonald Pass to approximately the Hahn Creek Road (Area 4) would be closed to wheeled and motorized over-snow vehicle travel. There would also be winter closures in the Sweeny Creek (Area 1) and Hahn Creek areas, as well as lower elevation west facing slopes Clarks Canyon north to Threemile Creek (Area 2). Those areas that remain open have a season of December 2nd to May 15th for over-snow travel.

Alternative 3 - Unauthorized Roads

In this alternative approximately nine of the 16 miles of non-system routes would be incorporated into the existing system of National Forest System Roads. Table 42 for general information and Table 4 of the transportation specialist report for specific information, which can be found in the project file.

Alternative 3 - MVUM

An MVUM would be produce as a result of this alternative.

Alternative 3 - Road Conditions

Most routes are in fair to good condition with some individual routes in poor condition. Trends for future maintenance dollars do not show a significant change in the dollars allocated. Future proposed projects may provide additional opportunities for road improvements.

Alternative 3 - Enforcement/Complexity

The enforcement for this alternative will be similar to Alternative 2.

Alternative 3 - Irreversible and Irretrievable Commitments

There are no irreversible or irretrievable commitments as a result of implementing this alternative.

Alternative 3 - Cumulative Effects

The most significant change from alternative 1 (no action) to alternatives 2 and alternative 3 is the substantial reduction in the number of roads that are closed year around. Most of the roads that were closed year-long are classified as open to over-snow vehicles use during the winter but still closed to all other motorized vehicles. The cumulative effects for this alternative are the same as those listed under "Cumulative Effects Common to all Alternatives" except that there would be an increased need for law enforcement in the short-term to patrol the roads that would be closed to wheeled motorized use. Motor vehicle use maps that identify routes and designations for motorized use within the planning area would be available to the public.

Summary of Effects – Alternative 3

Implementation of alternative 3 would provide for compliance with Travel Planning Regulations, provide clarity to users regarding the 2001 Tri-State OHV decision and establish a route by route plan that provides for a manageable system of designated public access routes throughout the planning area. This alternative would provide for a variety of recreational motorized and non-motorized opportunities throughout the forest. Effects on the ground would be continued maintenance on the existing high use roads as well as capitalizing on additional opportunities to increase road maintenance when presented as part of other projects. Decommissioning would be accomplished as part of a proactive, comprehensive plan over-time and as the budget allows. In alternative 3, the line officer made the decision to take a much more aggressive approach towards unclassified routes and acquired routes in that rather than being proposed for storage, they are proposed for decommissioning. Roads that fail to provide public access to the National Forest would be placed in storage or decommissioned.

Alternative 4

Direct and Indirect Effects

Table 43: Direct and Indirect Effects – Alternative 4

Resource Element	Resource Indicator	Measure	Alt 4
Quality Motorized Route System	Miles of routes open for motorized use and relationship to currently used or popular areas	Miles	291
Quality Motorized Route System	Miles of routes open for motorized over-snow use	Miles	153
Quality Motorized Route System	Miles of roads available for possible motorized mixed use	Miles	291
Quality Motorized Route System	Overall ease of use of the MVUM	Number of closure codes	4

Transportation System Description – Alternative 4

Closures – Alternative 4

Alternative 4 increases the number of miles that are closed year-long in comparison to alternatives 1, 2 and 3. In general alternative 4 is more closely related to alternative 3 than to alternatives 1 and 2. Similar to alternative 2 and 3, alternative 4 opens road prisms to over-snow motorized vehicle use in order to be consistent with the area surrounding the road that is already open for that type of use. Table 44 for general information and Table 4 of the transportation specialist report for specific information, which can be found in the project file for specific information regarding miles of roads affected.

Table 44: Summary Comparison of Roads and Trails (in miles)

Type of Use (Corresponding designation on Alternative Maps)	Alternative 1 Existing Condition	Alternative 4
Roads open to highway legal vehicles, no seasonal restrictions (All Alternatives) (OPEN-HWY-LEGAL)	286	265
Private roads within planning area boundary (All Alternatives) (PVT)	99	99
State or County Road (CO)	70	70
State or County Road (STATE)	34	34
Roads closed to motorized vehicles yearlong, including over-snow motorized vehicles (01-Res)	85	27
Roads open to highway legal vehicles 12/2-10/14 (02-Res) Open to over-snow motorized vehicles 12/2-10/14 (02-Res)	8	0
Roads open to highway legal vehicles 5/16-12/1 (03-Res)	4	3
Roads open to highway legal vehicles 5/16-12/1 (03-Res) Open to over-snow motorized vehicles 12/2 – 5/15 (03-Res)	4	0
Open to over-snow motorized vehicles 12/2-5/15 (03-Res)	0	3
Roads open to highway legal vehicles 5/16-10/14 (05-Res) Open to over-snow motorized vehicles 12/2-5/15 (05-Res)	0	10

Type of Use (Corresponding designation on Alternative Maps)	Alternative 1 Existing Condition	Alternative 4
Roads closed to wheeled motorized vehicles yearlong (06-Res)	42	137
Open to over-snow motorized vehicles 12/2 - 5/15 (06-Res)	42	0
Open to over-snow motorized vehicles 12/2 - 5/15 (06-Res)	0	137
Open designated routes to over-snow motorized vehicles 12/2-5/15 (06-Res-Spc)	0	0
Roads open to highway legal vehicles 10/15-12/1(07-Res) Open to over-snow motorized vehicles 12/2-5/15 (07-Res)	0	3
Roads open to wheeled motorized vehicles 6/1-8/31 (13-Res) Open to over-snow motorized vehicles 12/1-8/31 (13-Res)	8	0
Roads open to wheeled motorized vehicles 5/16-4/14 (15-Res) Open to over-snow motorized vehicles, no seasonal restrictions (15-Res)	7	0
Trails open to vehicles 50 inches or less in width, no seasonal restriction	12	0
Trails open to vehicles 50 inches or less in width 5/16-10/14	7	4
Trails open to vehicles 50 inches or less in width 5/16 – 8/31	0	0
Trails closed to motorized vehicles yearlong (ATM MT-01-Res)	0	20
Open non-system roads and trails (Alt 1) (UOPEN-HWY-LEGAL)	16	10
Non-system roads, closed to motorized vehicles yearlong (01-Res)	0	6
Non-motorized system trail (NO MTR) (not including CDNST segments)	20	20
CDNST Non-Motorized (closed to wheeled motorized vehicles)	19.3	18.0
CDNST open to wheeled motorized vehicles	24.6	21.9
CDNST located in an area open to over-snow motorized vehicles	8.0	12.0
CDNST located on State or County Jurisdiction	4.4	4.4
CDNST (Old Trail) Proposed to be Re-routed	0	0
P-NM – Proposed Non-Motorized Trail in an area that allows over-snow motorized use	0	0

Specific status in key areas under alternative 4 is as follows:

Sweeny Creek – Roads and trails would be closed year-long to wheeled motorized vehicles.

Limburger Spring/Kading – This area would be closed year-long to wheeled motorized vehicles.

Negro Mountain– 1857 –D2 and 1859 D4 and E1 would be closed yearlong.

Ontario Creek – The connection from 491-D1 and 4104-A1 would be closed year-long to wheeled vehicles.

Microwave Tower – This area will be closed year-long to wheeled motorized vehicles.

Hunting Season Access – Routes 335-A1 and A2 (Area 2), 1856 (Area 4) and 314-J3 (Area 3) would be closed year-long to wheeled motorized vehicles.

Continental Divide National Scenic Trail – Roads 1802-B2 (Area 2), 335-B2 (Area 2) and 136-D1 (Area 1) would be closed to wheeled motorized vehicles year-long.

Winter Use – The area south of MacDonald Pass to approximately the Hahn Creek Road (Area 4) would be closed to wheeled and motorized over-snow vehicle travel. There would also be winter closures in the Sweeny Creek (Area 1) and Hahn Creek (Area 4) areas, as well as lower elevation west facing slopes Clarks Canyon north to Threemile Creek (Area 2). Those areas that remain open have a season of December 2nd to May 15th for over-snow travel.

Unauthorized Roads – Alternative 4

In this alternative, as in alternatives 2 and 3, approximately 10 of the 16 miles of non-system routes would be incorporated into the existing system of Forest Roads. Table 44 for general information and to Table 4 of the transportation specialist report for specific information, which can be found in the project file.

MVUM – Alternative 4

An MVUM will be produced as part of this alternative.

Road Conditions – Alternative 4

Road conditions, as described in the affected environment section indicates most routes are in fair to good condition with some individual routes in poor condition. Trends for future maintenance dollars do not show much change than the current amount, however, future proposed projects may provide additional opportunities for road improvements.

Enforcement/Complexity – Alternative 4

The enforcement for this alternative will be similar to alternative 2.

Irreversible and Irretrievable Commitments – Alternative 4

There are no irreversible or irretrievable commitments as a result of implementing this alternative.

Cumulative Effects – Alternative 4

The most significant change from alternative 1 (no action) to alternatives 2, 3 and 4 is the substantial reduction in the miles of roads that are closed year round. Most of the roads that were closed year-long are classified as open to over-snow vehicles use during the winter but still closed to all other motorized vehicles. The cumulative effects for this alternative are the same as those listed under “Cumulative Effects Common to all Alternatives” except that there would be an increased need for law enforcement in the short-term to patrol the roads that would be closed to wheeled motorized use. Motor vehicle use maps (MVUM) that identify routes and designations for motorized use within the planning area would be available to the public.

Summary of Effects – Alternative 4

Alternative 4 leaves fewer miles of open road on the landscape than alternatives 1, 2 and 3.

Alternative 5

Refer to the tables in this section for details regarding mileage and acres available for motorized travel. Alternative 5 would meet the intent of subsequent site-specific planning as required by the 'Off-Highway Vehicle Record of Decision and Forest Plan Amendment' (January 2001).

Direct and Indirect Effects – Alternative 5

Table 45: Direct and Indirect Effects

Resource Element	Resource Indicator	Measure	Alt 5
Quality Motorized Route System	Miles of routes open for motorized use and relationship to currently used or popular areas	Miles	162
Quality Motorized Route System	Miles of roads open for motorized over-snow use	Miles	170
Quality Motorized Route System	Miles of roads available for possible motorized mixed use	Miles	162
Quality Motorized Route System	Overall ease of use of the MVUM	Number of closure codes	2

Closures – Alternative 5

Off Route Travel – Alternative 5

In accordance with FSM 7716.1 – A designation of a road or trail includes all terminal facilities, trailheads, parking lots and turnouts associated with the road or trail. The designation also includes parking a motor vehicle on the side of the road when it is safe to do so without causing damage to NFS resources or facilities, unless prohibited by state law, a traffic sign, or an order (36 CFR 261.54). Road designations must specify either that they include parking within one vehicle length, or within a specified distance of up to 30 feet, from the edge of the road surface. Designations that include limited use of motor vehicles within a specified distance from certain forest roads and forest trails for dispersed camping or big game retrieval must specify the distance, the vehicle class, the time of year the use is permitted, if appropriate and any other conditions on use.

In alternative 5 motorized travel and parking is proposed to be allowed up to 30 feet from the edge or the road for any legal purpose on the forest as long as no permanent routes are created and as long as no resource damage takes place. In addition, for resource protection, no off-route motor vehicle travel will be allowed within 30 feet of any water body. Where the designated route is less than 30 feet from a water body, no off-route parking will be allowed. All allowed dispersed camping areas greater than 30 feet from the edge of a designated route will be shown on the MVUM. The size of the dispersed camping area shall not exceed 20 feet x 20 feet in width and length. Vehicle travel off route between dispersed camp sites is not permitted.

Temporary Emergency Closures for resource protection will be issued in accordance with FSM 7716.51.

In the existing condition, the 2001-Tri State ROD states that motorized wheeled cross-country travel to a campsite is permissible within 300 feet of roads and trails. Site selection must be completed by non-motorized means and accessed by the most direct route causing the least damage. This exception does not apply where existing seasonal restrictions prohibit traveling off designated routes to a campsite. Existing local rules take precedence over this exception. This distance could be modified through subsequent site-specific planning. In alternative 5, through this site specific planning effort this distance will be modified to be 70 feet from the edge of the road but not within 30 feet of a body of water.

Unauthorized Roads – Alternative 5

In this alternative, as in alternatives 2 and 3, approximately 10 of the 16 miles of non-system routes would be incorporated into the existing system of Forest Roads. Table 46 for general information and to Table 4 of the transportation specialist report for specific information, which can be found in the project file.

Table 46: Summary Comparison of Roads and Trails (in miles)

Type of Use (Corresponding designation on Alternative Maps)	Alternative 1 Existing Condition	Alternative 5
Roads open to highway legal vehicles, no seasonal restrictions (OPEN-HWY-LEGAL)	286	159
Roads closed to motorized vehicles yearlong, including over-snow motorized vehicles (01-Res)	85	60
Roads open to highway legal vehicles 12/2-10/14 (02-Res) Open to over-snow motorized vehicles 12/2-10/14 (02-Res)	8	0
Roads open to highway legal vehicles 5/16-12/1 (03-Res)	4	0
Open to over-snow motorized vehicles 12/2-5/15 (03-Res)	4	0
Roads open to highway legal vehicles 5/16-10/14 (05-Res) Open to over-snow motorized vehicles 12/2-5/15 (05-Res)	0	3
Roads closed to wheeled motorized vehicles yearlong (06-Res)	42	167
Open to over-snow motorized vehicles 12/2-5/15 (06-Res)	42	167
Open to over-snow motorized vehicles 12/2-5/15 (Alt 3) (06-Res)	0	0
Roads open to wheeled motorized vehicles 6/1-8/31 (13-Res) Open to over-snow motorized vehicles 12/1-8/31 (13-Res)	8	0
Roads open to wheeled motorized vehicles 5/16-4/14 (15-Res) Open to over-snow motorized vehicles, no seasonal restrictions (15- Res)	7	0
Trails open to vehicles 50 inches or less in width 5/16-10/14	7	2.5
Trails open to vehicles 50 inches or less in width 5/16-8/31	0	47.3
Trails open to vehicles 50 inches or less in width, no seasonal restriction	12	14.5
Trails closed to motorized vehicles yearlong (MT-01-Res)	0	19
Open non-system roads and trails (UOPEN-HWY-LEGAL)	16	0
Non-system roads, closed to motorized vehicles yearlong (NS-01- Res)	0	5
Non-motorized system trail (NO MTR) (not including CDNST segments)	20	20
CDNST Non-Motorized (closed to wheeled motorized vehicles)	19.2	32.7
CDNST open to wheeled motorized vehicles	24.6	14
CDNST located in an area open to over-snow motorized vehicles	8.0	6.9

Type of Use (Corresponding designation on Alternative Maps)	Alternative 1 Existing Condition	Alternative 5
CDNST located on State or County Jurisdiction	4.4	4.4
CDNST (Old Trail) Proposed to be Re-routed	0	14.53
P=NM – Proposed Non-Motorized Trail in an area that allows over- snow motorized use	0	4.2

Road Conditions – Alternative 5

Road conditions, as described in the affected environment section indicates most routes are in fair to good condition with some individual routes in poor condition. Trends for future maintenance dollars do not show much change than current amount, however, future proposed projects may provide additional opportunities for road improvements.

Enforcement/Complexity – Alternative 5

The enforcement for this alternative will be similar to alternative 2.

Irreversible and Irretrievable Commitments – Alternative 5

There are no irreversible or irretrievable commitments as a result of implementing this alternative.

Cumulative Effects – Alternative 5

The most significant change from alternative 1 to alternatives 2, 3, 4 and 5 is the substantial reduction in the miles of roads that are closed year-around. Most of the roads that were closed year-long are classified as open to over-snow vehicles use during the winter but still closed to all other motorized vehicles. The cumulative effects for this alternative are the same as those listed under “Cumulative Effects Common to All Alternatives” except that there would be an increased need for law enforcement in the short-term to patrol the roads that would be closed to wheeled motorized use. Motor vehicle use maps (MVUM) that identify routes and designations for motorized use within the planning area would be available to the public.

Conclusions

Implementation of any of the action alternatives 2, 3, 4 or 5 would result in the following outcomes common to all alternatives:

- Access to the National Forest during the winter would be significantly increased by allowing over-snow vehicle use on previously closed roads, as described above.
- There would be clarification regarding closed roads that are closed to all activity and those that are closed but allow over-snow use.
- Roads that are located in areas that are already open to over-snow motorized vehicle use to over-snow motorized travel. By doing so, the road use would be consistent with the area surrounding the road prism allowing over-snow motorized vehicle access from December 2nd to May 15th.
- Wheeled motorized vehicle trails that currently have no seasonal restrictions would be modified to have a seasonal closure.

- Road and wheeled motorized trail conditions would remain approximately the same in all alternatives.
- Any change to existing conditions (no action alternative) would necessarily require additional effort from law enforcement personnel and Forest Protection Officers on a short-term basis while the users adjust to the new closures and become familiar with the use of the MVUM.

Table 47: Conclusions By Alternative

Summary of Key Changes by Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Miles of designated NFS roads (that would be shown on the MVUM (under alternative 2 alternative 3, alternative 4, alternative 5)	333	321	281	291	162
Miles of Roads closed year-long to all motorized travel	85	22	30	33	65
Total road miles open for over-snow use	69	139	164	153	170
Changes to CDNST	No change; mix of motorized and non-motorized use	Managed as part of the trail system See Recreation Report	Managed for non-motorized use only See Recreation Report	Managed for non-motorized use only See Recreation Report	Managed for non-motorized use only See Recreation Report
Key Issues from the Transportation Perspective					
Quality motorized trail/route system	No improvements to the visitor experience by an improvement to maps. No Change to Forest Access	Improved visitor experience as clarification of road use is achieved and an MVUM is produced.	Improved visitor experience as clarification of road use is achieved and an MVUM is produced	Improved visitor experience as clarification of road use is achieved an MVUM is produced	Improved visitor experience as clarification of road use is achieved an MVUM is produced
Continental Divide National Scenic Trail	Continued to be managed for motorized and non-motorized use	See Recreation	See Recreation	See Recreation	See Recreation

Forest Plan Consistency

All alternatives would be consistent with the Forest Plan in that: none would involve road construction or reconstruction, maintenance would continue as part of all alternatives and input would be provided by Forest Resource specialists, transportation planning and road management would be coordinated with State and local agencies and owners of intermingled land, the Helena National Forest would

generally be open to vehicles except for roads, trails, or areas which may be restricted, travel restrictions would be evaluated annually, enforcement of the Road Management Program would be a high priority, road maintenance would occur based on resource protection, road investment protection, user safety, user comfort and travel efficiency and maintenance levels would be constantly monitored for appropriateness and schedules would be prepared annually.

HERITAGE

Regulatory Framework

The National Historic Preservation Act (NHPA) of 1966, as amended and its implementing regulations in 36 CFR 800, provide the legal framework for considering cultural resources in project planning. National Historic Preservation Act Section 106 requires that federal agencies take into account, in consultation with the State Historic Preservation Officer (SHPO), Tribes and the Advisory Council on Historic Preservation (ACHP), the potential effects of agency actions on places and sites of archaeological or historical significance. The Act establishes the National Register of Historic Places, a listing of locally, regionally and nationally significant heritage properties (36 CFR 60). In project planning, agency historic preservation specialists use the National Register eligibility criteria to determine the scientific, historical or cultural value of cultural resources affected by projects.

The Archaeological Resources Protection Act, the Native American Graves Protection and Repatriation Act, Executive Order 11593 (Protection and Enhancement of the Cultural Environment) and Executive Order 13007 (Indian Sacred Sites) also require federal agencies to identify, monitor, protect and preserve cultural resources under their jurisdictions.

Assumptions

It is assumed that Geographic Information System maps showing known cultural resource distributions and existing inventory (field survey) data, provide an adequate means of assessing the general effects of the five travel plan alternatives on cultural resources (see Methodology section).

The 2001 State Off-highway-vehicles (OHV) plan describes a range of OHV impacts to cultural resources on public lands across Montana. These data are largely anecdotal rather than quantitative and no attempt was made to compare OHV damage to cultural resources with other recreational and non-recreational activities, such as horseback riding, livestock grazing or minerals exploration. Still, it is apparent from these data that cultural resources common to the Helena National Forest are similarly exposed and vulnerable to OHV travel. Specifically, vehicles cause compaction, rutting, erosion and other disturbances atop cultural resources. Off-highway-vehicles use facilitates access to otherwise remote areas, leaving archaeological and historic ruins exposed to the effects of off-route riding, vandalism, artifact-collecting and theft. Therefore, this analysis assumes that motorized recreation has the potential to cause similar impacts to cultural resources on the Helena National Forest. It also assumed that non-motorized recreation (i.e. hiking, biking and skiing) has similar but lesser capacity to cause damage to cultural resources.

Information Used

This analysis for the Divide travel planning relied on cultural resource inventory data and site records on file at the Helena National Forest (HNF) Supervisor's Office. These data were generated through project and reconnaissance-level field inventories completed from 1979 to 2010. Cultural resource site and inventory records are contained in Infra, GIS and hard copy records at the Helena National Forest Supervisor's Office.

Background context for the planning area are available in various archaeological and historical documents pertinent to the Helena Valley areas (i.e. Beck 1989; Knight 1989).

Methodology & Scientific Accuracy (40 CFR 1502.15)

This analysis focused on cultural resources identified within the Divide travel planning area in the Continental Divide Range of southwestern Montana.

Using GIS data layers, the currently known distribution of cultural resources, as identified during previous project inventories, was displayed atop the road and trail system proposed under each alternative to determine where there were overlaps. Cultural resource size and boundary data are not always precise, particularly in absence of intensive surface investigation and mapping (historic sites) or subsurface testing (archaeological sites). For this reason, GIS analysis identified all sites within 600 feet of the roads and trails in each alternative. A 600 foot analysis buffer also takes into account the wheeled motorized vehicle travel which is allowed within 300 feet of designated system routes (unless signed otherwise), including roads and trails for camping under alternatives 2 and 3 and for all recreation activities (parking, camping, firewood gathering, etc.) under alternatives 4 and 5.

Approximately 75 percent of the identified cultural resources in the planning area are either bisected by or lie within 100 foot or less of existing road and trails. These cultural resources could be directly affected by closures, seasonal restrictions, camping/recreation or permanent road use and maintenance.

The remaining 25 percent of cultural resources are located at further distances (100-600 feet) from existing roads or trails. These could be indirectly affected by road and trail use or closure, as well as parking, camping, firewood gathering or other recreational activities. Specifically, these routes provide access to cultural resources and thus invite vandalism, artifact collecting, arson and other resource-depreciative behaviors. For example, old access roads to late 19th Century granite quarries in Sweeny Creek have been converted to a network of OHV trails. Because these trails now draw attention to the old quarry ruins, many have suffered various kinds of vandalism and abuse.

The effects of the Divide travel plan on cultural resources were evaluated on this basis:

- cultural resources effected permanently by road and trail closures in each alternative
- cultural resources effected by road and trail operations and maintenance

Closed roads and trails that are eventually proposed for reclamation/decommissioning would require National Historic Preservation Act Section 106 compliance reviews since they may be:

- historic in origin;
- linked to a significant cultural resource; or
- contain an exposed historic or prehistoric archaeological site within the roadbed or prism.

Heritage, Affected Environment

Introduction

Archaeological research, ethnographic data and tribal oral tradition confirm that American Indian peoples have occupied or used the Divide Travel Plan Area of southwestern Montana for thousands of years. Prior to Euroamerican settlement and during the historic period, Indian groups living in what would become Idaho and western Montana made seasonal trips over Continental Divide at MacDonald, Mullan, Priest and other mountain passes en route to hunt bison, trade, socialize and raid on the

Montana plains. After ca. 1720 A.D., these seasonal journeys were facilitated by horse-drawn travois, which transported supplies, hides and meat. As a result of these treks, Indian trails became equestrian thoroughfares or, quite literally, “roads”. The Continental Divide area was also used for hunting, wild plant food collecting, tool stone quarrying and other cultural activities. Today, the Salish, Kootenai, Blackfeet, Shoshone and other tribes attach cultural significance to archaeological sites found throughout the travel planning area. Contemporary American Indian religious activity occurs at one mountain pass in the Divide area.

During the early 1800s, fur trappers sought beaver in mountain streams throughout the Divide travel planning area. The mountain range was officially explored by the Stevens Expedition in 1854. The Mullan Road, linking Fort Walla Walla with Fort Benton, was subsequently built in 1859-1860 atop one of the Steven Expedition routes, under the supervision of Lieutenant John Mullan, for whom Mullan Pass in the Divide travel planning area is named. Military use was limited but the wagon road greatly facilitated the non-Indian settlement of both Montana and Washington Territories. The first meeting of the Freemasons of Montana (who may have formed the nucleus of the Vigilantes during the early, violent days of the Montana Gold rush) occurred atop Mullan Pass in 1862. An outdoor lodge (with paths, benches and altars), developed in 1955 under a Forest Service special use permit, is maintained on this spot by the Masons.

The Mullan Road served as an important travel route until the Northern Pacific (NP) Railroad (and Mullan Tunnel) was completed in 1883. The Northern Pacific railroad spurred development of large hardrock (lode) mines and mills throughout the Continental Divide Range, as exemplified by the Drumlummon Mine in Marysville and the Lee Mountain and Ontario mines in the Ten Mile and Little Blackfoot drainages, respectively. The Divide travel planning area encompasses four major mining districts (Austin/Blossburg, Elliston, Ophir Creek and Rimini). The abundant (checkerboard) private lands and extensive network of mining ditches and roads throughout the travel planning area demonstrate the scale of mining activity and development. Most patented (private) mining claims (operations) have long since been abandoned. Reclamation has occurred at some of these hardrock mining sites. The reclaimed Charter Oak Mine and Millsite is now a well-used forest interpretive site.

Logging to support mining, community building and ore smelting in Anaconda and (later) East Helena followed. An extensive flume and ditch system to transport logs to the Elliston railhead is located in the Little Blackfoot River area. Grassy basins atop the Continental Divide seasonally sustained large sheep and cattle herds, as attested by old photographs and the remains of old camps in aspen groves and “sheepherder” monuments atop high promontories. Granite quarrying in the eastern foothills of the Continental Divide provided durable building materials for fire-prone Helena and other fledgling communities across the newly formed State of Montana (1889). Much of the Divide travel planning area was incorporated into the National Forest system in 1906.The Moose Creek Ranger Station was established in the Ten Mile drainage in 1908 to facilitate timber, range, fire, minerals and recreation management by the Forest Service.

The current road and trail system within the Divide travel planning area owes much of its existence to the early cultural history of this region. Upon its formation, the Forest Service simply preempted existing historic travel routes, parts of which had antecedents in American Indian trails and “buffalo roads”. By this process, a variety of historic cultural resources (i.e., mines, homesteads, line camps, trappers cabins, log flumes) to which these roads were intimately connected also came into federal ownership at the turn of the 20th Century. Road improvements and new road construction, particularly that spurred by an extensive Forest Service timber harvesting program beginning in the 1940s, followed. More recently Forest Service administrative uses, coupled with housing development at the wildlands-urban interface

and growing OHV use, have added another tier of both non-system and system roads and trails across the Divide travel planning landscape.

Analysis Area

A total of 181 cultural resources are currently identified within or near roads and trails that are the focus of the Divide travel planning analysis. A mix of prehistoric and historic cultural resources are identified north of Highway 12. Most of the identified cultural resources south of Highway 12 in the Ten Mile and Little Blackfoot drainages are historic in origin and relate to placer and lode mining. The historical or scientific value of many cultural resources in the analysis area has not been determined. The exceptions are major lode mines sites such as the Ontario and Charter Oak, which have been the focus of National Historic Preservation Act Section 106 compliance for recent mine reclamation work. For purposes of this NEPA analysis, all identified cultural resources are treated as eligible (significant) for listing in the National Register of Historic Places, in accordance with FSM 2363.22.

Heritage, Environmental Consequences

Effects Common to All Alternatives

Direct and Indirect Effects

The 2001 State OHV Plan benefited cultural resources by confining motorized travel to designated routes, as defined in alternative 1 (Existing Condition). alternatives 2, 3, 4 and 5 provide area-specific travel plans that replace, in part, the State OHV Plan.

Road and trail closures benefit cultural resources by preventing easy vehicle access to sensitive cultural resources which helps to abate vandalism and artifact theft. For example, because of relatively easy vehicle access across the Divide travel planning area, historic mining buildings have been dismantled to obtain antique wood for various decorative uses such as in home remodeling and picture frames. Mining equipment, such as ore carts and old equipment parts, has found new homes as lawn and landscaping ornaments. Valuable artifacts are collected for sale in antique shows and on the Internet.

Roads and trails often bisect prehistoric (American Indian) and historic archaeological sites, exposing artifacts in their tread. As time goes by, these treads get deeper and deeper, leading to by-pass routes and multiple treads. The exposed archaeological remains become highly visible and vulnerable to illegal collection, crushing by vehicles, erosion damage and other processes. Permanent roads and trails closures would eliminate some of these problems.

Conversely, permanent road closures under any alternative may limit access to historic sites that people want to visit. This can be construed as a negative effect. Further, some (primitive) roads retain historical value by virtue of their linkage to specific cultural resource sites. Their permanent closure and potential obliteration (considered under a separate NEPA decision), may diminish the historical value of some of these cultural resources.

Fall to spring road and trail closures provide limited benefit to cultural resources since public use of National Forest System land diminishes during this time period and cultural resources are usually blanketed in snow or are otherwise inaccessible due to poor road conditions. However, once these roads are open from late spring through early fall, cultural resources become vulnerable to artifact collection, vandalism, arson and other depreciative behavior.

Winter use with snowmobiles has limited effects on cultural resources because most cultural resources are obscured by deep snow. Standing historic ruins (i.e., old cabins) are vulnerable to public activity,

including use as winter shelter and a ready source of dry firewood. However, there is no strong correlation between snowmobile activity and the dismantling of historic ruins for winter firewood on the Helena National Forest.

A variety of cultural resources are located within or near major roads and trails that would remain open and available for public use under any alternative. Annual road maintenance continues to degrade some cultural resources exposed in the roadbeds and berms. For example, road grading and drainage clearing incrementally pick away at archaeological sites (i.e., Hope Creek) and standing historic ruins. Regardless of alternative, public use will continue on these travel routes and may increase due to road and trail closures elsewhere in the Continental Divide Range and on adjacent public lands managed by the Forest Service and Bureau of Land Management. This situation could potentially accelerate on-going impacts to cultural resources from road maintenance and use.

Road closures will eventually necessitate evaluation and implementation of closure methods, which could include road obliteration, ripping and seeding. Contingent on the targeted roads and OHV trails, this could have an adverse effect on cultural resources. The effect of this activity could be mitigated by using various closure methods in areas where cultural resources are currently exposed in roads and trail-beds. For example, road segments within identified archaeological sites could be buried with soil, as opposed to being ripped and seeded. As an outcome of road and trail closures, any future obliteration will require careful long-range planning to insure that cultural resource inventory, evaluation and treatment precede such undertakings (ground-disturbance), in accordance with Section 106 of the National Historic Preservation Act (NHPA), as amended.

Effects Common to All Action Alternatives

Irreversible/Irretrievable Commitments

Travel management may increase public access and as a consequence, enhance opportunities for artifact collecting and vandalism. Travel management may inadvertently expose previously undiscovered prehistoric or historic sites. It is possible that exposed artifacts and/or ruins would be observed and not reported to the Forest Service, thus providing opportunities for artifact collecting and vandalism. However, the results of past cultural resources monitoring and inventories suggest that these kinds of indirect effects would be negligible.

Cumulative Effects

All action alternatives would improve cultural resource protection in the Divide travel planning area in the short- and long-term. See alternative 1 for a description of past, present and reasonably foreseeable future actions.

Alternative 1, No Action

Alternative 1 falls under the purview of the 2001 State OHV Plan and eliminates cross-country travel. It provides the same level of protection to the culture resource base within the travel planning area as currently exists. Some 85 miles of roads and trails are closed under this alternative, the bulk of which are snowmobile routes which are open under alternative 2.

Cultural resources would remain vulnerable to vandalism and related impacts because OHV riding would be allowed yearlong on a wide range of designated routes.

The numerous open roads and trails provide ample access to cultural resources for purposes of monitoring, scientific investigation and potentially interpretation, which is a beneficial effect.

Road maintenance will continue to degrade some cultural resources in the travel planning area under alternative 1.

Indirect Effects

The Existing Condition protects many vulnerable cultural resources by confining motorized travel to designated routes. It would preclude the opportunity to further protect cultural resources that may currently be vulnerable to vehicle traffic, artifact collecting and natural deterioration in undesignated routes.

Irreversible/Irretrievable Commitments

Since no actions associated with this project would occur, there would not be a need to inventory the planning area. Therefore, additional cultural resources data would not be realized.

Cumulative Effects

This alternative is the existing condition and does not improve cultural resource protection in the Divide travel planning area.

Past Actions – The Continental Divide Range and its adjacent foothills and valley bottoms, has supported livestock grazing, logging, recreation and utility development during the last 140 years. These activities and particularly the road construction associated with them, have exposed and in some cases damaged, cultural resources. However, it is difficult to quantify the effects of these past actions on cultural resources in the Divide travel planning area.

Since the late 1970s, cultural resource inventories have preceded all ground-disturbing Forest Service projects in the Divide travel planning area including vegetation treatments, livestock grazing, restoration and recreation development. The majority of the cultural resources described in this travel plan analysis were discovered as a result of these compliance inventories. In fact, many archaeological sites were found because they were exposed in old road and trail beds. In most cases, project boundaries and treatments were reconfigured to avoid impacting important cultural resources so the cumulative effect of these actions on cultural resources has been relatively minor.

Present Actions – Cultural resource inventory and evaluation has preceded restoration work, fencing, weed treatment, road and trail repairs, reforestation and stock watering repairs. On-going forest activities will continue to have a cumulative effect on cultural resources. Livestock grazing, in particular, continues to degrade prehistoric and historic resources, especially where they concentrate near water sources. Roads and trails have been constructed through archaeological and historic sites over a period of many years. Regardless of alternative, road maintenance, especially road grading and road use will continue to degrade cultural resources, particularly prehistoric archaeological sites. Cultural resources exposed in roadbeds and borrow pits invite illegal artifact collecting.

Reasonably Foreseeable Future Actions – Future actions in the analysis area focus on public safety and environmental health and include fire and watershed restoration, hazardous fuels reduction, abandoned mine reclamation and minor recreation developments and mineral operations. In all likelihood, the effects of these projects on cultural resources can be mitigated through project re-design and avoidance.

Despite economic uncertainty and other factors, Lewis and Clark and Jefferson Counties will continue to be developed at an incremental pace. The cumulative effect of this demographic growth (i.e., rural subdivisions, commercial development) at the forest-urban interface on Helena National Forest cultural resources is difficult to estimate but easier access (i.e., trails out of subdivisions) into Continental Divide

Range (i.e., Sweeny Creek area) may increase the problems described above, such as user-built trail proliferation atop cultural resources, artifact collecting and vandalism.

Alternative 2

Direct Effects

Alternative 2 would close additional miles of non-system and system roads and trails to wheeled vehicles that pass closely or directly through 53 identified cultural resources, as compared to alternative 1. This alternative will leave 110 miles of road open to over-snow vehicles. Permanent closures would protect these cultural resources from on-going damage by continued wheeled vehicle traffic and public use and be a beneficial effect.

At the same time, permanent closures would constrain public access for purposes of agency or agency-authorized scientific investigation, monitoring and protection-related activities.

Road maintenance would continue to degrade cultural resources in the Divide travel planning area.

Indirect Effects

Alternative 2 would improve cultural resource protection over alternative 1 by decreasing road access across the Divide travel planning area. This, in turn, would reduce cultural resource exposure to artifact collecting, vandalism and other depreciative behavior.

Alternative 3

Direct Effects

Alternative 3 would also close additional miles of non-system and system roads and trails yearlong to wheeled motorized vehicles that pass closely or directly through 77 identified cultural resources, as compared to alternative 1. These various closures would benefit cultural resources by limiting public access. However, this alternative will leave 154 miles of road open to over-snow vehicles. The negative effect would be constraining Forest Service administrative and public recreational access to these historic ruins and features.

Road maintenance would continue to degrade cultural resources in the Divide travel planning area.

Indirect Effects

Alternative 3 would improve cultural resource protection over alternatives 1 and 2 by decreasing road access across the Divide travel planning area. This, in turn, would reduce cultural resource exposure to artifact collecting, vandalism and other depreciative behavior.

Alternative 4

Direct Effects

In comparison to alternative 1, alternative 4 would close miles of non-system and system roads and trails yearlong to wheeled motorized vehicles that pass closely or directly through 65 identified cultural resources. These various closures would benefit cultural resources by limiting public access. However, this alternative will leave 137 miles of road open to over-snow vehicles. The negative effect would be constraining Forest Service administrative and public recreational access to these historic ruins and features.

Roads and trails in Sweeny Creek would be closed year-long to motorized vehicles, which would benefit cultural resources.

Road maintenance would continue to degrade cultural resources in the Divide travel planning area.

Indirect Effects

Alternative 4 would improve cultural resource protection over alternatives 1 by decreasing road access across the Divide travel planning area. This, in turn, would reduce cultural resource exposure to artifact collecting, vandalism and other depreciative behavior.

Alternative 5

Alternative 5 would close non-system and system roads and trails yearlong to wheeled motorized vehicles that pass near or directly through 88 identified cultural resources, as compared to alternative 1. These various closures would benefit cultural resources by limiting public access. However, this alternative will leave 169 miles of road open to over-snow vehicles. In contrast to alternatives 3 and 4, it would leave 14.5 miles of trail open to vehicles 50 inches or less with no seasonal restriction. This newly open 14.5 miles of trails have the potential to impact 2 cultural sites if resource protection measures are not established. For this factor alone, alternative 5 provides the least cultural resource protection of the five alternatives. Alternatives 2-4 provide for one mile or less of trail open to vehicles 50 inches or less with no seasonal restriction. When compared strictly on the basis of total miles to be restricted, alternative 5 remains the most restrictive and thus provides the most over-all benefit to cultural resources. The negative effect of decreased motorized access would be constraining Forest Service administrative and public recreational access to these historic ruins and features.

As in alternative 4, roads and trails in the Sweeny Creek area would be closed yearlong to motorized vehicles, except for County Road 335, which would benefit cultural resources.

Road maintenance would continue to degrade cultural resources in the Divide Travel Plan area.

Indirect Effects

Alternative 5 would generally improve cultural resource protection over alternatives 1-4 by decreasing road access across the Divide Travel Planning area. This is despite the fact that unlike alternatives 1-4, it provides 14.5 miles of trail for vehicles 50 inches or less. The general reduction in access, in turn, would reduce cultural resource exposure to artifact collecting, vandalism and other depreciative behavior.

Conclusions

The Divide Travel Plan project area contains a variety of cultural resources. Overall, travel planning would have a beneficial effect on cultural resources. Alternative 1 essentially implements the State OHV Plan by eliminating cross-country travel and confining motorized travel, including snowmobiles in some areas, to designated routes. It does not increase protection of cultural resources by closing numerous open roads and trails but it does provide ample access to cultural resources for purposes of monitoring, scientific investigation and potentially interpretation.

Alternative 2 would permanently close approximately six miles of non-system roads and trails, which would benefit cultural resources over alternative 1. These closures might constrain some administrative and public access to cultural resources, but overall there would remain ample opportunity for the public to visit cultural resources in the Divide Travel Plan area.

Alternative 3 would permanently close approximately seven miles of system and non-system roads and trails, which would benefit cultural resources over both alternatives 1 and 2.

Alternative 4 would permanently close approximately six miles of system and non-system roads and trails, which would benefit cultural resources over alternatives 1, 2 and 3.

Alternative 5 would permanently close approximately five miles of non-system roads and trails, which is less than in alternatives 1-4. When judged on this factor alone, alternative 5 would provide the least benefit to cultural resources derived from the permanent closure of non-system roads and trails of the five alternatives.

Permanent road and trail closures that eventually lead to obliteration (ripping, seeding), as based on future site-specific NEPA and National Historic Preservation Act analyses, could adversely affect identified cultural resources unless mitigation treatments are imposed (e.g., bury the road bed with topsoil as opposed to ripping of tread and the archaeological deposit). Road closure methods are not part of the current Divide Travel Plan decision, but they are linked.

Compliance inventory, evaluation of site significance and project effect, consultation with the Montana State Historic Preservation Office and Tribal Historic Preservation Officers and implementation of design features for project-affected cultural resources would comply with the National Historic Preservation Act and its implementing regulations in 36 CFR 800, as well as Helena National Forest Plan (USDA 1986) standards and guidelines.

Forest Plan Consistency

The Forest Plan requires the integration of cultural resources in project planning and forest management. Compliance inventory, evaluation of site significance and project effect, consultation with the Montana State Historic Preservation Office and Tribal Historic Preservation Officers and implementation of design features for project-affected cultural resources would comply with the National Historic Preservation Act and its implementing regulations in 36 CFR 800, as well as Helena National Forest Plan (USDA 1986) standards and guidelines.

SOILS

Regulatory Framework

National Forest Roads and Trails Act of 1964 (78 Stat. 1089; 16 U.S.C. 532-538)

Section 1 of the National Forest Roads and Trails Act states “Congress hereby finds and declares that the construction and maintenance of an adequate system of roads and trails within and near the national forests and other lands administered by the Forest Service is essential”. This system of roads is needed “to provide for intensive use, protection, development and management of these lands under principles of multiple use and sustained yield of products and services”. (16 U.S.C. 532)

Section 2 of this act states, “The Secretary is authorized, under such regulations as he may prescribe, subject to provisions of this Act, to grant permanent or temporary easements for specified periods or otherwise for road rights-of-way (1) over national forest lands administered by the Forest Service”. (16 U.S.C. 533)

Implicit in this legal direction is Forest Service authority to withdraw lands from vegetation production and related soil productivity on National Forest for dedication to road and trail corridors for transportation and access uses.

National Environmental Policy Act of 1969

This report was developed using the principle elements from the NEPA of 1969 and the regulations for implementing the procedural provisions of the NEPA from the Council on Environmental Quality (40 CFR Parts 1500-1508) and Regulation 36 CFR Part 220.

National Forest Management Act of 1976 (90 Stat. 2949; 16 U.S.C. 1608)

Section 8(b) of the National Forest Management Act states, "any road constructed on land of the National Forest system in connection with a timber contract or other lease shall be designed with the goal of re-establishing vegetation cover on the roadway and areas where vegetation cover has been disturbed by the construction of the road, within 10 years after the termination of the contract, permit, or lease". This section of the Act further states, "Such action shall be taken unless it is determined that the road is needed for use as a part of the National Forest Transportation System".

This legal direction states that lands no longer needed for and dedicated to, transportation or access uses should be returned to a vegetated state. Implicit in this legal direction is Forest Service responsibility to recover soil productivity on these lands, to the extent that vegetation can be re-established. Type and degree of soil recovery necessary for re-establishment of vegetation will depend on site-specific conditions and land management objectives for that area.

Section 8(c) of this act states "Roads constructed on National Forest System lands shall be designed to standards appropriate for the intended uses, considering safety, cost of transportation and impacts on land resources".

Executive Order 11644--Use of off-road vehicles on the public lands (1972)

Section 3 of EO 11644 describes four criteria for designating areas and trails for motorized uses so that conflicts between various uses of public lands shall be minimized. One of these categories is areas and trails shall be located to minimize damage to soil, watershed, vegetation, or other resources of the public lands.

Section 8 of EO 11644 describes the requirements for monitoring and adjusting off-road use on Forest Service managed lands overtime.

Travel Management Rule 36 CFR 212 Subpart B (2005)

(a) In designating National Forest System roads, National Forest System trails and areas on National Forest System lands for motor vehicle use, the responsible official shall consider effects on National Forest System natural and cultural resources, public safety, provision of recreational opportunities, access needs, conflicts among uses of National Forest System lands, the need for maintenance and administration of roads, trails and areas that would arise if the uses under consideration are designated; and the availability of resources for that maintenance and administration.

(b) Specific criteria for designation of trails and areas. In addition to the criteria in paragraph (a) of this section, in designating National Forest System trails and areas on National Forest System lands, the responsible official shall consider effects on the following, with the objective of minimizing:

(1) Damage to soil, watershed, vegetation and other forest resources.

Helena National Forest Plan of 1986

The Helena National Forest Plan provides further guidance: "Areas of decomposed granite soils will be identified and erosion control measures planned prior to ground disturbing activities"; "To reduce sedimentation associated with management activities, the highly sensitive granitic soils, which cover about 20 percent of the Forest, will have first priority for erosion control" (USDA Forest Service 1986, page II-26).

Assumptions

- Roads located on private land and those that are not under Forest Service management were not considered in this analysis.
- The Divide Travel Plan decision will include only open-or-closed determinations. No ground disturbing activities are proposed as part of this project.
- Use of over-snow vehicles would not result in soil disturbance as the ground would be covered with snow.
- Soil impacts would be greater on roads than compared to non-motorized and motorized trails 50 inches in width or less. This is because cut and fill associated with roads frequently results in a larger area of soil disturbance than that of trails.
- Other than roads and trails over sensitive soils (typically riparian areas), areas most prone to extensive soil degradation would include routes that run parallel to the slope and complex networks or "spaghetti" road patterns.

Existing dispersed use sites or new sites would be closed if impacts were observed to occur based on criteria of use and consistency with 36 CFR 212.52 (b)(2) for this activity.

Information Used

Helena National Forest Soil Survey - Professional interpretations of landtypes based upon the "Soil Survey of Helena National Forest Area, Montana" USDA Forest Service and Natural Resource Conservation Service 2001.

Helena National Forest Geospatial Data – Analysis and interpretations of GIS Landtype and Divide Travel Plan alternatives datasets. Subsequent tables produced are located in an Excel database file, located in the project record and summarized in appendix A.

Roads Analysis Process (RAP) Report – An analysis of the Helena National Forest road network was completed in 2004. The analysis designated road risk ratings based on road mileage within riparian habitat conservation areas, wet areas, erosive and slide-prone soils, Total Maximum Daily Loads (TMDL) watersheds and the number of road-stream crossings (USDA, 2004).

Methodology and Scientific Accuracy

The data used for the analysis of this report is the best available data with regards to accuracy of route location, soil type and associated soil properties. The road and trail layer was overlaid with the soil landtypes designated as "sensitive" for a GIS product displaying the miles of roads and trails occurring on specific designated sensitive landtypes. Sensitive landtypes were

grouped into four categories of geologic hazard as identified in the Soil Survey of the Helena National Forest, 2001. These hazards address soils that occur in positions identified as landslide and slump prone, wet soils and flood prone areas, loess soils with volcanic ash surfaces and granitic soils. From this information, all routes were stratified based on these geologic hazards and then further divided by open or closed travel restriction.

For this analysis report, all routes from each geologic hazard were grouped into open or closed travel restriction. Routes with travel restrictions that allow any wheeled motorized travel at any time of year were placed into the open category. The closed category was applied to those routes that are closed to all wheeled motorized travel yearlong. Travel restriction codes in the open category include: 02, 03, 05, 07, 13, 15, open highway legal, U open highway legal, M-07, MT, MT 5/16 – 10/14, MT May 16th to August 31st and M-08.1. Travel restriction codes in the closed category include: 01, 06, 06-SPC, CDNST, NS-01-RES, MT-01, NS-01-RES and NONMT. This assumption is based on the premises that as long as routes are open to wheeled motorized use, for any length of time, the potential for natural reclamation or to perform decommissioning would not be possible.

Alternatives Considered

Five alternatives were considered in this analysis. Alternative 1 is the no-action alternative, alternative 2 is the original proposed action, alternative 3 was developed as part of the scoping process, alternative 4 was the preferred alternative based on public feedback prior to release of the draft EIS and alternative 5 was developed in response to comments received from the draft EIS in conjunction with recent field reviews.

Soils, Affected Environment

Introduction

The planning area is the southern portion Continental Divide area, known as the Divide travel planning area, located west of Helena Montana on the Helena Ranger District of the Helena National Forest.

Analysis Area

Within the Divide Travel Planning Area, there are 60 landtypes affected by roads and trails; 12A, 12B, 12C, 12D, 13A, 14, 14A, 14B, 14C, 15, 21, 26, 31, 32, 32A, 32B, 36, 36A, 36B, 39, 39A, 41, 44, 46, 47, 47B, 49, 49A, 49B, 56, 56A, 57A, 59, 59A, 76, 76A, 77, 77A, 77B, 79, 79B, 80, 86, 87, 90, 100, 101, 110, 120, 130, 136, 150, 210, 260, 320, 360, 390, 470, 490, 790.

Soil effects from roads and trails include: removal of vegetative cover, compaction, degradation of soil structure, decreased infiltration and water holding capacity, reduction in organic material, accelerated surface erosion and exacerbation of mass failure, such as landslides or slumps. These types of soil impacts can occur on the prism of all roads and trails, whether those routes are used for motorized or non-motorized access.

Past road and trail management has taken steps on the Helena National Forest to minimize damage to soils from wheeled motorized use. These actions include:

- Forest Supervisor closure orders have been implemented on roads and trails to reduce impacts to soil and water resources.

- Forest Supervisor closure orders have been implemented limiting travel to designated routes in certain areas.
- Roads and trails are maintained in order to prevent erosion and mass wasting events.
- Projects have been completed re-routing and/or decommissioning roads and trails that were located on sensitive soils.
- In this analysis, sensitive soils are used as indicators because they represent landscapes most vulnerable to watershed impacts from roads or trails. These detrimental watershed impacts would include:
- Soil compaction with increased surface water runoff and/or concentration causing accelerated erosion and increased risk of landslides on and near roads
- Routing of sediment and surface water runoff from road or trail prisms to streams
- Direct connection between roads or trails and streams at crossings, including culverts, fill material, etc.

Sensitive soils are identified in 44 landtypes within the Helena National Forest. These landtype sensitivities are identified as landslide and slump prone, wet soils and flood prone areas, loess soils with volcanic ash surfaces and granitic soils. This project occurs on 37 of the 44 sensitive landtypes. These determinations are based upon the "Soil Survey of Helena National Forest Area, Montana" USDA Forest Service and Natural Resource Conservation Service 2001. Table 48 displays the sensitive landtypes on the Helena National Forest.

Table 48: Sensitive Soil Landtypes by Geological Hazard

Sensitive Soil Group	Soil Geologic Hazards (from HNF Soil Resource Inventory)	"Sensitive" Landtypes
Landslide and Slump Prone (also Wet Soil)	Landslide Map Units: Landslide-prone and wet soils	15, 15C, 150
	Colluvial Map Units: Slump-prone and wet soils	14, 14A, 14B, 14C
Wet Soil and Flood Prone	Wet Soil Map Units: Vulnerable to compaction and rutting	12A, 12B, 12C, 12D, 13A, 14, 14A, 14B, 14C, 15, 15C, 36B, 100, 101, 130, 136, 150
	Flood Plains & Terrace Map Units: Flood-prone areas and wet soils	100, 101
	Alluvial Fan MU: Flood-prone areas	110
Loess with Volcanic Ash	Loess with Volcanic Ash Map Units: Highly erodible soils and vulnerable to compaction	12B, 12C, 49B, 56, 57, 57A, 58, 59, 59A, 59B, 76, 76A, 77, 77B, 79, 89, 90, 790, 791
Granitic Landtypes	Granitic Map Units: Highly erodible soils	12C, 26, 36, 36A, 36B, 56, 56A, 76, 76A, 86, 89, 120, 260, 360

Landslide and Slump Prone Landtypes

Landtypes considered landslide and slump prone have been identified as colluvial deposits and former landslides. These landtypes are characterized by formation in unconsolidated material with hummocky microrelief and a predominance of springs and seeps. Landslides are most likely to occur in areas where they have already occurred in the past, on roaded landscapes and in areas of past wildfire. The landslide and slump-prone landtypes in this project area include landtypes 14, 14A, 14B, 14C, 15 and 150.

Wet Soil and Flood Prone Landtypes

Wet soils and flood prone landtypes typically occur in areas with high water tables or areas at risk of seasonal flooding. These landtypes can be identified by presence of surface water (either seasonal or yearlong), poor drainage, riparian areas near streams and presence of springs or seeps. These sites are usually found in geographical depressions, concave shaped areas or along fault zones. The wet soil and flood prone landtypes in this project area include landtypes 12A, 12B, 12C, 12D, 13A, 14, 14A, 14B, 14C, 15, 36B, 100, 101, 110, 130, 136 and 150.

Loess with Volcanic Ash Landtypes

The most significant and influential layer of this loess, or wind-blown soil, was deposited on the Forest approximately 6,700 years ago by the eruption of Mount Mazama, or Crater Lake, in Oregon. These soil's textures range from silt to sand sized particles that have been deposited by wind events. Ash cap layers tend to be resistant to erosive forces when fully vegetated due to high infiltration rates and strong soil structure. When vegetation and litter layers are removed, the ashy surface is highly susceptible to erosion. Loess with volcanic ash surface layers in this project area include landtypes 12B, 12C, 49B, 56, 57A, 59, 59A, 76, 76A, 77, 77B, 79, 90 and 790.

Granitic Landtypes

These landtypes have formed from granitic parent materials such as granite, grandiorites and diorites. These parent materials weakly to moderately fractured and weather into moderately - coarse to coarse textured soils. The subsoil of these landtypes is subject to a high erosion hazard. Granitic landtypes in the project area include landtypes 12C, 26, 36, 36A, 36B, 56, 56A, 76, 76A, 86, 120, 260 and 360.

Soils, Environmental Consequences

Effects Common to All Alternatives

Although no road decommissioning is proposed in the scope of this project, this action sets up the potential for roads on sensitive soils to be reclaimed in future projects. Simply removing the road bed from motorized use would encourage revegetation which would in turn begin to allow the road bed to act more as a natural site, however, soil impacts such as compaction and decreased infiltration capacity on road or trail prisms can persist for several decades even though transportation or access use is discouraged. Physical features, such as compaction, would not be mitigated until mechanical treatments can be applied (Lloyd et al. 2013).

Impact on Soils from Off-route Activity

Transportation uses can indirectly impact soil productivity on lands outside the road or trail prism when travelers establish new routes, especially to avoid trail obstructions and crossing difficult terrain or wet areas. Soil impacts associated with non-system routes can occur on all types of roads and trails, whether those routes are used for motorized or non-motorized access. This activity results in soil quality degradation on areas that are identified for other types of uses in the Forest Plan, such as timber or forage production and provision for wildlife or fisheries habitat. A portion of these routes have been identified as U open highway legal (under alternative 1) and NS-01-RES (under alternatives 2, 3, 4 and 5) in the Divide Travel Planning corridor.

Impact on Soils from Roads and Trails

Generally, roads and trails are a dedicated use for lands that comprise the road prism. Regional Soil Quality Standards direct Forest Service personnel to manage National Forest System lands without permanent impairment of land productivity and to maintain or improve soil quality. Soil quality standards apply to lands where vegetation and water resource management are the principal objectives. The standards do not apply to intensively developed sites such as mines, developed recreation sites, administrative sites, rock quarries, or the permanent transportation system.

Effects Common to All Action Alternatives

Alternative 2, 3, 4 and 5 would close unauthorized routes (user created), which would in turn be considered a benefit to soils. These routes are assumed to be the most detrimental to soil conditions because they were not constructed with any erosion prevention measures. User created routes added to the permanent transportation system and designated open will be brought up to Forest Service standards through the annual maintenance program.

Alternative 1, No Action

Direct and Indirect Effects

Below is a description of the miles of road on each identified sensitive landtype feature. The quantities described do not take into account state highways, county roads or routes on private land occurring on sensitive landtypes.

Table 49: Alternative 1, Miles of Open and Closed Roads on Sensitive Landtypes

Sensitive Landtype Feature	Miles of Open Roads	Miles of Closed Roads
Landslide and Slump Prone	18.1	9.5
Wet Soil and Flood Prone	33.0	17.8
Loess with Volcanic Ash	52.9	28.3
Granitic Landtypes	61.2	33.1
Total miles	165.1	88.7

As directed by 36 CFR 212.50(b), wheeled motorized travel within 300 feet of designated system routes would be permitted as long as the following criteria are met:

- No new permanent routes are created,
- No damage to existing vegetation, soil or water resource occurs;
- Travel off-route does not cross streams; and
- Travel off-route does not traverse riparian or wet areas.

Irreversible and Irretrievable Commitments

No ground disturbing activity is proposed as part of this scope or decision, therefore no soil related irreversible and/or irretrievable commitments exist.

Cumulative Effects

There are approximately 5.5, U open or NS-01-RES, miles of identified unauthorized roads or trails (user created) occurring on sensitive landtypes. These routes are assumed to be the most detrimental to soil conditions because they were not constructed with any erosion prevention

measures. Therefore, no action would leave these routes open to use and would potentially further degrade soil conditions.

No action taken would only perpetuate further degradation of areas which contain sensitive soils, however small. Degradation may include compaction and increased run-off from non-vegetated areas which would transport sediment off the native site.

Alternative 2, 3 and 4

Direct and Indirect Effects

Below is a description of the miles of road on each identified sensitive landtype feature for action alternatives 2 through 4. The quantities described analyses roads on National Forest Lands and do not take into account state highways, county roads or routes on private land occurring on sensitive landtypes.

When comparing alternative 2 to alternative 1, the miles of routes opened for wheeled motorized use increase for routes occurring on Landslide/Slump prone areas, Granitic soils and those soils occurring on Volcanic Ash dominated soils by approximately 1.5 miles. The routes occurring on Wet/Flood prone areas decrease by approximately 0.7 of a mile.

Table 50: Alternative 2, Miles of Open and Closed Roads on Sensitive Landtypes

Sensitive Landtype Feature	Miles of Open Roads	Miles of Closed Roads
Landslide and Slump Prone	19.0	8.6
Wet Soil and Flood Prone	32.3	18.5
Loess with Volcanic Ash	53.3	27.9
Granitic Landtypes	61.3	32.9
Total miles	165.9	87.9

Alternative 2 would result in a net increase in the number of miles of routes open to wheeled motorized use on sensitive soils by approximately 0.8 miles.

When comparing alternative 3 to alternative 1, the miles of routes opened for wheeled motorized use decreases by approximately 35 miles for sensitive landtypes (Landslide/Slump prone areas, Wet/Flood prone areas, routes on Granitic soils and for routes occurring on Volcanic Ash soils).

Table 51: Alternative 3, Miles of Open and Closed Roads on Sensitive Landtypes

Sensitive Landtype Feature	Miles of Open Roads	Miles of Closed Roads
Landslide and Slump Prone	13.7	13.9
Wet Soil and Flood Prone	28.2	22.6
Loess with Volcanic Ash	43.6	37.6
Granitic Landtypes	44.7	49.5
Total miles	130.2	123.6

The effects of alternative 3 include a net reduction in the number of miles of routes open to wheeled motorized use on sensitive soils.

When comparing to alternative 4 to alternative 1, the miles of routes opened for wheeled motorized use decreases by approximately 28 miles for Landslide/Slump prone areas, Wet/Flood prone areas, routes on Granitic soils and for routes occurring on Volcanic Ash soils overall.

Table 52: Alternative 4, Miles of Open and Closed Roads on Sensitive Landtypes

Sensitive Landtype Feature	Miles of Open Roads	Miles of Closed Roads
Landslide and Slump Prone	15.1	12.5
Wet Soil and Flood Prone	28.6	22.2
Loess with Volcanic Ash	47.7	33.5
Granitic Landtypes	46.2	48.0
Total miles	137.6	116.2

The effects of alternative 4 include a net reduction in the number of miles of routes open to wheeled motorized use on sensitive soils.

Alternatives 2 and 3 would permit off-road wheeled motorized use within 300 feet of a road or trail for dispersed camping only. Alternative 4 would permit off-road vehicle use within 300 feet of roads for all legal recreational activities. The 300 feet motorized travel authorization would be contingent upon meeting the following criteria;

- No new permanent routes are created,
- No damage to existing vegetation, soil or water resource occurs;
- Travel off-route does not cross streams; and
- Travel off-route does not traverse riparian or wet areas.

Soil displacement, compaction or impacts to water quality through sedimentation could occur from off route travel through sensitive areas. The above dispersed vehicle use restrictions are consistent with 36 CFR 212.52 (b) (2) for this activity. This resource analysis does assume that existing sites or new sites would then be closed if impacts were observed to occur.

Professional observation suggests that the distinction between the two activities (camping only versus multiple-use) is indistinguishable in terms of impacts to the soil resource. Once camping activities occur, then firewood and general recreational use occurs in the same areas. Additionally, based on experience, the vast majority of opportunities for camping or multiple-uses within 300 feet of designated system routes has already been established and is part of the existing condition in this area. The terrain does not lend itself to many more, if any possibilities for additional dispersed recreational use (Marr, personal communication).

Irreversible and Irretrievable Commitments

No ground disturbing activity is proposed as part of this scope or decision, therefore no soil related irreversible and/or irretrievable commitments exist.

Cumulative Effects

Since no ground disturbing activities are proposed as part of alternatives 2, 3 and 4, there is no potential for cumulative effects from the soil resource when analyzing past, present and reasonably foreseeable actions.

Excluding some forms of wheeled motorized use such as full-sized vehicles would decrease exposed soil surfaces by removing a portion of the road from regular travel. Once vegetation begins to establish on the un-used surfaces, run-off and sediment transport will decrease. Compaction will still be a factor.

Alternative 5 – Preferred Action

Direct and Indirect Effects

Below is a description of the miles of road on each identified sensitive landtype feature. The quantities described do not take into account state highways, county roads or routes on private land occurring on sensitive landtypes.

When comparing alternative 5 to alternative 1, the miles of routes opened for wheeled motorized use decreases by approximately 44 miles for Landslide/Slump prone areas, Wet/Flood prone areas, routes on Granitic soils and for routes occurring on Volcanic Ash soils overall.

Table 53: Alternative 5, Miles of Open and Closed Roads on Sensitive Landtypes

Sensitive Landtype Feature	Miles of Open Roads	Miles of Closed Roads
Landslide and Slump Prone	13.5	14.1
Wet Soil and Flood Prone	28.0	23.3
Loess with Volcanic Ash	43.9	37.8
Granitic Landtypes	36.6	58.2
Total miles	121.9	133.4

The effects of alternative 5 include a net reduction of routes open to wheeled motorized use on sensitive soils.

Alternative 5 would restrict off-road wheeled motorized use to within 70 feet of a road or trail. The wheeled motorized travel authorization would be contingent upon meeting the following criteria;

- No new permanent routes are created,
- No damage to existing vegetation, soil or water resource occurs;
- Travel off-route does not cross streams; and
- Travel off-route does not traverse riparian or wet areas.

Alternative 5 has the additional restriction that vehicle travel to dispersed campsites would be limited to no closer than 30 feet of a stream or body of live water.

Soil displacement, compaction or impacts to water quality through sedimentation could occur from off route travel through sensitive areas. The above dispersed vehicle use restrictions are consistent with 36 CFR 212.52 (b) (2) for this activity. This resource analysis does assume that existing sites or new sites would then be closed if impacts were observed to occur.

Irreversible and Irretrievable Commitments

No ground disturbing activity is proposed as part of this scope or decision, therefore no soil related irreversible and/or irretrievable commitments exist.

Cumulative Effects

Since no ground disturbing activities are proposed as part of alternative 5, there is no potential for cumulative effects from the soil resource when analyzing past, present and reasonably foreseeable actions.

Excluding some forms of wheeled motorized use such as full-sized vehicles would decrease exposed soil surfaces by removing a portion of the road from regular travel. Once vegetation

begins to establish on the un-used surfaces, run-off and sediment transport will decrease. Compaction will still be a factor.

Conclusions

Combining Landslide/Slump prone, Wet/Flood prone, Granitic and Volcanic Ash soils, there are currently about 165 total miles of routes open to wheeled motorized use on sensitive soils within the Divide Travel Planning Area. Implementing alternative 2 there would cause a negligible net increase of approximately one mile of road accessible to wheeled motorized use on sensitive soils. Alternative 3 would result in an approximate reduction of 35 miles of routes open to wheeled motorized use on sensitive soils. Alternative 4 would result in an approximate reduction of 27 miles of routes open to wheeled motorized use on sensitive soils. Alternative 5 would result in an approximate reduction of 44 miles of routes open to wheeled motorized use on sensitive soils.

Soil effects from roads and trails include: removal of vegetative cover, compaction, degradation of soil structure, decreased infiltration and water holding capacity, reduction in organic material, accelerated surface erosion and exacerbation of mass failure, such as landslides or slumps. These types of soil impacts can occur on the prism of all roads and trails, whether those routes are used for motorized or non-motorized access.

Implementation of alternative 5 would provide for the monitoring and enforcement of the 70 feet off-road wheeled motorized use restriction. Alternative 5 would provide the most potential benefits and resource protection; in that this alternative reduces the number of heavily used dispersed recreation sites and reduces the impacts of camping activities on sensitive landtypes.

Although no travel route decommissioning is proposed in the scope of this project, this action sets up the potential for travel routes on sensitive soils to be reclaimed in future projects. Administrative changes such as installation of a sign or barrier at the entrance to the route, changing the maintenance level or type of use without making any physical improvements to the road or trail prism would be evaluated as having low effectiveness for improving watershed conditions. These methods would not be considered effective in reclaiming soil productivity. Soil impacts such as compaction and decreased infiltration capacity on road or trail prisms can persist for several decades without implementation of physical reclamation measures, even though transportation or access use is discontinued. Physical features, such as compaction, will not be mitigated until mechanical treatments can be applied (Lloyd et al. 2013).

Forest Plan Consistency

The Forest Plan Consistency table does not apply to the soils portion of this decision because there are no ground disturbing activities proposed.

The Forest Plan direction for soils applies to areas outside the permanent transportation system. The soil quality standards apply to management activities, but not to management schemes in the broad sense. Forest Plan consistency under all the alternatives was not evaluated from a soils perspective because, with the exception of unauthorized roads and trails, routes were constructed for management purposes.

Alternative 2 would not move in the direction outlined in the Helena National Forest's Plan when managing for preservation of granitic soils. The criteria are described on page II/26 section 3 under Soil Guidance; which states: (Section 3) "*To reduce sedimentation associated*

with management activities, the highly sensitive granitic soils, which cover about 20 percent of the Forest, will have first priority for soil erosion control."

Alternative 2 would result in an increase of routes open to wheeled motorized use occurring on granitic soils. Although, completely eliminating routes on all granitic landtypes would be most beneficial, it would be simply impractical to effectively manage the Forest. Designated Forest routes are designed to minimize erosion and sediment potential.

Alternatives 3, 4 and 5 are moving in the direction as outlined in the Helena National Forest's Plan when managing for preservation of granitic soils. The criteria are described in the Forest Plan on page II/26 section 3 under Soil Guidance and as described above.

Alternatives 3, 4 and 5 would result in a reduction of routes open to wheeled motorized use occurring on granitic soils. Although, completely eliminating routes on all Granitic landtypes would be most beneficial, it would be simply impractical to effectively manage the Forest. Designated Forest routes are designed to minimize erosion and sediment potential.

HYDROLOGY

Introduction

The Divide Travel Plan proposes designations for motorized routes in portions of 22 Sixth Hydrologic Unit Code (6th-HUC) watersheds, primarily in the Little Blackfoot River and Tenmile Creek drainages on the Helena National Forest (HNF). This decision would provide only open or closed designations. Any route designated as closed yearlong to wheeled motorized vehicles may potentially be fully decommissioned in a separate future NEPA analysis. From the standpoint of watershed improvement, the primary value of this travel plan is that it would identify closed routes which could be stabilized and are also available to be decommissioned through separate, future analysis.

This decision would not include any ground-disturbing activities, all of the affected roads are already on the landscape and none would be removed as a result of this decision. Therefore, the direct effect from this decision would be only to cease motorized vehicle disturbance on roads proposed for closure while opening a few roadbeds to motorized activity elsewhere in some watersheds. Overall there would be a net reduction in wheeled motorized traffic from baseline conditions in the planning area.

A road closed by this decision may generate less, the same, or more sediment over time as a result of the closure, depending on the road surface condition, the topography of the road and surrounding terrain, the effectiveness of the closure and other factors. Similarly, a road opened by this decision may or may not become a greater source of sediment, depending on level of use, maintenance, improvements and other factors. Given this uncertainty, sediment delivery from the road network under each alternative was not estimated for this analysis. Instead, in order to estimate the potential impact of the proposed alternatives on water resources in the analysis area, the following management indicators were compared for each alternative, following the assumption that at least some of the closed routes would eventually be decommissioned or stabilized:

- number of road-stream crossings on open and closed roads;
- miles of road within specified stream buffers on open and closed roads; and
- total miles of open and closed roads.

Regulatory Framework

Clean Water Act (CWA)

The Clean Water Act stipulates that states are to adopt water quality standards. Included in these standards are provisions for identifying beneficial uses, establishing the status of beneficial uses, setting water quality criteria and establishing Best Management Practices (BMP's) to control non-point sources of pollution. Executive Order 12088 also requires the Forest Service to meet the requirements of the Act. Section 313 of the Clean Water Act requires Federal agencies to comply with all Federal State, interstate and local requirements, administrative authority and processes and sanctions with respect to control and abatement of water pollution. Section 303(d) of the Clean Water Act stipulates that states must identify and prioritize water bodies that are water quality limited (i.e., water bodies that do not meet water quality standards). For waters identified on this list, states must develop a total maximum daily load (TMDL) for the pollutants, set at a level to achieve water quality standards.

Forest Service Manual sections 2532.02, 2532.03

Sections 2532.02 and 2532.03 of the Manual describe the objectives and policies relevant to protection (and where needed, improvement) of water quality on National Forest System Lands so that designated beneficial uses are protected. Guidelines for data collection activities (inventory and monitoring) are also described.

Montana Code Annotated (MCA) 75-5-303: Non-Degradation Policy

This policy mandates that "existing uses of state waters and the level of water quality necessary to protect those uses must be maintained and protected," although activities existing as of April 1993 that generate non-point-source pollution are exempted from this policy (MCA 75-5-303[1-2], MCA 75-5-317[2][a]). This exemption would apply to most Helena National Forest system roads.

Montana Code Annotated (MCA) 75-5-703: Development and Implementation of TMDLs

In water bodies for which a TMDL has been developed and implemented, Montana law supports a "*voluntary program of reasonable land, soil and water conservation practices for nonpoint source activities for water bodies*" in order to achieve compliance with water quality standards (MCA 75-5-703 [8]). In water bodies identified as impaired and in need of TMDL development, but for which no TMDL has been completed, "*new or expanded nonpoint source activities affecting a listed water body may commence and continue if those activities are conducted in accordance with reasonable land, soil and water conservation practices*" (MCA 75-5-703 [10][c]).

Administrative Rules of Montana (ARM) 17.30.6: Surface Water Quality Standards and Procedures

Montana law links water quality to the attainment of "*beneficial uses*" in a water body. Designated beneficial uses vary by water body classification. The state has classified most of the streams within the planning area as *B-1* (ARM 17.30.610). Water bodies classified as *B-1* must be "*maintained suitable for drinking, culinary and food processing purposes, after conventional treatment; bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply*" (ARM 17.30.623[1]). There are some additional specific standards that apply to *B-1* waters, they can be found at ARM 17.30.623[2]. Upper Tenmile Creek is classified as *A-1* (ARM 17.30.610).

Water bodies classified as *A-1* have the same beneficial uses as *B-1* waters, with some additional specific standards (ARM 17.30.622[3]) similar to those listed for *B-1* waters.

The additional standards for *A-1* and *B-1* waters that are pertinent to this project include "*no increases are allowed above naturally occurring concentrations of sediment or suspended sediment (except as permitted in 75-5-318 , MCA), …, which will or are likely to create a nuisance or render the waters harmful, detrimental, or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish, or other wildlife*" (ARM 17.30.622[3][f]) for both categories and "*no increase above naturally occurring turbidity or suspended sediment is allowed except as permitted in 75-5-318, MCA*" for *A-1* waters (ARM 17.30.623[3][d]) and "*the maximum allowable increase above naturally occurring turbidity is five nephelometric turbidity units except as permitted in 75-5-318, MCA*" for *B-1* waters (ARM 17.30.622[3][d]). The term *naturally occurring* implies "*conditions or material present from runoff or percolation over which man has no control or from developed land where all reasonable land, soil and water conservation practices have been applied*" (ARM 17.30.602). *Reasonable land, soil and water conservation practices* consist of "*methods, measures, or practices that protect present and reasonably anticipated beneficial uses*" (ARM 17.30.602).

National Forest Management Act (NFMA)

Roads constructed on National Forest System (NFS) lands shall be designed to standards appropriate for the intended uses, considering safety, cost of transportation and impacts on land and resources. This is understood to mean that the transportation system on NFS lands provides protection for streams, streambanks, shorelines, lakes, wetlands and other bodies of water from detrimental changes in water temperature, blockages of water courses and deposits of sediment, where roads are likely to seriously and adversely affect water conditions or fish habitat.

National Environmental Policy Act (NEPA)

This report was developed using the principle elements from the NEPA of 1969 and the regulations for implementing the procedural provisions of the NEPA from the Council on Environmental Quality (40 CFR Parts 1500-1508) and Regulation 36 CFR Part 220.

Forest Plan Standards

Forestwide standards relating to water resources include the following:

Water currently meeting state water quality standards will be maintained by applying soil and water conservation practices. Any project which causes excessive water pollution or undesirable water yield will be corrected where feasible, or the project will be re-evaluated or terminated (II/25).

Practices in the Soil and Water Conservation Practices Handbook (FSH 2509.22) developed cooperatively by the State Water Quality Agency and the Forest Service will be incorporated, where appropriate, into all land use and project plans as a principal mechanism for controlling non-point pollution sources and meeting State water quality standards and other resource goals (II/25).

Assumptions

- The Divide travel plan decision would include only open-or-closed determinations; no road construction or decommissioning measures would be specified in this decision;

- The act of closing a road to motorized use without action to stabilize the road (e.g. improving drainage, removing culverts, de-compacting, seeding) may not result in any benefit to the watershed;
- Any route designated *as closed yearlong to wheeled vehicles* may potentially be fully decommissioned in a separate NEPA analysis and decision;
- Any existing route not identified as a Helena National Forest system route in this travel plan decision would be considered an unauthorized route and would be available for decommissioning;
- Existing or future dispersed-use sites would be closed if impacts were observed to occur based on criteria of use and consistency with 36 CFR 212.52 (b)(2) for this activity;
- Analysis for and decisions on future projects (e.g. Telegraph Vegetation Project) may determine methods of closure (e.g. decommissioning) for closed roads within the Divide travel planning area;
- Road maintenance and improvements in the Divide Travel Planning area following this decision would occur at a pace similar to that of the past several years (i.e. there would continue to be a road maintenance backlog for roads within the Divide Travel Planning area);
- Road maintenance (blading, culvert clearing) and improvements (surfacing, replacing culverts) may result in temporary increases in sediment delivery to streams, but would result in a long-term (3 to 5+ year) reduction in sediment delivery from planning area roads; and
- No measurable change in water yield would occur as a result of this decision, because the decision only describes the open-or-closed status of existing roads (i.e. no tree removal would occur as a result of this decision).

Information Used

Helena National Forest GIS data – Datasets used in this analysis include the National Hydrography Dataset streams and 6th-HUC watersheds, roads and planned road designations. The analysis for the hydrology specialist report relied heavily upon datasets providing the number of stream crossings and length of roadway within 300 feet of fish-bearing streams and 150 feet of non-fish-bearing streams.

Road sediment-source survey – Roads in some watersheds within the planning area were evaluated in the field seasons from 2008 to 2014 to determine points where sediment from roads could be transported to streams. Information collected in this survey includes location information as well as parameters required to predict sediment delivery using the WEPP: Roads model (Elliot et al., 1999). However, no effort was made to model sedimentation due to the uncertainty in future sediment generation from roads opened or closed by this decision.

Roads Analysis Process (RAP) Report – An analysis of the Helena National Forest road network was completed in 2004. The analysis designated road risk ratings based on road mileage within riparian habitat conservation areas, wet areas, erosive and slide-prone soils, TMDL watersheds and the number of road-stream crossings (USDA, 2004). The RAP assessment of watershed road risks was found to be consistent with more recent GIS data on stream crossings and roads within the buffers based on INFISH riparian habitat conservation areas. Thus, the latter datasets were used. For discussion of the RAP data, see the fisheries specialist report.

Methodology and Scientific Accuracy

Scale of analysis – The spatial scale of analysis is the 6th-HUC watershed. This is an appropriate scale for this analysis given the types of watershed impacts that are associated with road networks (e.g. increased sediment delivery) are generally discernible at the 6th-HUC scale. The temporal scale of the analysis for all effects is greater than five years, given that the decision to designate a route as either opened or closed does not necessarily determine whether that route would have a reduced, neutral, or increased impact on water resources in the short-term (less than five years).

GIS data – GIS data was used as a surrogate for field data in the analysis because field data for the planning area were incomplete. The accuracy of Helena National Forest GIS datasets is described in GIS metadata files available in the public record. Updated GIS data on stream/road crossings and miles of road within buffers specified by INFISH standards (USDA, 1995) were used in place of RAP data as indicators of problematic roads. Roads within these buffers and the number of stream crossings were selected as indicators because a road must be hydraulically connected to a stream for sediment-laden runoff to flow from the road to the stream. Roads with stream crossings or that run parallel and adjacent to streams are likely to deliver sediment to streams, while roads that are far from a stream are unlikely to be hydraulically connected. The buffer distances used to comply with direction specified in the INFISH standards are 300 feet for fish-bearing streams and 150 feet for non-fish-bearing streams. In practice, the width of an adequate sediment buffer depends on buffer slope, vegetation and other site-specific characteristics. A distance of 150 feet generally affords a buffer of sufficient width to minimize most sediment delivery from roads, while roads beyond 300 feet from a stream are unlikely to deliver measurable amounts of sediment (Haupt 1959; Swift 1986; Ketcheson and Megahan 1990; Ellis 2008).

Road sediment data – Road sediment surveys were completed by trained Helena National Forest hydrologic technicians from 2008-2014. The work performed by technicians was field-validated by the forest hydrologist. Data collected in the road sediment survey were of a degree of precision and accuracy that exceeded the sensitivity of the sediment modeling software typically used. However, sediment modeling was not performed as a part of this analysis.

Hydrology, Affected Environment

Analysis Area

The analysis area for the Hydrology Report consists of all drainages covered by roads affected in this decision. This includes 22 6th-HUC watersheds primarily in the Little Blackfoot River and Tenmile Creek drainages (Table 54). Several streams within the travel planning area are listed by Montana DEQ as having impaired water quality (MT DEQ, 2014). Most of these streams are not fully meeting beneficial uses due to sedimentation, among other impairments. Additionally, some non-listed stream reaches within the planning area flow directly into listed impaired reaches (e.g. Spotted Dog Creek). Streams in the Divide Travel Planning area are covered by three Montana DEQ TMDL planning areas: the Lake Helena, Little Blackfoot and Holter. The Lake Helena and Little Blackfoot TMDL reports recommend sediment reductions ranging from 40 percent to 80 percent from unpaved roads, depending on 6th-HUC (US EPA, 2006; MT DEQ and US EPA, 2011). The Holter planning area (covering streams in the Iron Horse Creek drainage) does not have a TMDL at the time of writing.

Table 54: 6th-HUC Watersheds within the Divide Travel Plan Area with TMDL

6th-HUC ID	6th-HUC name	Area, total (acres)	Area, HNF (acres)	Percent of Basin on HNF	TMDL planning area
100301011401	Upper Tenmile Creek	26,134	20,963	80	Lake Helena
100301011402	Middle Tenmile Creek	22,965	13,904	61	Lake Helena
100301011403	Greenhorn Creek	12,926	7,817	60	Lake Helena
100301011404	Skelly Gulch	7,882	2,331	30	Lake Helena
100301011406	Lower Tenmile Creek	20,413	4,436	22	Lake Helena
100301011502	Upper Silver Creek	24,302	917	4	Lake Helena
100301011801	Iron Horse Creek	15,096	10,101	67	Holter
170102010501	Ontario Creek	12,795	12,614	99	Little Blackfoot
170102010502	Little Blackfoot River-Larabee Gulch	18,155	18,063	99	Little Blackfoot
170102010503	Telegraph Creek	12,222	10,174	83	Little Blackfoot
170102010504	Mike Renig Gulch	7,329	3,046	42	Little Blackfoot
170102010505	Upper Dog Creek	20,356	11,046	54	Little Blackfoot
170102010506	Lower Dog Creek	16,618	3,071	18	Little Blackfoot
170102010507	Little Blackfoot River-Hat Creek	13,517	9,252	68	Little Blackfoot
170102010601	North Trout Creek	10,525	3,301	31	Little Blackfoot
170102010602	Snowshoe Creek	11,604	3,542	31	Little Blackfoot
170102010603	Little Blackfoot River-Elliston Creek	20,180	4,801	24	Little Blackfoot
170102010604	Carpenter Creek	16,808	5,690	34	Little Blackfoot
170102010605	Trout Creek	11,001	2,999	27	Little Blackfoot
170102010606	South Fork Spotted Dog Creek	8,310	232	3	Little Blackfoot
170102010607	Upper Spotted Dog Creek	8,706	5,061	58	Little Blackfoot
170102010610	Threemile Creek	14,304	4,656	33	Little Blackfoot

Water Quality

Forest roads, by virtue of their existence on the landscape, have a negative effect on watershed values. The impact of a road is generally continuous whether the road is open or closed to public use, although unused roads are often partially stabilized by vegetation over time. The Divide Travel Plan decides only the open-closed status of system roads and does not determine whether or how any system roads will be decommissioned. The act of closing roads to all motorized use provides some benefit to watershed conditions, in that over time these roadbeds could likely become revegetated and stabilized. Vegetation regrowth on the road surface has been linked to lower levels of road sediment reaching stream channels (MacCaffery et al. 2007). However, without decompaction of the road surface, top soil may remain unavailable to plant roots, preventing the road prism from revegetating to a point that sufficiently decreases concentrated runoff. Additionally, subsurface hydraulic connectivity would continue to be impaired on roads with cut-fill construction without decompaction and recontouring of the road (Gucinski et al. 2001). Further, undersized culverts or improperly designed road/stream crossings on closed, but not decommissioned roads, could continue to be a source of road sediment without restoration and stabilization of the stream channel (Madej 2000). Thus, this decision is unlikely to result in any substantial change in the existing impacts of roads on

streams and riparian areas within planning area watersheds. The primary benefit to a watershed with the route designations provided in this decision is in the opportunity it affords to subsequently decommission closed roads to remove them from the landscape, following additional NEPA analysis and public review.

The primary water quality concern related to the network of routes in the Divide Travel Planning area is sediment from roads. Other documented impairments in these watersheds include various metals related mainly to past mining activities, low pH, flow alteration and alteration of riparian vegetation. This analysis focuses on sediment, as this impairment stems in large part from forest roads in the planning area and has the greatest potential to be affected by the travel planning decision, assuming subsequent road decommissioning occurs.

Sediment

Roads

Unpaved roads are a dominant source of sediment in most forested drainages, including the 6th-HUC watersheds covered by this travel plan. Specifically, unpaved roads (especially native-surface roads) that cross or run adjacent to streams generally deliver sediment to streams during rain and snowmelt events. In contrast, roads without a hydraulic connection to a stream channel may lose eroded sediment from the road surface, but do not deliver sediment to stream channels and are thus generally not a stream water quality concern. In the hydrology analysis, motorized trails, open to wheeled-motorized vehicles 50 inches in width or less, are assessed the same as engineered roads open to full-sized vehicles. Motorized trails have been observed to contribute more sediment than unpaved forest roads (Chen et al. 2006; Welsh 2008). This occurs because motorized trails tend to lack the design features of engineered roads that help minimize erosion and sedimentation. Additionally, routes intended for off-highway vehicles are more likely to have steep gradients that result in higher runoff energy and thus greater erosion and transport capacity. Motorized trails also tend to be located in valley bottoms allowing them to be hydraulically connected to adjacent stream channels (Chin et al. 2006; Meadows et al. 2008; Welsh 2008).

Road and culvert maintenance and gravel surfacing can reduce the number and/or magnitude of sediment delivery points on a road for a period of years, but a road hydraulically connected to a stream will remain an episodic source of sediment as long as it remains on the landscape. Thus, the most important indirect indicators of the potential for road sedimentation in streams are the number of road/stream crossings and the length of road near a stream. The number of observed sediment delivery points generally increases with the length of road near a stream and the number of stream crossings (Table 55).

Unauthorized, non-system routes can also be major contributors of sediment to adjacent streams. Non-system roads and motorized trails lack the design features and maintenance required for Helena National Forest system roads intended to mitigate negative impacts of use. As a result, the impacts to water quality and riparian resources can be greater on unauthorized routes than on system routes. During 2010 to 2011, Helena National Forest hydrologic technicians inventoried previously unidentified non-system routes in portions of the Divide Travel Planning area and documented impacts to adjacent water resources (Table 56). Although nearly 100 miles of non-system routes were identified, there are almost certainly additional routes on the landscape that were not identified.

Table 55: Road Information for Portions of 6th-HUC Watersheds

6th-HUC ID	6th-HUC name	System Roads (mi)	Roads within INFISH buffers (mi)*	Stream crossings (#)	Surveyed road sediment delivery points**
100301011401	Upper Tenmile Creek	70.4	10.6	31	177
100301011402	Middle Tenmile Creek	21.2	4.0	15	4
100301011403	Greenhorn Creek	29.1	1.1	2	†
100301011404	Skelly Gulch	9.3	4.3	9	†
100301011406	Lower Tenmile Creek	3.1	1.3	3	†
100301011502	Upper Silver Creek	2.7	0.6	1	†
100301011801	Iron Horse Creek	17.4	3.6	8	†
170102010501	Ontario Creek	35.5	8.8	36	40
170102010502	Little Blackfoot River-Larabee Gulch	7.1	13.0	26	9
170102010503	Telegraph Creek	52.6	15.6	51	39
170102010504	Mike Renig Gulch	15.5	3.1	3	6
170102010505	Upper Dog Creek	98.0	13.8	40	†
170102010506	Lower Dog Creek	22.1	2.1	10	†
170102010507	Little Blackfoot River-Hat Creek	39.1	10.9	17	37
170102010601	North Trout Creek	19.3	4.6	16	†
170102010602	Snowshoe Creek	27.0	6.6	19	†
170102010603	Little Blackfoot River-Elliston Creek	21.4	4.2	7	9
170102010604	Carpenter Creek	31.1	7.2	21	†
170102010605	Trout Creek	14.5	3.5	1	2
170102010606	South Fork Spotted Dog Creek	1.0	0.9	2	1
170102010607	Upper Spotted Dog Creek	19.8	5.0	10	7
170102010610	Threemile Creek	1.7	0.1	1	†

Bold text indicates that the watershed contains a stream on the Montana *303(d)* list as impaired by sediment, see Table 57
* INFISH standards specify riparian habitat conservation areas (RHCA) within 300 feet of fish-bearing streams and 150 feet of non-fish-bearing streams
** surveyed by Helena National Forest hydrology personnel during field seasons 2008-2014; Technicians were not able to survey every road in the travel plan; therefore, not every stream crossing is listed as a sediment source
† roads not surveyed for road sediment recently

Nearly 60 percent of the 6th-HUC watersheds covered by the travel planning area contain a stream that is considered by Montana DEQ to be impaired by sediment (Table 57), including nearly all of the major streams in this area. In part as a result of sediment impairment, all of these impaired stream reaches are not fully meeting the aquatic life and cold water fishery designated beneficial uses (MT DEQ, 2014). The Lake Helena TMDL recommends a 60 percent reduction in sediment delivery from system roads and 100 percent reduction for non-system roads (US EPA, 2006). The Little Blackfoot TMDL report recommends road sediment reductions dependent on 6th-HUC in the planning area, with recommended reductions ranging from 40 percent to 80 percent (MT DEQ and US EPA, 2011).

Table 56: Non-system routes surveyed in the Divide planning area

6th-HUC ID	6th-HUC name	Non-system Roads (mi)	Non-system roads within INFISH buffers (mi)*	Number of stream crossings on non-system roads
100301011401	**Upper Tenmile Creek**	10.8	4.5	9
100301011402	**Middle Tenmile Creek**	3.3	0.7	1
100301011403	Greenhorn Creek	10.4	1.1	4
100301011404	**Skelly Gulch**	1.9	0.1	0
100301011406	**Lower Tenmile Creek**	0	0	0
100301011502	Upper Silver Creek	0.2	0	0
100301011801	Iron Horse Creek	3.5	1.2	4
170102010501	Ontario Creek	4.3	1.6	3
170102010502	**Little Blackfoot River-Larabee Gulch**	2.1	0.2	1
170102010503	**Telegraph Creek**	7.8	0.7	1
170102010504	Mike Renig Gulch	0.1	0	0
170102010505	**Upper Dog Creek**	7.5	0.8	3
170102010506	**Lower Dog Creek**	2.7	0.3	1
170102010507	**Little Blackfoot River-Hat Creek**	6.2	0.9	1
170102010601	North Trout Creek	5.2	1.7	6
170102010602	**Snowshoe Creek**	2.2	0.4	1
170102010603	**Little Blackfoot River-Elliston Creek**	2.0	0.4	1
170102010604	Carpenter Creek	4.8	0.1	2
170102010605	**Trout Creek**	1.2	0.3	0
170102010606	South Fork Spotted Dog Creek	1.6	0.8	1
170102010607	**Upper Spotted Dog Creek**	19.6	2.9	3
170102010610	Threemile Creek	1.3	0	0
Total		98.9	18.8	42

Bold text indicates that the watershed contains a stream on the Montana *303(d)* list as impaired by sediment
***INFISH standards specify riparian habitat conservation areas (RHCA) within 300 feet of fish-bearing streams and 150 feet of non-fish-bearing streams**

Culverts (particularly those that are undersized) at road/stream crossings also present a risk of large-scale sediment delivery through failure of the crossing. During a flood event, especially following a wildfire, a culvert can become partially or fully obstructed, leading to its failure and a breach of the road fill. This commonly leads to the erosion and deposition/transport of a large volume of fine sediment into the stream system.

Table 57: Project Area Streams (or directly downstream) Listed as Impaired by Montana DEQ

6th-HUC ID	6th-HUC Name	Impaired Stream
100301011401	Upper Tenmile Creek	Tenmile Creek
100301011402	Middle Tenmile Creek	Tenmile Creek
100301011403	Greenhorn Creek	None*
100301011404	Skelly Gulch	Skelly Creek
100301011406	Lower Tenmile Creek	Tenmile Creek
100301011502	Upper Silver Creek	None*
100301011801	Iron Horse Creek	None*
170102010501	Ontario Creek	None*
170102010502	Little Blackfoot River-Larabee Gulch	Little Blackfoot River
170102010503	Telegraph Creek	Telegraph Creek
170102010504	Mike Renig Gulch	None*
170102010505	Upper Dog Creek	Dog Creek
170102010506	Lower Dog Creek	Dog Creek
170102010507	Little Blackfoot River-Hat Creek	Little Blackfoot River
170102010601	North Trout Creek	None*
170102010602	Snowshoe Creek	Snowshoe Creek
170102010603	Little Blackfoot River-Elliston Creek	Little Blackfoot River, Elliston Creek
170102010604	Carpenter Creek	None*
170102010605	Trout Creek	Trout Creek
170102010606	South Fork Spotted Dog Creek	None*
170102010607	Upper Spotted Dog Creek	Spotted Dog Creek
170102010610	Threemile Creek	None*

***watershed does not contain a stream on the Montana *303(d)* list as impaired by sediment; however, not all streams have been assessed by Montana DEQ**

Non-Road Sediment Sources

Streambank erosion occurs in undisturbed drainages as a part of natural channel geomorphic processes. Streambank erosion can be accelerated by management activities, for example cattle trampling on grazing allotments. Along several planning-area streams, bank trampling was evaluated by Helena National Forest hydrology crews during the summers of 2008-2010 using the Region 1 Bank Alteration Protocol (Enk et al. 2005). Several reaches were observed to be impacted by bank trampling (data available in the project record). Although this information is now somewhat dated, the allotments surveyed are generally operating in the same manner and trampled streambanks are likely a continuing source of sediment to area streams. The Lake Helena TMDL estimated that anthropogenic streambank erosion accounted for 11 percent and 16 percent of the total sediment loading in Tenmile Creek and Sevenmile Creek, respectively (US EPA, 2006). The Little Blackfoot TMDL reports that streambank erosion makes up 18 percent of the annual sediment load in the drainage (MT DEQ and US EPA 2011). However, much of the sediment generated from eroding streambanks in both TMDL planning areas comes from agricultural areas downstream of the forest boundary (US EPA, 2006; MT DEQ and US EPA,

2011). There is also likely, accelerated streambank erosion along other streams within the planning area due to past mining activities and cattle grazing.

Other sources of sediment in planning area streams include natural watershed erosion, erosion from timber harvest activities on private and federal land and abandoned mining lands (see cumulative effects discussion). Aside from natural erosion, these sources likely contribute less sediment than erosion from roads, based on estimates made in the Lake Helena assessment and other area TMDL reports (US EPA 2006; Montana DEQ 2004; MT DEQ and US EPA 2011).

Non-Sediment Impairments

A common impairment of stream water quality in the study area is elevated metals from past mining activities. For example, an adit failure in the Tramway Creek drainage delivered elevated metals loads to the Little Blackfoot River for several weeks during the winter of 2008-2009 (metals contamination in the flow from this adit has greatly diminished since the adit failure). Another vector for metals transport to streams is contaminated roads, where mine waste rock was used in road construction (e.g. Rimini Road along Tenmile Creek). Many of the streams in the planning area do not fully meet designated beneficial uses as a result of metals impairments (MT DEQ, 2014).

Water Yield

Water yield in most if not all of the drainages in the planning area will likely be measurably greater than baseline conditions as a result of widespread tree mortality from insect infestation, in concert with other activities that have removed large numbers of trees from the watersheds (e.g. green-tree timber harvest) over the past few decades. Baseline conditions are defined to be the expected water yield given a natural extent of forest cover throughout a watershed. In practice, the concept of a static baseline water yield is of limited value, as forest cover in undisturbed watersheds is generally in a state of flux based on several factors, including fire and insect-induced mortality.

Water yield would not be meaningfully affected by a decision under any alternative of the Divide Travel Plan, as it would designate only open and closed routes. Even if the plan facilitates the eventual stabilization or removal of roads from the landscape and recovery of forest on former road beds, the area of trees gained would be insignificant with respect to basin water yield at the 6th-HUC scale. Decommissioning several hydraulically connected roads in a watershed might alter the flow regime marginally, as efficient vectors of runoff (roads) are removed from the landscape, although this too would be difficult to measure.

Riparian Conditions

Riparian areas include zones at the interface of land and water and are important ecological niches on the landscape of the analysis area. The condition of riparian areas within the travel planning area varies widely. Within grazing allotments, riparian areas are generally impacted by cattle grazing and trampling. Several stream riparian areas were evaluated by Helena National Forest hydrologic technicians using an abbreviated Proper Functioning Condition (PFC) protocol (Prichard 1998) during the 2008 to 2010 field seasons (Table 58). Although this dataset is four to six years old at this time, allotment management has not changed substantially. Thus, riparian conditions are likely similar to what was observed during the survey years. The PFC approach specifies field review by an interdisciplinary team of resource specialists, because this dataset was not collected by such a team, the results presented in

Table 58 is preliminary. The PFC methodology qualitatively evaluates riparian area vegetation, channel and floodplain characteristics to arrive at an estimate of how well the riparian area functions in dissipating flow energy and maintaining floodplain stability during larger flood events. Past mining, livestock and native ungulate grazing, browsing and trampling and other land use activities can all negatively impact riparian area form and function. Streams outside of grazing allotments and legacy mining areas have in the past generally been rated as properly functioning.

Table 58: Proper Functioning Condition (PFC) Assessment Ranking 2008-2010

		PFC assessment*				
6th-HUC ID	**6th-HUC Name**	**Total Reaches**	**PFC Reaches**	**FAR Reaches**	**NF Reaches**	**Allotments**
100301011401	Upper Tenmile Creek	0	--	--	--	--
100301011402	Middle Tenmile Creek	0	--	--	--	--
100301011403	Greenhorn Creek	20	0	17	3	Tenmile-Priest Pass, Blossburg
100301011404	**Skelly Gulch**	7	1	6	0	Drumlummen Skelly
100301011406	**Lower Tenmile Creek**	0	--	--	--	--
100301011502	Upper Silver Creek	4	0	4	0	Unallocated
100301011801	Iron Horse Creek	21	0	20	1	Deadman Lost Horse
170102010501	Ontario Creek	4	0	1	3	Telegraph
170102010502	**Little Blackfoot River-Larabee Gulch**	12	0	12	0	Hat Creek
170102010503	**Telegraph Creek**	2	0	2	0	Telegraph
170102010504	Mike Renig Gulch	9	1	5	3	Tenmile-Priest Pass
170102010505	**Upper Dog Creek**	51	0	39	12	Ophir-Hope, Spring Gulch, Blossburg, Drumlummen Skelly
170102010506	**Lower Dog Creek**	3	0	2	1	Blossburg
170102010507	**Little Blackfoot River-Hat Creek**	34	3	22	9	Slate Lake, Hat Creek
170102010601	North Trout Creek	13	0	11	2	Clarks Canyon
170102010602	**Snowshoe Creek**	10	0	10	0	Ophir-Hope
170102010603	**Little Blackfoot River-Elliston Creek**	28	2	15	11	Slate Lake
170102010604	Carpenter Creek	17	0	11	6	Ophir Hope
170102010605	**Trout Creek**	26	0	22	4	Spotted Dog-Trout Creek, Slate Lake
170102010606	South Fork Spotted Dog Creek	4	0	4	0	Dog Creek
170102010607	**Upper Spotted**	21	0	17	4	Spotted Dog-Trout

6th-HUC ID	6th-HUC Name	PFC assessment*				
		Total Reaches	**PFC Reaches**	**FAR Reaches**	**NF Reaches**	**Allotments**
	Dog Creek					Creek, Dog Creek, Hat Creek
170102010610	Threemile Creek	0	--	--	--	--

***PFC: Properly Functioning Condition; FAR: Functioning At Risk; NF: Not Functioning**
Bold text indicates that the watershed contains a stream on the Montana *303(d)* list as impaired by sediment

There are many non-riparian wetlands in the travel planning area, however their extent has not been quantitatively described and their condition is largely unknown. Professional observation within allotments has shown that wetlands in some locations see degradation from trampling and grazing. Impacts from recreational activities (camping and campfires, off highway vehicle use, etc.) have also been observed in non-riparian wetlands.

Hydrology, Environmental Consequences

Effects Common to All Alternatives

Road maintenance and improvements unrelated to this decision, but carried out as part of routine operations or as part of future projects, would generally reduce sediment delivery from system routes to streams for a period of years following the work. However, maintenance backlogs continue to leave many system roads in need of improvement.

Effects Common to All Action Alternatives

The action alternatives would each designate Helena National Forest system routes. Roads or trails not designated system routes would by default be considered unauthorized routes and would be closed to motorized use and available for decommissioning in future projects. Unauthorized routes have been surveyed in some, but not all areas within the planning area and have been observed in some areas to negatively impact water quality and riparian form and function. Alternative 1 does not identify unauthorized routes as available for decommissioning. Thus, implementation of Alternatives 2, 3, 4 or 5 would likely result in somewhat improved water quality and riparian conditions within the planning area. This conclusion is based on the assumption that unauthorized routes that impact water quality or riparian conditions would be decommissioned as watershed improvement projects in the first few years following the decision. However, the potential unauthorized route decommissioning would not be mandated by the decision and therefore cannot be considered a direct or indirect effect of the decision.

Alternative 1, No Action

Direct, Indirect and Cumulative Effects

Under alternative 1, no new management actions are proposed. If no new actions are undertaken, no new management-related water resource impacts would occur. Past and ongoing management activities, such as road use, OHV use, mining and livestock grazing would continue to affect water resources. No new additions to watershed-scale cumulative effects would be predicted, because no new management activities are proposed with alternative 1.

Irreversible and Irretrievable Commitments

An irretrievable commitment represents a temporary loss of a resource, which can be replaced over time. An irreversible commitment represents a total loss of a resource, which cannot be replaced. An irretrievable commitment of alternative 1 would be continued sediment delivery to streams from the existing road network and continued impact to riparian areas traversed by roads. There are no irreversible commitments from this alternative.

Alternatives 2, 3, 4, 5

Direct and Indirect Effects

Direct and indirect effects of the four action alternatives are essentially the same and are therefore presented together. Direct and indirect effects of the action alternatives are also similar to those of the no-action alternative, in that no new construction is proposed and no system roads are specified for decommissioning. New construction and decommissioning would be left to subsequent analysis. However, implementation of all the action alternatives would set the stage for decommissioning of any unauthorized routes. As stated above, the impacts of unauthorized routes on water resources in the planning area have not been fully quantified, but are likely to be considerable.

An additional indirect benefit of the action alternatives to water resources in the planning area lies in their designation of routes. By placing all routes in the planning area into one of several categories, the four action alternatives provide the framework for future projects to decommission or stabilize roads. Any route designated as closed to wheeled motorized vehicles yearlong could be decommissioned in a separate, subsequent NEPA analysis. The routes that fit this definition include routes with the designated map code of *01-Res* (Closed), *06-Res* (over-snow vehicles only), *MT-01-Res* (trail closed to motorized vehicles) and *NS-01-Res* (non-system routes). All of the action alternatives have more miles of roads in these categories that are within the buffers specified by INFISH because Alternatives 2, 3, 4 and 5 incorporate and close routes that are currently unclassified. Similarly, roads in these categories under the action alternatives have a higher number of stream crossings than do those under the no action alternative, again because of the incorporation of miles that are currently unclassified.

Each of the action alternatives also incorporates a number of miles of currently unclassified roads that would be designated as open, at least seasonally. Most of these routes are currently on the landscape and are receiving motorized use. Under the action alternatives, these newly incorporated routes would add to the Helena National Forest travel system at most 1.1 miles of open roads within INFISH buffers and three open stream crossings (Table 59 and Table 60). Of the eight roads that would be added to the system with alternative 5, FSR# 123-001 has the greatest impact on water resources. This road, in the Ontario Creek drainage, parallels Ontario Creek for 0.6 miles within the INFISH buffer. The route also has two culvert stream crossings over tributaries to Ontario Creek and accesses a ford on FSR# 123-A1 (an open route that connects FSR# 123-001 to FSR# 123). However, FSR# 123-001 provides an alternate route to FSR# 4104-A1 and closing FSR# 4104-A1 to wheeled-motorized traffic would allow the closure and stabilization of five stream crossings, including two problematic fords and close an equivalent distance (0.6 miles) within the INFISH buffer. A route-by-route description for all proposed unclassified routes is provided in the project record. Although the action alternatives would incorporate up to 1.1 miles of road within INFISH buffers and three stream crossings, only the action alternatives provide a mechanism by which to eventually decommission or stabilize

stream adjacent roads and unneeded stream crossings, a potential benefit to water quality and riparian condition.

The potential for road decommissioning does not constitute a direct or indirect effect resulting from the travel planning decision, but it should be considered a benefit. Additionally, the *de facto* recognition of all unauthorized, non-system routes as illegal and available for decommissioning is an indirect effect of all four action alternatives; in that the full benefit to watershed values would not be realized until the routes were decommissioned, this decision would not specify the decommissioning of these routes.

Table 59: Unclassified Roads Open to Wheeled Motorized Vehicles, Seasonally

6th-HUC ID**	6th-HUC name	Miles within INFISH* buffers / # stream crossings				
		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
100301011401	**Upper Tenmile Creek**	0.1 / 0	None	None	None	None
100301011403	Greenhorn Creek	0.6 / 2	None	None	None	None
100301011404	**Skelly Gulch**	0.1 / 0	None	None	None	None
100301011502	Upper Silver Creek	0.6 / 1	None	None	None	None
170102010501	Ontario Creek	0.7 / 2	0.2 / 1	0.2 / 1	0.2 / 1	0.7 / 2
170102010502	**Little Blackfoot River-Larabee Gulch**	0.2 / 1	0.1 / 0	0.1 / 0	0.1 / 0	None
170102010505	**Upper Dog Creek**	0.9 / 3	0.3 / 0	0.3 / 0	0.3 / 0	0.1/ 0
170102010507	**Little Blackfoot River-Hat Creek**	0.5 / 0	0.2 / 0	None	None	0.2 / 0
170102010603	**Little Blackfoot River-Elliston Creek**	0.2 / 0	0.1 / 0	0.1 / 0	0.1 / 0	0.1 / 1
Total		3.9 / 8	0.9 / 1	0.7 / 1	0.7 / 1	1.1 / 3

Bold text indicates that the watershed contains a stream on the Montana *303(d)* list as impaired by sediment
* INFISH standards specify riparian habitat conservation areas (RHCAs) within 300 feet of fish-bearing streams and 150 feet of non-fish-bearing streams
** Watersheds not listed currently have no identified unclassified roads within INFISH buffers

With respect to water quality, the primary difference among the four action alternatives is in the total number of road/stream crossings and miles of road within INFISH buffers (a 300-foot buffer distance for fish-bearing and 150-foot buffer for non-fish-bearing streams) available for future decommissioning or stabilization (Table 60 and Table 61). However, because no road decommissioning would occur as a direct result of this decision, these differences are generally not pertinent to direct or indirect effects of the alternatives. There would likely be some indirect benefit to watershed conditions in the effective closure of roads to motorized use, in that over time these roadbeds could be expected to revegetate and stabilize. However, without decompaction and recontouring, restoration of subsurface flow-path connectivity and soil productivity would not be realized until decades into the future. In any case, the differences do give alternative 5 the greatest potential for future work that would benefit watershed values.

Table 60: Miles of Road Available for Decommissioning

6th-HUC ID	6th-HUC name	Available for decommissioning (mi)				
		Alt. 1			**Alt. 1**	
100301011401	**Upper Tenmile Creek**	2.2	100301011401	**Upper Tenmile Creek**	2.2	100301011401
100301011402	**Middle Tenmile Creek**	0.3	100301011402	**Middle Tenmile Creek**	0.3	100301011402
100301011403	Greenhorn Creek	0.1	100301011403	Greenhorn Creek	0.1	100301011403
100301011404	**Skelly Gulch**	0.1	100301011404	**Skelly Gulch**	0.1	100301011404
100301011406	**Lower Tenmile Creek**	0	100301011406	**Lower Tenmile Creek**	0	100301011406
100301011502	Upper Silver Creek	0	100301011502	Upper Silver Creek	0	100301011502
100301011801	Iron Horse Creek	1.4	100301011801	Iron Horse Creek	1.4	100301011801
170102010501	Ontario Creek	2.3	170102010501	Ontario Creek	2.3	170102010501
170102010502	**Little Blackfoot River-Larabee Gulch**	0	170102010502	**Little Blackfoot River-Larabee Gulch**	0	170102010502
170102010503	**Telegraph Creek**	3.9	170102010503	**Telegraph Creek**	3.9	170102010503
170102010504	Mike Renig Gulch	2.9	170102010504	Mike Renig Gulch	2.9	170102010504
170102010505	**Upper Dog Creek**	0.3	170102010505	**Upper Dog Creek**	0.3	170102010505
170102010506	**Lower Dog Creek**	0	170102010506	**Lower Dog Creek**	0	170102010506
170102010507	**Little Blackfoot River-Hat Creek**	2.5	170102010507	**Little Blackfoot River-Hat Creek**	2.5	170102010507
170102010601	North Trout	0	170102010601	North Trout	0	170102010601

6th-HUC ID	6th-HUC name	Available for decommissioning (mi)				
		Alt. 1			Alt. 1	
	Creek			Creek		
170102010602	**Snowshoe Creek**	1.8	170102010602	**Snowshoe Creek**	1.8	170102010602
170102010603	**Little Blackfoot River-Elliston Creek**	1.3	170102010603	**Little Blackfoot River-Elliston Creek**	1.3	170102010603
170102010604	Carpenter Creek	4.4	170102010604	Carpenter Creek	4.4	170102010604
170102010605	**Trout Creek**	0	170102010605	**Trout Creek**	0	170102010605
170102010606	South Fork Spotted Dog Creek	0.1	170102010606	South Fork Spotted Dog Creek	0.1	170102010606
170102010607	**Upper Spotted Dog Creek**	0.3	170102010607	**Upper Spotted Dog Creek**	0.3	170102010607
170102010610	Threemile Creek	1.7	170102010610	Threemile Creek	1.7	170102010610
TOTAL		25.6	32.7	TOTAL	25.6	32.7

Bold text indicates that the watershed contains a stream on Montana *303(d)* list as impaired by sedimentation

An additional difference between the four action alternatives occurs with the dispersed camping rule. As described in chapter 2 of the FEIS, alternatives 2, 3 and 4 would permit off-road wheeled motorized use within 300 feet of a road or trail for dispersed camping. Alternative 4 would also permit off-road vehicle use within 300 feet of roads for all legal recreational activities. However, alternative 5 would permit wheeled motorized vehicle travel up to 30 foot from water and 70 foot from a designated route while still allowing for many of the historic dispersed campsites, greater than 70 feet from the road to remain. For all action alternatives, wheeled motorized vehicle travel for camping opportunities would be allowed within the specified distance of designated system routes, including roads and trails (unless signed otherwise or specifically closed) as long as:

- No new permanent routes are created by this activity,
- No damage to existing vegetation, soil, or water resource occurs,
- Travel off-route does not cross streams and
- Travel off-route does not traverse riparian or wet areas.

Dispersed recreation sites currently exist and are heavily used within the planning area. Implementation of any of the action alternatives would provide for the monitoring and enforcement of the provisions for resource protection and would ensure that adverse impacts are minimized. This component is particularly important to the quality of water resources

because many dispersed sites are located adjacent to or provide access to waterbodies and lack the design features found at developed sites to mitigate negative impacts of use. As a result, the impacts of dispersed recreation use on soils, water quality and riparian resources can be greater than impacts at developed sites. It is difficult to quantify the positive impact that restrictions for dispersed recreation would have on water quality and riparian condition; however positive effects would be realized with the removal of sediment sources and re-establishment of riparian vegetation in areas previously accessible to dispersed camping. Alternative 5 would provide the most potential benefits and resource protection, in that this alternative reduces the number of heavily used dispersed recreation sites in sensitive riparian areas. With the implementation of the action alternatives, monitoring of dispersed sites and enforcement of the Motorized Vehicle Use Map (MVUM) established by this decision should help to prevent additional degradation of water quality and riparian areas by minimizing the negative effects of off-road travel.

Table 61: Number of Stream Crossings on Roads Available for Future Decommissioning

6th-HUC ID	**6th-HUC name**	**Closed road-stream crossings (#)**				
		Alt. 1			**Alt. 1**	
100301011401	**Upper Tenmile Creek**	6	100301011401	**Upper Tenmile Creek**	6	100301011401
100301011402	**Middle Tenmile Creek**	3	100301011402	**Middle Tenmile Creek**	3	100301011402
100301011403	Greenhorn Creek	0	100301011403	Greenhorn Creek	0	100301011403
100301011404	**Skelly Gulch**	1	100301011404	**Skelly Gulch**	1	100301011404
100301011406	**Lower Tenmile Creek**	0	100301011406	**Lower Tenmile Creek**	0	100301011406
100301011502	Upper Silver Creek	0	100301011502	Upper Silver Creek	0	100301011502
100301011801	Iron Horse Creek	2	100301011801	Iron Horse Creek	2	100301011801
170102010501	Ontario Creek	15	170102010501	Ontario Creek	15	170102010501
170102010502	**Little Blackfoot River-Larabee Gulch**	0	170102010502	**Little Blackfoot River-Larabee Gulch**	0	170102010502
170102010503	**Telegraph Creek**	19	170102010503	**Telegraph Creek**	19	170102010503

6th-HUC ID	6th-HUC name	Closed road-stream crossings (#)				
		Alt. 1			Alt. 1	
170102010504	Mike Renig Gulch	2	170102010504	Mike Renig Gulch	2	170102010504
170102010505	**Upper Dog Creek**	2	170102010505	**Upper Dog Creek**	2	170102010505
170102010506	**Lower Dog Creek**	0	170102010506	**Lower Dog Creek**	0	170102010506
170102010507	**Little Blackfoot River-Hat Creek**	13	170102010507	**Little Blackfoot River-Hat Creek**	13	170102010507
170102010601	North Trout Creek	0	170102010601	North Trout Creek	0	170102010601
170102010602	**Snowshoe Creek**	5	170102010602	**Snowshoe Creek**	5	170102010602
170102010603	**Little Blackfoot River-Elliston Creek**	3	170102010603	**Little Blackfoot River-Elliston Creek**	3	170102010603
170102010604	Carpenter Creek	15	170102010604	Carpenter Creek	15	170102010604
170102010605	**Trout Creek**	0	170102010605	**Trout Creek**	0	170102010605
170102010606	South Fork Spotted Dog Creek	1	170102010606	South Fork Spotted Dog Creek	1	170102010606
170102010607	**Upper Spotted Dog Creek**	3	170102010607	**Upper Spotted Dog Creek**	3	170102010607
170102010610	Threemile Creek	1	170102010610	Threemile Creek	1	170102010610
TOTAL		91	98	TOTAL	91	98

Bold text indicates that the watershed contains a stream on Montana *303(d)* list as impaired by sedimentation

Total open road density is a less refined indicator of the impact of roads on water resources than the above listed metrics, but can be a useful summary of overall watershed impacts of the road network. Under each action alternative, the open road density would be reduced for most 6th-HUC drainages (Table 62). The total reduction in open road mileage from the existing condition ranges from 1.3 to 103.1 miles (Table 63). Decommissioning or long-term

storage/stabilization of these closed routes would be critical in order to realize water resource benefits from this decision. In this analysis, a road was counted as open unless it had the designation *01-RES* (closed yearlong to motorized use) or *06-RES* (over-snow use only), as these are generally the only designations which would allow for stabilization or decommissioning in a subsequent analysis and decision.

Table 62: Open road density

6th-HUC ID	6th-HUC name	Open road density (mi/mi^2)				
		Alt. 1			Alt. 1	
100301011401	Upper Tenmile Creek	1.58	100301011401	Upper Tenmile Creek	1.58	100301011401
100301011402	Middle Tenmile Creek	2.32	100301011402	Middle Tenmile Creek	2.32	100301011402
100301011403	Greenhorn Creek	2.67	100301011403	Greenhorn Creek	2.67	100301011403
100301011404	Skelly Gulch	3.57	100301011404	Skelly Gulch	3.57	100301011404
100301011406	Lower Tenmile Creek	1.72	100301011406	Lower Tenmile Creek	1.72	100301011406
100301011502	Upper Silver Creek	1.38	100301011502	Upper Silver Creek	1.38	100301011502
100301011801	Iron Horse Creek	1.72	100301011801	Iron Horse Creek	1.72	100301011801
170102010501	Ontario Creek	1.28	170102010501	Ontario Creek	1.28	170102010501
170102010502	Little Blackfoot River-Larabee Gulch	0.93	170102010502	Little Blackfoot River-Larabee Gulch	0.93	170102010502
170102010503	Telegraph Creek	2.70	170102010503	Telegraph Creek	2.70	170102010503
170102010504	Mike Renig Gulch	2.36	170102010504	Mike Renig Gulch	2.36	170102010504
170102010505	Upper Dog Creek	4.09	170102010505	Upper Dog Creek	4.09	170102010505
170102010506	Lower Dog Creek	1.90	170102010506	Lower Dog Creek	1.90	170102010506
170102010507	Little Blackfoot River-Hat Creek	2.11	170102010507	Little Blackfoot River-Hat Creek	2.11	170102010507
170102010601	North Trout Creek	2.07	170102010601	North Trout Creek	2.07	170102010601
170102010600	Snowshoe Creek	1.84	170102010600	Snowshoe	1.84	170102010600

6th-HUC ID	6th-HUC name	Open road density (mi/mi^2)				
		Alt. 1			Alt. 1	
2			2	Creek		2
170102010603	Little Blackfoot River-Elliston Creek	1.99	170102010603	Little Blackfoot River-Elliston Creek	1.99	170102010603
170102010604	Carpenter Creek	1.37	170102010604	Carpenter Creek	1.37	170102010604
170102010605	Trout Creek	3.53	170102010605	Trout Creek	3.53	170102010605
170102010606	South Fork Spotted Dog Creek	1.67	170102010606	South Fork Spotted Dog Creek	1.67	170102010606
170102010607	Upper Spotted Dog Creek	2.48	170102010607	Upper Spotted Dog Creek	2.48	170102010607
170102010610	Threemile Creek	0.92	170102010610	Threemile Creek	0.92	170102010610

Table 63: Reduction in Open Road Mileage

Alternative	Open roads (mi)	Change from existing	
		(mi)	(%)
1	1165.2	--	--
2	1164.0	1.3	0.1%
3	1116.4	48.8	4.2%
4	1128.0	37.2	3.3%
5	1062.1	103.1	9.1%

Implementing any action alternative for this project could require a programmatic Helena National Forest Plan amendment for the planning area regarding the standard for big game security index as described in chapter 2 of the FEIS. This proposed amendment would not measurably impact water resources. Although managing seasonal closures would decrease traffic levels during certain months, it would not directly eliminate the potential for sediment delivery to streams from adjacent roads or road/stream crossings.

Irreversible and Irretrievable Commitments

Irretrievable commitments of the action alternatives would include continued sediment delivery to streams from the existing road network and continued impacts to riparian areas traversed by roads. There are no irreversible commitments from this alternative.

Cumulative Effects

In addition to the impacts of roads on water quality, riparian condition and stream form and function, several past and present federal and non-federal activities have affected and continue to affect water quality, water yield and riparian health in the cumulative effects analysis area. Past timber harvest has likely caused temporary increases in water yield and sediment delivery, though these effects generally attenuate over time. In the past, mining has contributed metals and sediment to stream channels in the watersheds. In some cases, ongoing mining activity continues to be a chronic source of sediment to streams and of riparian degradation. Old mine workings can also pose chronic or episodic water quality problems to forest streams, as in the Tramway Creek (Little Blackfoot) adit plug failure of November 2008. Past pulses of elevated sediment (e.g. from timber harvest or mining) can remain stored in stream channels (banks, bed, floodplain) for many years following deposition. Continued grazing in riparian areas and cattle trailing along streams within grazing allotments would likely continue to contribute elevated sediment levels to streams in watersheds with grazing allotments. Road work completed in recent years should reduce erosion and sediment delivery from certain project-area roads (appendix B). Thus, some past and ongoing activities have been and continue to generate elevated sediment delivery, whereas other activities will reduce sediment delivery. This decision would not directly result in measurable additions to or reductions from cumulative watershed effects.

In planning area watersheds, water yield most likely has been and would continue to be affected by large-scale tree mortality. Large-scale loss of live trees reduces the volume of water removed from a watershed by transpiration. Increases in water yield could result in higher peak flows than would otherwise occur; higher flows have the potential to increase streambank and bed scour. As discussed above, none of the alternatives would meaningfully affect water yield.

Extensive tree mortality could also potentially affect stream temperature in streams that cross the affected stands through multiple mechanisms. For instance, whereas reduced shade may result in an increase in stream temperature, increased base flow resulting from decreased transpiration could have the opposite effect. Regardless, understory vegetation is generally unaffected by insect mortality and would continue to provide shade to streams. Furthermore, understory and riparian vegetation exposed to increased levels of sunlight (due to loss of overstory canopy) can expand and provide additional shade (Gravelle & Link 2007). None of the alternatives would measurably influence stream temperature.

Reasonably foreseeable federal and non-federal activities that could affect water quality, water yield and riparian health in the cumulative effects analysis area include future timber harvest, fuels-reduction projects, small-scale mining or failure of old mines, continued livestock impacts, roads and fire. Foreseeable timber harvest and fuels reduction activities in the analysis area (e.g. Telegraph Vegetation Project, Tenmile-South Helena Project) on the national forest are not likely to substantially affect water quality or riparian area viability, assuming compliance with the streamside management zone (SMZ) law and strict adherence to the Montana Department of Natural Resources and Conservation (DNRC) forestry best management practices (Montana DNRC 2008). Timber sale road improvements (e.g. Telegraph, Tenmile projects) would be expected to reduce sediment delivery from project area roads through implementation of road best management practices. The road impacts on water quality, as outlined in the *Affected Environment* section of this report, would not change as a direct result of any of the action alternatives. However, the action alternatives lay the groundwork for future road stabilization and decommissioning, which if implemented would reduce sediment delivery from forest roads.

Other activities that would serve to reduce sediment delivery to streams in project watersheds would likely be implemented periodically in the future within the cumulative effects analysis area. Such activities include watershed improvement projects, culvert upgrades and effectively implemented allotment management plan (AMP) revisions, among others.

Conclusions

Alternative 1, No Action

Currently, many streams do not fully support all beneficial uses within several of the planning-area 6th-HUC watersheds. In some of these impaired streams, beneficial uses are compromised due at least in part to land use activities off of the Helena National Forest. Under the no action alternative, full attainment of all beneficial uses would still not be met in planning-area watersheds. Existing activities (e.g. forest roads) on the Helena National Forest portions of these watersheds might in some cases not meet the state requirement that "*all reasonable land, soil and water conservation practices have been applied*" (ARM 17.30.602) to minimize pollution, although effects of forest roads and other management practices in place before April 1993 are exempt from this standard (MCA 75-5-317). This exemption notwithstanding, many of these roads could be considered to "*cause excessive water pollution*" (HNF Forest Plan, II/25) and should thus be "*corrected where feasible*" (*ibid.*), or stand in violation of the Forest Plan. Road maintenance can and should continue in the planning area under this alternative and would address some chronic sediment sources on the existing road network. However, future road decommissioning in the planning area would be greatly facilitated by a travel management decision and would allow for work to restore areas that under existing conditions are chronic sources of sediment. With these matters considered, alternative 1 would hold the least promise of the alternatives for future work to reduce the impact of the Forest's road network on water quality and riparian conditions.

Alternatives 2, 3, 4, 5

The action alternatives are similar to alternative 1 in that the open-or-closed constraint of this decision would not specifically provide for actions that would alleviate current water quality problems in the planning area. Thus, the remarks above under *Conclusions—Alternative 1* also apply to alternatives 2 through 5, with the important exceptions that the action alternatives would provide the framework for future system road decommissioning.

From the standpoint of protecting watershed values and reducing impacts of the Helena National Forest travel system on water quality, a travel planning decision that contained specific road closure measures would be more desirable than one that offered only open-or-closed prescriptions. Therefore, Helena National Forest hydrology specialists recommend that NEPA analyses for future decommissioning begin immediately upon finalizing the Divide Travel Plan Decision, so that routes closed by this decision can be decommissioned as soon as funding becomes available. Furthermore, many routes that are known sediment sources to streams on the Montana list of water-quality-limited segments (WQLS) would remain open under all action alternatives. All action alternatives would also include re-opening of some routes that are currently closed year-round. However, a road opened by this decision may or may not become a greater source of sediment, depending on level of use, maintenance, improvements and other factors. Nevertheless, with respect to water resources, it is recommended that open roads hydraulically connected to streams should receive improved maintenance, as funding allows; to

move towards meeting the sediment reductions recommended in the Little Blackfoot and Lake Helena TMDL documents.

The action alternatives would realize a net reduction in open-road stream crossings, open-road miles within INFISH buffers and overall road density. The decision would be a positive step toward route decommissioning and stabilization, which would result in reduction of sediment delivery to streams throughout the project area. Thus, any of the action alternatives are preferable to the no action alternative. Alternative 5 makes the most progress in addressing road related watershed concerns, but each of the action alternatives would move toward Forest Plan consistency on the maintenance of acceptable water quality in streams on the Helena National Forest. The implementation of this plan would also move the Forest toward meeting the Lake Helena and Little Blackfoot TMDL sediment reduction goals.

Forest Plan Consistency

Although several water bodies in the planning area are not currently meeting state water quality standards (i.e. several streams are on the Montana *303(d)* list of WQLS), the no-action alternative is in compliance with water-related Forest Plan standards. The proposed travel plan, under any of the action alternatives, does not specify any activities that would directly result in the degradation of water quality in the planning area. In this sense, the travel plan is in compliance with the Forest Plan standard requiring that a project resulting in water pollution be modified or discontinued (see *Regulatory Framework* above). The Divide Travel Plan is also consistent with the Forest Plan standard requiring that BMPs are employed in projects to minimize non-point-source pollution, in that the decreased number of open routes would allow limited road improvement funds to be concentrated on fewer roads, potentially decreasing the maintenance backlog. Additionally, unauthorized routes would be available to be stabilized or removed from the landscape, which would move the Forest Service towards meeting State water quality recommendations. While this decision would not directly specify road improvements or decommissioning, its route designations set the stage for this work.

FISHERIES

Regulatory Framework

1976 National Forest Management Act

Under the National Forest Management Act of 1976 (NFMA), the Forest Service is charged with maintaining the viability of all existing native and desired non-native vertebrate species in a planning area. A forest plan must identify management indicator species (MIS) that serve as proxies for fulfilling this NFMA viability requirement. Westslope cutthroat trout (WCT) is the fisheries management indicator species on the Helena National Forest. The regulations (36 CFR 219.9) impose a standard by requiring habitat objectives to be established for maintaining viability of management indicator species throughout a planning area.

Endangered Species Act (Act) of 1973

The Endangered Species Act of 1973 (section 2) is designed to protect imperiled species, which are officially listed as endangered or threatened, from extinction as a "*consequence of economic growth and development untempered by adequate concern and conservation*." The stated purpose of the Endangered Species Act is to provide a means to protect listed species and

"*conserve the ecosystems upon which they depend*." Bull trout are listed as a threatened fish species under the ESA and occur west of the Continental Divide on the Helena National Forest within the Upper Clark Fork and Blackfoot River sub-basins.

Section 7(a)(2) of the Act states each Federal agency shall, in consultation with the Secretaries of Interior and Commerce (Secretary), insure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. This section of the Act defines the consultation process, which is further developed in regulations promulgated at 50 CFR §402.

Section 7(a)(1) of the Act makes clear that all Federal agencies should participate in the conservation and recovery of listed threatened and endangered species. It directs all other Federal agencies to utilize their authorities in furtherance of the purposes of the Act by carrying out programs for the conservation of species listed pursuant to the Act. Under this provision, Federal agencies often enter into partnerships with the Fish and Wildlife Service for implementing and funding conservation agreements, management plans and recovery plans developed for listed species.

Pertinent also to this project is road management guidance in the biological opinion (BO) on Forest Plans (USDI 1998, pgs 23, 24, 71-73, 82, 89, 90, 94, 95, 100) that emphasize commitments to implement existing standards in INFISH for ESA listed fish. Specific INFISH standards RF-2, RF-3 and RF-4 will be a priority as discussed under the Helena National Forest Plan. From a dispersed and developed recreation aspect, standard RM-2 (pg 9) specifies *where adjustment measures such as education, use limitations, traffic control devices and/or specific site closures fail to meet Riparian Management Objectives and avoid adverse effects to native fish habitat, eliminate the practice or occupancy*. The 1998 biological opinion (pg 89) emphasizes *given the negative impact of roads on aquatic species and a habitat, moving forward on the development of comprehensive plans addressing road system related effects is extremely important to bull trout conservation*.

Helena National Forest Plan

Direction for fisheries management under the Helena National Forest Plan (USDA 1986) emphasizes maintenance or enhancement of cold-water habitat and water quality to meet the needs of fisheries (Forest Plan pages II-1 and II-4). The general forestwide standard (pg II-22) states: *"Maintain quality water and habitat for fish by coordinating activities and by direct habitat improvement*." The analysis will also identify opportunities, if any exist, for mitigating adverse effects on water related beneficial uses.

For road management (pgs II-31 to II-32), the Plan states that unacceptable damage to soils, watershed, fish, wildlife, or historical/archaeological sites will be mitigated by road restrictions or other road management actions as necessary. Forest specialists representing soils and watershed shall provide input to the road maintenance planning process to verify standards, identify rehabilitation needs and designate roads which should be permanently closed for resource protection. Road standard #3 (pg II-30) provides where forest specialists representing soils, watershed and fisheries shall identify potential soil erosion, water quality and fisheries problems and provide input, including project design features or mitigation measures, to the development of road design standards.

In riparian areas, page II-35 of the Forest Plan specifies that wet meadows and wet areas are closed to OHV use. Construction of roads will avoid stream course encroachment and

channelization, including the avoidance of all riparian areas except to cross them. In addition, the Plan states the Forest will provide for vegetative cover adjacent to streams to serve as a filter strip for sediment and maintain optimum water temperatures, as well as provide large debris for long-term instream fish cover and pooling. For stream crossings, Plan standards call for stream crossing structure design that allows free water flow and fish passage. Additionally, the Plan requires riparian areas are to be managed compatible with dependent wildlife species.

The Forest Plan (USDA 1986) was amended on August 30, 1995 to incorporate the INFISH (USDA Forest Service 1995). This interim strategy was designed to provide additional protection for existing populations of native trout, especially bull trout, outside the range of anadromous (moving from ocean to fresh water to spawn) fish, on 22 National Forests in the Pacific Northwest, Northern and Intermountain Regions throughout the Columbia River Basin including the Helena National Forest. This strategy, therefore, applies to riparian habitats for only those watersheds west of the Continental Divide in the Divide Travel Planning area. INFISH established riparian management objectives (RMOs) and riparian habitat conservation areas (RHCAs) including project and site-specific standards and guidelines for drainages west of the Divide in the interior Columbia River. INFISH standards pertinent to this project include road standards RF-2, RF-3 and RF-4. RF-3c *requires closing, stabilizing, or obliterating roads not needed for future management activities and prioritizing these actions based on current/potential damage to inland native fish in priority watersheds.*

Forest Service Manual

The Forest Service Manual (FSM) contains legal authorities, policies, instructions and guidance needed in the proper management of aquatic resources. Where other resource activities have potential to impact fish habitat, FSM 2634 provides for integrating prescriptions during project planning to help meet fisheries habitat objectives and to mitigate adverse impacts of resource management activities. After a half-century of rigorous research, fine sediment originating from a broad array of human activities has been singled out as the principal factor in the degradation of stream fisheries (Waters 1995, pg 79). Water quality management shall recognize sediment as the major non-point pollutant from Forest Service lands and establish guidelines and procedures for preventing unacceptable resource impacts from introduced sediment (FSM 2542.02).

In addition, FSM 2672.1 imposes a strict standard for treatment of sensitive species. The Forest Service designates westslope cutthroat trout (WCT) on the Regional Forester's Sensitive Species (RFSS) list and therefore, confers special attention in WCT management to ensure their viability and preclude trends toward endangerment that would result in warranting listing under the Endangered Species Act. A biological evaluation (BE) is required to be completed to display the effects of the selected alternative.

Assumptions

This analysis draws upon the following assumptions:

- Research confirms roads have the greatest effect of all forest management practices on erosion and sedimentation (Megahan and King 2004).
- The *stream road proximity* indicator (high risk roads less than 300 feet of a stream) provides a reasonable approximation of the hydrologic connectivity (sedimentation) and physical alterations on streams.

- The *road-stream intersections* indicator provides a reasonable estimate of stream crossings that act as sediment delivery sites and fragment aquatic habitats.
- Road-stream intersections and roads within 300 feet of a stream (high risk roads) respond most predictably and reliably to the action alternatives as a barometer of potential change.
- An important effect to salmonid fish and habitat relates to increased sediment delivery and deposition due to high risk roads and stream route intersections. (USDA FS 1998; USDA FS 1999, pgs 143-145, 179-180)
- Excess sediment delivery and deposition in stream channels is an important source of mortality to trout (Chapman 1988, Waters 1995). Other variables (temperature, dissolved oxygen, food, cover and angler harvest) are outside the scope of this analysis as the project focuses on designating routes open for motorized vehicle use and gating select routes identified for administrative closure.
- Critical channel reaches (core sampling reaches) within a watershed generally represent an estimate of sediment effects on spawning habitat for the watershed as a whole. (Stowell et al., 1983)
- For the purposes of this analysis, roads defined as "closed" include all those with the following restriction codes: 01, 06, NS-01, MT-01-Res, NM and NOMTR. The "06" restricted roads would be closed year-round to motorized use except where snowmobiles would be allowed due to surrounding lands available for over-snow use. All high risk roads, whether open or closed in this travel analysis can be considered for future obliteration/recontour projects to protect soil, watershed and fish resources.
- It is assumed that over-snow travel with snowmobiles presents no sediment risk to streams except at stream ford crossings.
- Sediment risk associated with winter travel increases on high risk road segments when wheeled vehicles needed to accommodate both motorized (snowmobile) and non-motorized recreationists travel these routes during periods of winter/springtime thaws. The erosion and rutting hazard on roads becomes high under rapidly warming weather conditions (e.g chinook winds) increasing the potential for road top materials to enter the surface water system. (Burroughs & King 1989; Kennedy 1997; Walch 2008)
- The closure of existing open roads tends to decrease road surface erosion and sediment delivery to the surface water system over the long-term due to passive revegetation of the road prism.

Information Used

Information on fish populations within the Divide Travel Planning area was drawn from updated GIS fishery spatial layers and associated linked data. Geographic information systems spatial layers were derived from a variety of sources including past and ongoing fisheries electrofishing surveys conducted by Forest Service and Fish, Wildlife and Parks fisheries personnel over the past 30 years, WCT sub-basin updates in 2009, WCT biological evaluations, past NEPA fisheries reports and bull trout biological assessments in consultation with the U.S. Fish and Wildlife Service (USFWS). Additionally, information specific to bull trout watersheds came from watershed baselines for the Little Blackfoot River portion of the Upper Clark Fork bull trout Section 7 Watershed (USDA 2000) including any updates to those baselines for consultation with the USFWS.

Relevant to measures used to evaluate effects of roads on fisheries resources, GIS road and stream GIS coverages helped to estimate the number of stream/road intersections (culverts, bridges, fords) and miles of high risk roads (those inside INFISH buffers). In lieu of complete field data across portions or entire areas encompassed by twenty-six (26) NRCS 6th field HUCs, the transportation and stream coverages were attributed in GIS as an aid to project ongoing and potential effects on fish habitat for the various alternatives. A roads database for the Divide Travel Planning area was the basis for monitoring any changes in measures used to evaluate potential effects on fish habitat.

Information to help characterize fish habitat conditions in the planning area was drawn from past sediment and riparian monitoring data, cursory fish habitat condition surveys, fish species and distribution surveys, road sediment surveys and culvert assessments on the Helena National Forest. All resource information was collected by Forest Service fisheries and hydrology personnel for over the past 28 years. Other sources included previous analysis specific to the Little Blackfoot River and Tenmile Creek drainages, the Divide Landscape Analysis, stream permit applications and westslope cutthroat trout and bull trout biological evaluations. Watershed baselines for the Little Blackfoot River portion of the Upper Clark bull trout Section 7 Watershed (USDA 2000) including updates to the various sub-watershed documents were also used.

Field data from road sediment inventories and culvert inventories/assessments since 2008 in sub-watersheds south of Highway 12 in the project area are mostly complete and on-going. These surveys will provide a baseline comparison for the indicators and observed effects on the ground within this analysis area. Road surveys within the Divide Travel Plan area north of Highway 12 are ongoing and will be strategically conducted to address the highest risk areas for listed species and their habitat.

Methodology and Scientific Accuracy

This report follows procedures outlined in Report FS-683, *Roads Analysis: Informing Decisions about the National Forest Transportation System* (USDA Forest Service, 1999) customized to local situations. The effects section takes the broad scale forestwide roads analysis down to the finer sub-watershed scale (6th field hydrologic unit code (HUC)) specific to the Divide Travel Plan area. Key road related issues identified are: stream substrate conditions, road proximity to streams and stream crossings/intersections. Two measures determined most useful at quantifying these important road/fish habitat interactions were: 1) high risk roads (roads within INFISH buffers) and 2) stream/road intersections (crossings).

These two measures, used to evaluate effects, were chosen with an understanding about how the mechanisms impact fish habitat (sediment, channel alterations and habitat fragmentation) are tied specifically to high risk roads and stream crossings. Therefore, the road and stream coverages were attributed in GIS for all sub-watersheds encompassed by the project area. This GIS based analysis systematically examined the motorized transportation system aimed at the two measures in evaluating potential effects on fish habitat. Determining miles of high risk road involved buffering the stream coverage by a 300-foot distance each side of streams for fish-bearing habitat and 150-foot distance for non-fish-bearing streams consistent with INFISH riparian habitat conservation areas (buffers), then clipping out all road segments within these buffers as a reasonable approximation of the length of high risk roads in each sub-watershed. Stream/road intersection points were produced by intersecting the road and stream layers and placing the intersection nodes into point coverage for each sub-watershed.

Streams delineated on topographic maps may, however, under represent actual streams; conversely crenulated contour coverages may over represent streams depending on the rules applied and individual crenulation (USDAFS 1999, pgs 140 and 180). The accuracy of the indicators in this analysis is probably moderate at best. Past analyses in the North Belts Travel Plan found that comparing GIS based stream/road intersections with actual on-the-ground measurements amongst four arterial routes indicated the GIS coverages over represented the amount of stream/road intersections by approximately 30 percent. Conversely, field checking stream/road intersections for the Cabin Gulch Vegetation Treatment project found that GIS-based stream/road intersections were under represented up to 45 percent of the actual number of intersections in East Cabin Gulch, yet GIS coverages over represented this indicator 21 percent in the North Fork Deep Creek drainage. Therefore, this analysis likely provides a reasonable approximation of relative differences between the alternatives. Ground truthing can provide accurate data as it relates to actual miles of high risk roads and number of stream/road intersections in a watershed. Portions of the analysis area have been ground-truthed and this monitoring is ongoing.

To separate the differences amongst alternatives since there is no ground disturbance or physical changes planned to the transportation system under this “open/closed” roads administrative decision, a risk/benefit assessment was performed for each road segment by sub-watershed. The benefits of closing currently open segments of road to motorized use year-round is based on the premise that erosion and sedimentation are reduced as a function of passive re-vegetation and lack of motorized disturbance over closed roadbeds in the long-term. Additionally, permanently closing roads sets the stage for future road treatment opportunities that fully restore slopes and drainages impacted by roads to contour over the long-term. Conversely, the consequence of opening currently closed segments of road to motorized use relates to the potential to destabilize the road bed and inhibit re-vegetation over the long-term. Additionally, access decisions to open closed roads have implications for the extent and nature of recreational use and subsequent effects on fish habitat (Clark and Gibbons 1991, pg 476).

Fisheries, Affected Environment

Introduction

This section is organized under two major subsections: **fish populations** and **fish habitat**. The first discusses the current known distribution and status of fish populations in the Divide Travel Plan area including discussions about non-native and native fish species that occupy project area streams. The second subsection gives an overview of stream habitat conditions and trends as influenced by past and ongoing land-use activities that can affect fish populations.

Analysis Area

The Divide Travel Planning area encompasses twenty-six (26) National Resource Conservation Service (NRCS) 6th field HUCs, commonly referred to as sub-watersheds. Four sub-watersheds are dropped from the fisheries analysis area since there are no fish populations and/or roads occurring in the portion of these sub-watersheds encompassed by the planning area. Therefore, 22 sub-watersheds - seven east of the Continental Divide and 15 west of the Divide are considered for potential effects to fisheries resources in this travel planning decision.

Natural processes and landuse activities unique at the sub-watershed scale influence local fish habitats independently of other sub-watershed units. Logically the geographic unit of preference is delineated at the sub-watershed (6th-field HUC) scale as the range for examining

direct/indirect and cumulative effects in the fisheries analysis area. It is possible, however, for water quality in a sub-watershed to be influenced by activities in another sub-watershed located upstream from it.

Fish Populations in Planning Area

Trout species occupy approximately 140.7 miles of stream in the planning area. Other fish species found in the planning area include longnose suckers and sculpins. Appendix A of the fisheries specialist report shows maps that display the current known distribution of native and non-native salmonid trout in the Divide Travel Plan area respectively.

In the Upper Missouri sub-basin side of the Divide Travel Plan area non-native trout occupy approximately 27.7 miles (96 percent) of fish habitat while native WCT (90+ percent pure) occupy about 1.6 miles (5.5 percent) of available fish habitat. In the Upper Clark Fork sub-basin side of the planning area, non-native trout occupy about 73.1 miles (65.3 percent) of fish-bearing habitat while native WCT (those populations 90+ percent pure included those untested) occupy about 109.7 miles (98 percent) of fish habitat. Although rare, bull trout, a native char listed as “threatened” under the Endangered Species Act, had occupied about 20.9 miles (18.7 percent) of fish habitat in the Upper Clark Fork sub-basin side of the planning area; however, recent electrofishing surveys conducted from 2000 to 2010 suggest these numbers are questionable. The Little Blackfoot River local bull trout population is believed nearly extinct based on extensive sampling efforts by Montana Fish, Wildlife and Parks surveys in 2007 and 2008 and sampling by Forest Service fishery personnel in 2010 (USDA 2013, pgs 69-71).

The Divide Travel Plan area straddles both east and west sides of the Continental Divide and includes six fish-bearing sub-watersheds in the Upper Missouri 4th field HUC (sub-basin) and 15 fish-bearing sub-watersheds in the Upper Clark Fork 4th field HUC. Table 64 lists six sub-watersheds east of the Divide having streams supporting a fishery. One of the seven eastside watersheds having no fish populations on forest is Lower Tenmile Creek and is therefore not listed in Table 64.

Table 65 outlines the 15 sub-watersheds west of the Divide having fish-bearing streams.

A summary of key aspects of known fish populations in the planning area is provided below in two separate tables. Table 64 summarizes aspects of fish populations found in the Upper Missouri sub-basin (east) side of the project area and Table 65 summarizes aspects of fish populations for the Upper Clark Fork sub-basin (west) side of the project area.

Table 64: Current Fish Populations in Upper Missouri Sub-Basin

6th Field HUC watershed (name)	Select Streams within HUC	Fish Species[1]	Abundance Rating[2]	Occupied Length (mi)	WCT Genetic Status
100301011401 (Upper Tenmile Cr)	Tenmile Cr	Rb Eb	C C	7.01 11.63	
	Minnehaha Cr	Eb	C	2.77	
	Moose Cr	Eb	C	1.63	
	Ruby Cr	Eb	C	1.16	
	Monitor Cr	Eb	C	1.45	
100301011402 (Middle Tenmile Cr)	Walker Cr	Rb	C	0.29	
	Colorado G	Eb	U	0.33	
100301011403 (Greenhorn Cr)	Austin Cr	Eb	C	2.28	
	Greenhorn Cr	Eb WCT	C R	1.90 0.54	untested
100301011404 (Skelly G)	Skelly G	WCT	U	1.07	100%
100301011502 (Upper SilverCr)	Sawmill G	WCT x Yct	C	0.03	95%
100301011801 (Iron Horse Cr)	Deadman Cr	Eb Rb	C U	1.45 0.59	
	Cottonwood G	Eb Rb WCT x Rb	C U R	1.37 1.37 1.37	<90%
	Lost Horse Cr	Eb	C	2.25	

[1]Species symbols: WCT = westslope cutthroat trout, LL = brown trout, Eb = eastern brook trout, MWF = mountain whitefish, Rb = rainbow trout, YCT = Yellowstone cutthroat trout

[2]Abundance Ratings: A standardized system adopted by MDFWP to reflect peak abundance for a discrete species, expressed in number of fish per thousand feet for streams up to 20 feet wide. Abundant = 99 fish per 1000 ft., Uncommon = 4 – 19 fish per 1000 ft., Common = 20 - 99 fish per 1000 ft., Rare = < 4 fish per 1000 ft.

Table 65: Known Fish Populations in Upper Clark Fork Sub-Basin

6th Field HUCwatershed (name)	Select Streams within HUC	Fish Species[1]	Abundance Rating[2]	Occupied Length (mi)	WCT Genetic Status
170102010501 (Ontario Cr)	Ontario Cr	WCT BT Eb MWF	C R U U	6.23 4.35 6.23 3.26	100%
	Mary Ann Cr	WCT	C	0.64	untested
	Ontario trib s. 27	WCT	R	0.14	untested
	Ontario trib s. 28	WCT	U	0.73	untested
	Bison Cr	WCT Eb	C C	5.12 4.42	100%
	Monarch Cr	WCT Eb	C U	2.91 2.42	100%
170102010502 (L.Blackfoot-Larabee)	Little Blackfoot R.	WCT BT LL EB MWF Sc	C R U C R A	11.72 11.04 9.48 11.72 9.48 10.16	100%
	No Grass Cr	WCT Eb	C C	2.44 1.03	untested
	Connors G	WCT Eb	C U	1.95 1.32	untested

6th Field HUCwatershed (name)	Select Streams within HUC	Fish Species[1]	Abundance Rating[2]	Occupied Length (mi)	WCT Genetic Status
	Larabee G	WCT BT Eb Sc	C R C U	3.31 0.62 2.73 0.62	untested
	Trib-A (s. 21)	WCT Eb	C U	0.80 0.80	untested
	Trib-B (s. 15)	WCT Eb	A C	0.75 0.25	untested
170102010503 (Telegraph Cr)	Telegraph Cr	WCT Eb LL SC	C C R C	4.64 4.64 0.67 0.67	100%
	Hahn Cr	WCT Eb	U U	0.63 0.63	untested
	Flume/L. Flume G	WCT Eb	C C	2.35 2.35	untested
	Jericho Cr	WCT Eb	C U	0.57 0.18	untested
	Sally Ann Cr	WCT Eb	C U	0.94 0.26	untested
	Bryan Cr	WCT Eb	U C	0.70 0.47	untested
	O'Keefe Cr	WCT Eb	U C	1.47 0.51	untested
	Clemmer G	WCT Eb	U U	0.73 0.41	untested
	Booth G	WCT Eb	C R	0.98 0.44	untested
	Moose G	WCT Eb	C U	0.22 0.22	untested
170102010504 (Mike Renig G)	Mike Renig G	WCT Eb	C C	4.98 4.98	100%
170102010505 (Upper Dog Cr)	Dog Cr	WCT LL MWF LNS Sc	C C U U A	8.78 7.05 7.05 7.05 7.05	100%
	Hope Cr	WCT LL MWF Sc	C U U C	2.03 2.03 2.03 2.03	100%
	Spring G	WCT	U	0.66	untested
	Nelson G	WCT LL	U U	0.65 0.65	untested
	Hope tributary s18	WCT LL	U R	0.32 0.32	untested
	Sawmill G	WCT	C	1.13	untested
	Meadow Cr	WCT	U	1.18	untested
	LaSalle G	WCT x YCT	C	1.26	98%

6th Field HUCwatershed (name)	Select Streams within HUC	Fish Species[1]	Abundance Rating[2]	Occupied Length (mi)	WCT Genetic Status
	American G	WCT	C	1.04	untested
	Bald Butte trib	WCT	U	0.39	untested
	Dago G	WCT	U	0.22	untested
170102010506 (Lower Dog Cr)	Uncle George Cr	WCT	U	1.93	untested
	Rich Spur Cr	WCT	C	0.19	untested
170102010507 (L.Blackfoot-Hat)	Little Blackfoot R.	WCT BT LL EB MWF Sc	C R U C R A	4.93 4.93 4.93 4.93 4.93 4.93	100%
	Slate Cr	WCT Eb	C R	2.10 1.30	100%
	Hat Cr	WCT Eb Sc	C C C	2.67 1.88 1.88	100%
170102010601 (North Trout Cr)	North Trout Cr	WCT x Rb Eb	C C	2.17 2.17	53%
	Clarks Canyon	WCT	C	1.37	untested
170102010602 (Snowshoe Cr)	Snowshoe Cr	WCT LL	C U	1.70 1.70	100%
	Spring G	WCT	U	0.10	untested
170102010603 (L.Blackfoot-Ellliston)	Elliston Cr	WCT Eb LL Sc	C C R U	3.28 1.45 1.40 1.40	100%
	Elliston tributaries	WCT	C	1.61	untested
	Hurd Cr	WCT Eb	C R	0.73 0.24	100%
170102010604 (Carpenter Cr)	Carpenter Cr	WCT	U	0.08	100%
	Ophir Cr	WCT Eb	U U	1.17 0.52	100%
	No. Fk. Ophir Cr	WCT	U	1.02	100%
170102010605 (Trout Cr)	Trout Cr	WCT	A	4.05	100%
170102010606 (So.Fork. Dog Cr)	S. Fk. Spotted Dog	WCT Eb	U C	0.39	untested
170102010607 (Upper Dog Cr)	Spotted Dog Cr	WCT Eb	C C	2.64 1.77	99.4%
	N. Fk. Spotted Dog	WCT Eb	C C	1.93 0.16	untested
	M. Fk. Spotted Dog	WCT	U	0.60	untested
170102010610 (Threemile Cr)	Threemile Cr	WCT Eb	C C	0.89	100%

[1]Species symbols: WCT = westslope cutthroat trout, LL = brown trout, Eb = eastern brook trout, MWF = mountain whitefish, Rb = rainbow trout, YCT = Yellowstone cutthroat trout, BT = bull trout, LNS = longnose sucker, Sc= sculpin
[2]Abundance Ratings: A standardized system adopted by MDFWP to reflect peak abundance for a discrete species, expressed in number of fish per thous*and feet for streams up to 20 feet wide.*Abundant= >99 fish per 1000 ft., Uncommon = 4 – 19 fish per 1000 ft., Common = 20 - 99 fish per 1000 ft., Rare = < 4 fish per 1000 ft.

Non-native fishes

Non-native fish in planning area streams include rainbow trout, brook trout, brown trout and Yellowstone cutthroat trout (YCT). These non-native trout do not occur in all streams or in equal proportions throughout planning area streams. The introduction of non-native trout into Montana streams began with brook trout, rainbow trout and brown trout in 1889 (Brown 1971) starting with the Madison River drainage. Yellowstone cutthroat trout, as the name implies, is native to the Yellowstone River drainage in southwest and southcentral Montana. They have been used extensively for stocking mountain lakes on both sides of the Continental Divide. Unknown at the time of these early introductions, non-native trout impose inherent risks to the viability of native westslope cutthroat trout populations that historically occupied area streams on both sides of the Divide and to native bull trout populations indigenous west of the Divide. Adverse interactions from introduced fish species is a principal way in which the negative effects of habitat alteration on bull trout can be compounded (MBTSG 1998, pg 46-47; Shepard 2004).

Rainbow trout were introduced from numerous west coast hatchery stocks into virtually every suitable habitat in Montana beginning in 1889 (Brown 1971; Fredenburg and Gould 1990). Within the planning area, rainbow trout are found in three 6th HUC watersheds east of the Divide and west of the Divide they are found only in a private pond in the North Trout Creek sub-watershed. Rainbow trout hybridize with native westslope cutthroat trout risking the loss of genetic integrity in localized westslope cutthroat trout populations. Evidence of rainbow hybridism in westslope cutthroat trout populations has been confirmed in Cottonwood Gulch east of the Divide and in North Trout Creek west of the Divide. The local westslope cutthroat trout population in the North Fork Trout Creek has a 47 percent rainbow genetic contribution based on testing by Leary and Sage (1990). In addition to hybrid influence, rainbow trout compete with native fishes for food, space and cover.

Yellowstone cutthroat trout (YCT) are the other cutthroat trout subspecies in Montana and they are indigenous only to the Yellowstone River basin of southeast and south central Montana, including northwest Wyoming. This cutthroat subspecies has been used extensively for stocking mountain lakes in Montana outside of the Yellowstone River basin (Fredenburg and Gould 1990). Although no yellowstone cutthroat trout populations occur in any one sub-watershed of the Divide Travel Plan area, past stocking of this subspecies in or near the planning area is evident. Like rainbow trout, yellowstone cutthroat trout also readily hybridize with westslope cutthroat trout. The local westslope cutthroat trout population in Upper Silver Creek HUC east of the Divide was confirmed genetically introgressed with yellowstone cutthroat trout and LaSalle Gulch and portions of upper Dog Creek west of the Divide also tested slightly introgressed with yellowstone cutthroat trout in 1989. The latest genetic sampling of westslope cutthroat trout in Dog Creek by Montana Department Fish Wildlife and Parks fisheries (MFWP) crews in 2008, however, has found westslope cutthroat trout to be genetically pure throughout the stream.

Brook trout were first introduced into Montana in 1889 from eastern North America, primarily from the Appalachian Mountains. It was extensively propagated and distributed throughout the state until 1954. Brook trout prefer cold, small headwater streams, which are also preferred by most remaining native westslope cutthroat trout populations. Because brook trout interact negatively (predation and competition) with indigenous westslope cutthroat trout, they can substantially reduce or totally eliminate local westslope cutthroat trout populations altogether from their historic habitats (Likness 1984; Griffith 1988; Rieman and Apperson 1989; Fauch 1988, 1989). Peterson and Fausch (2003) concluded brook trout depress cutthroat trout

populations at mid-elevations through age-specific biotic interactions that reduce age 0 and age 1 cutthroat trout survival; whereas, westslope cutthroat trout populations restricted to high elevations by brook trout invasion decline because an abiotic factor (very low temperatures) increases recruitment failure. Since brook trout spawn in the fall and are more sediment-tolerant than native cutthroat, they tend to have a competitive size and numerical advantage over westslope cutthroat trout in their first year of life. Native bull trout are also at risk from brook trout predation and competition, as well as introgressive hybridization with this species (Kanda et al, 2002). Brook trout currently occupy 15 of the 22 6th HUC watersheds in the analysis area.

The brown trout is native to Europe and was first introduced into Montana in 1889 by the Bureau of Sport Fisheries (Brown 1971). Most varieties originated from Germany or Scotland and were distributed in most of the larger streams from state and federal hatcheries (Brown 1971; Holton 1990). Stocking was discontinued after 1956 since natural propagation was found to be adequate. Brown trout prefer larger, low gradient streams and pose a threat to both westslope cutthroat trout and bull trout. This species is highly competitive in lower gradient streams and more predaceous on other fish than are rainbows or cutthroat trout (Fredenburg and Gould 1990). When brook trout and/or brown trout are present or have access to bull trout habitat, the ability of bull trout (and other native species) to survive and recover from habitat alterations can be irreversibly compromised (MBTSG 1998, pg 47). Brown trout prevail west of the Divide in this travel planning area especially in the main stem of the Little Blackfoot River. Planning area sub-watersheds occupied by brown trout include Upper Dog Creek, Telegraph Creek, Snowshoe Creek and Ontario Creek. They are also found downstream from the Forest boundary in many tributaries to the Little Blackfoot River.

Many subsequent stockings of non-native species continued in larger streams of Montana by fisheries agencies and local citizens; however, stocking of brook trout and brown trout was largely discontinued in the 1950s once natural reproduction was adequate to sustain fish populations. Rainbow trout stocking in streams was later discontinued beginning in the early 1970s after it was determined that hatchery raised rainbow stocked in streams containing wild rainbow trout proved counter-productive to the natural productivity of wild rainbow. However, stocking of hatchery rainbow (and yellowstone cutthroat trout) into Montana lakes and ponds is still practiced in Montana to meet recreational fish management goals. Currently, brook trout are the most pervasive of introduced fish species in the planning area occupying over 88 miles (79 percent) of fish habitat.

Native Species

Native fishes present within the planning area include the Regional Forester's Sensitive Species listed westslope cutthroat trout, listed threatened bull trout, mountain whitefish, slimy sculpin and longnose suckers. In addition, an invertebrate species known as the western pearlshell mussel was added to the Regional Forester's Sensitive Species listed list of aquatic sensitive species in 2011 and is considered in this report. Further discussion about sensitive westslope cutthroat trout including the western pearlshell mussel and listed bull trout follows under separate sections addressing each species.

Mapping of sculpin and whitefish populations has not been a priority and therefore, their distribution within the project area is not well-defined other than both species have been found extensively throughout the main stem Little Blackfoot River and Dog Creek. Sculpins are most abundant in cold, rocky riffle areas and because of their small size (two to three inches) they are

considered an important forage fish for trout. Mountain whitefish are widespread both sides of the Divide and occur in large schools during fall spawning runs to broadcast their eggs over gravel bars. Like sculpins, small whitefish provide an important forage fish for larger trout (Fredenburg and Gould 1990, pg 24).

Westslope Cutthroat Trout (Oncorhynchus clarki lewisi)

Status Overview

Westslope cutthroat trout are one of two subspecies of cutthroat trout, which have been designated Montana's state fish. Regionally, westslope cutthroat trout are one of several distinct interior subspecies of cutthroat trout (Behnke 1992, pgs 2 through 5). Currently westslope cutthroat trout are referred to as a *Species of Concern* by the State of Montana, a *Special Status Species* by the Bureau of Land Management (BLM) and a *Sensitive Species* by the northern region of the US Forest Service. On the Helena National Forest, westslope cutthroat trout have been identified as a management indicator species. Factors associated with declines in westslope cutthroat trout have lead up to these special categories include introductions of non-native fish, habitat loss or degradation and over exploitation (Hanzel 1959; Liknes and Graham 1988; Behnke 1992; McIntyre and Rieman 1995).

In May of 1997, the Fish and Wildlife Service (FWS) were petitioned to list westslope cutthroat trout as threatened under the Endangered Species Act. In 2000, several environmental groups brought suit to compel the Fish and Wildlife Service to issue its final determination as to the species' listing. After the Fish and Wildlife Service determined listing westslope cutthroat trout was "not warranted" at that time, the plaintiffs filed suit claiming the FWS failed to reconcile its recognition of hybridization as a threat to westslope cutthroat trout viability. Subsequently, the Fish and Wildlife Service initiated a new comprehensive status review for westslope cutthroat trout in 2002 and determined, based on best scientific information available, that introgressed westslope cutthroat trout with less than 20 percent of their genes derived from another taxon would still conform morphologically to the taxonomic description of westslope cutthroat trout. After considering evidence supporting its morphology-based approach to classifying westslope cutthroat trout populations (including broad westslope cutthroat trout distribution, habitat available on public lands and state and federal conservation efforts underway), the District Court for the District of Columbia concluded in March, 2007 in favor of the Fish and Wildlife Service's Reconsidered Listing Determination that westslope cutthroat trout is not warranted for listing at this time.

The westslope cutthroat trout status assessment by Shepard et al. (2003) estimates that of the 39 percent of historical habitat westslope cutthroat trout currently occupy in Montana, the decline of the westslope cutthroat trout subspecies is most pronounced east of the Continental Divide. East of the Divide, genetically pure westslope cutthroat trout populations occupy less than 5 percent of their historical habitat (Shepard et al. 2003, pgs 87-90) and most westslope cutthroat trout populations have been found restricted to headwater streams primarily above barriers. Consistent with findings for westslope cutthroat trout east of the Divide, westslope cutthroat trout populations in the Upper Missouri sub-basin side of the planning area account for only 5.5 percent of the fish-bearing habitat. These isolated resident westslope cutthroat trout populations (isolates) are considered extremely important to the conservation and restoration of westslope cutthroat trout in Montana.

Management and conservation actions undertaken on behalf of westslope cutthroat trout in Montana include: more restrictive fishing regulations; accelerated westslope cutthroat trout

surveys and inventories; non-lethal genetic testing protocols; development of captive brood stocks for stocking/recovery programs; education programs; and stepped-up compliance with water and habitat protection laws, policies and guidelines; non-native species removals; and habitat improvement. These efforts culminated in a formalized Montana MOU and Conservation Agreement for westslope cutthroat trout (MDFWP 1999) co-signed by nine government agencies and conservation groups including the Forest Service and Bureau of Land Management. The initial agreement was a five-year agreement, which expired in 2005 and has been superseded by the 2007 MOU and Conservation Agreement (MDFWP 2007) to expedite conservation measures for westslope cutthroat trout and yellowstone cutthroat trout throughout their respective historical ranges in Montana.

One outcome of the latest westslope cutthroat trout status review and agreement is the designation of three categories of cutthroat trout populations:

Core populations – Cutthroat populations having no evidence of hybridization (i.e. genetically pure) that can serve as donors for restoration efforts.

Conservation populations – Populations that include all the "core" populations as described above plus those that have unique ecological and behavioral traits of the subspecies. Introgressed conservation populations will typically be less than 10 percent introgressed.

Sportfish populations – Wild or hatchery-sustained cutthroat populations that are managed especially for the benefit of recreational fisheries. Often these are found in high mountain lakes. Some wild sport-fish populations may have conservation value.

All conservation populations of westslope cutthroat trout merit additional management emphasis on preserving them (Shepard et al. 2003, pg 8). Conservation coordination focuses on species management with the Montana Fish, Wildlife and Parks as the lead agency and habitat management on NFS/BLM lands with land management agencies taking lead responsibility. Regional/sub-basin scale conservation plans developed by Montana Fish, Wildlife and Parks in cooperation with land management agencies will identify management needs of westslope cutthroat trout conservation populations required to accomplish the conservation and restoration objectives outlined in the 2007 agreement across each 4th field HUC or sub-basin.

Distribution

On the Helena National Forest westslope cutthroat trout are found in the Blackfoot River, Little Blackfoot River portion of the Upper Clark Fork River, Upper Missouri River, Dearborn River, Smith River and Boulder River 4th field HUCs. Distribution of westslope cutthroat trout within these 4th HUC hydrologic units extends into a number of streams on the Helena National Forest with many more streams supporting westslope cutthroat trout west of the Continental Divide than east of the Divide. Only one stream on the Helena Forest in the Boulder drainage supports westslope cutthroat trout. Although the Dearborn River supports westslope cutthroat trout in its headwaters on the Lewis and Clark Forest, there are no known westslope cutthroat trout on Helena National Forest streams within the Dearborn 4th field HUC. The westslope cutthroat trout distribution information is detailed on 4th field hydrologic unit maps available at the Helena Forest Supervisor's Office fishery files and the Montana Fish, Wildlife and Park's Helena office. Many of the streams on the Helena Forest that support westslope cutthroat trout are small with many young-of-the-year and yearling westslope cutthroat trout found in Helena National Forest streams less than 18 inches in width.

For the Divide Travel Plan area, westslope cutthroat trout are distributed both sides of the Continental Divide. The subspecies is well distributed throughout the Little Blackfoot River and its tributaries of the travel plan area accounting for up to 98 percent of occupied fish habitat. Conversely, westslope cutthroat trout are poorly distributed east of the Divide within the travel plan area accounting for only about 5.5 percent of occupied fish habitat. A fish distribution map showing the range of native salmonids within the Divide Travel Plan area is shown as figure 1 in appendix A of the fisheries specialist report.

General Life History Characteristics

Detailed information on Life History, Habitat Relations and biotic interactions for westslope cutthroat trout is discussed in depth in McIntyre and Rieman (1995 pages 1-6), Behnke (1992 pgs 77-87) and Liknes and Graham (1988 pgs 53-59) and is summarized below. Additional citations are included if information varies from what is described by these authors.

Westslope cutthroat trout are adfluvial, fluvial, or resident. All three forms may use the same river and stream system. They begin to mature at age three but usually spawn first at age four or five. They spawn between March and July at water temperatures near 50 degrees Fahrenheit. The ratio of females to males has been found to vary from 1:1 up to 6:1. Alternate year spawning has been documented and repeat spawning also occurs, but generally spawning more than twice during an individual westslope cutthroat trout lifespan does not occur. Mortality following spawning has ranged from 27 percent to 60 percent with mortality rates slightly higher for males than for females.

Westslope cutthroat trout are generally thought to spawn in small tributaries. The headwaters and upper reaches of large river basins tend to be dominated by fluvial and resident forms while tributaries to lakes primarily support adfluvial fish. Migratory forms may spawn in the lower reaches of tributaries used by resident westslope cutthroat trout. Body size influences the nature of habitat selected for spawning.

Fry generally emerge from gravels between mid-June and mid-July, although emergence extending into August has been documented (Averitt and MacPhee 1971). Fry emerge following yolk absorption at a length of about 20 millimeters. After emergence many fry disperse downstream. Peaks in downstream movements of fry generally coincide with peaks in stream discharge. After an initial exodus of fry, the offspring of migratory forms may remain one to four years in their natal stream. Most juvenile migrants leave tributaries in spring or early summer and most movement is at night.

Adult and sub-adult fluvial westslope cutthroat trout often make long seasonal migrations. This type of migration is characterized by downstream movements in the fall followed by upstream movements in the spring. Downstream movement is presumably related to find areas of suitable winter habitat. Little or no winter movement was found in systems with an abundance of high quality pools that could be used for winter habitat.

Habitat Relations

Waters inhabited by WCT generally are cold and nutrient poor. Growth varies widely, but is probably strongly influenced by habitat productivity. Generally growth is higher for migrant forms that spend some period of time in larger rivers (fluvial) or lakes (adfluvial). Although westslope cutthroat trout can be found throughout large river basins spawning and early rearing generally occurs in headwater streams. Spawning habitat has been characterized as gravel substrates ranging in size from 2 millimeters to 75 millimeters, mean water depths ranging from 17 centimeters to 20 centimeters and mean velocities of 0.3 to 0.4 meters per second.

Substrate composition is believed to strongly influence survival. Highly embedded substrates may be particularly harmful to juveniles that typically over-winter between spaces in stream cobbles and rubble. Evidence for the negative influence of fine sediment is widespread and in general, increased sediment in substrates must be viewed as an increased risk for any westslope cutthroat trout population.

Westslope cutthroat trout micro-habitats are associated with velocities ranging 0.1 to 0.3 meters per second. Westslope cutthroat trout less than 100 millimeters in length are generally found in pools and runs while larger cutthroat trout are found in pools. Generally stream reaches with numerous pools support the highest densities of fish. Habitats that provide some form of cover also seem to be preferred. In winter small fish tend to use areas where cover is provided by the interstitial spaces in the stream substrates. Larger fish congregate in pools during the winter.

Biotic Interactions

Westslope cutthroat trout co-evolved with mountain and pygmy whitefish, several sculpins, cyprinids (minnows) and catastomids (suckers). In Columbia River tributaries the westslope cutthroat trout is most commonly associated with bull trout, resident and anadromous rainbow trout or steelhead and chinook salmon.

Where bull trout and westslope cutthroat trout overlap in distribution the species have selectively segregated their use of habitat and prey with westslope cutthroat trout focusing on a diet primarily of invertebrates.

Where introductions of non-native rainbow trout have occurred the two species tend to segregate themselves with rainbow in downstream reaches and westslope cutthroat trout in the upper reaches. However, segregation is incomplete and hybridization is common. Yellowstone cutthroat trout were commonly used as a stocking source, especially for mountain lakes and some larger rivers; therefore, hybridization between Yellowstone cutthroat trout and westslope cutthroat trout is also common.

Brook trout have replaced cutthroat trout populations, including the westslope cutthroat trout subspecies, in many streams (Peterson and Fausch 2003b) and several authors have discussed the possible mechanisms by which this occurs (Peterson et al 2004; Shepard 2004; De Staso and Rahel 1994). There is some evidence that water temperatures and increased water velocities associated with higher stream gradients are important factors (De Staso and Rahel 1994). In addition to temperature and stream gradient Peterson et al (2004) suggested that a very important factor in the interspecific species population dynamics between brook trout and cutthroat species may be the interaction of brook trout with age classes one and two of cutthroat trout. When there is much overlap of brook trout with the young age classes of westslope cutthroat trout, Peterson et al (2004) found that westslope cutthroat trout did not compete well. Upstream movements by brook trout during spring runoff and a general tendency to move upstream are possibly factors allowing adult and sub-adult brook trout to extend their upstream distributions into habitats occupied by cutthroat trout (Peterson and Fausch, 2003a). Shepard (2004) discusses past literature in relation to his findings and suggests that a number of factors or combination of factors such as pools, increased woody debris, increased fine sediment levels and increased water temperatures may facilitate brook trout invasion.

Bull Trout (Salvelinus confluentus)

Status Overview and Upper Clark Fork River Core Population

Bull trout were listed as a threatened species within the Columbia River and Klamath River Basins beginning July 10, 1998 by the Fish and Wildlife Service (USFWS 1998). In November 1999 all populations of bull trout were listed threatened within the coterminous United States pursuant to the Endangered Species Act of 1973 (USFWS 1999). Section 7(a)(2) of the Endangered Species Act (ESA) of 1973 as amended requires all federal agencies to review actions authorized, funded, or carried out by them to ensure such actions do not jeopardize the continued existence of listed species.

Since 1999 three separate draft bull trout recovery plans were developed by the Fish and Wildlife Service (USFWS), but none were finalized. However, these draft recovery plans served to identify recovery actions across the range of bull trout and provide a framework to implement numerous recovery actions. Then in 2014 the Fish and Wildlife Service issued a new Revised Draft Recovery Plan for bull trout (USFWS 2014) that supersedes and replaces all previous recovery plans. This revised draft recovery plan builds upon new information and studies about bull trout and revises recovery criteria from earlier draft recovery plans to focus on effective management of threats to bull trout at the core area level. The 2014 Revised Draft Recovery Plan reorganized the recovery unit structure for the coterminous United States bull trout population by combining the previous 27 recovery units (RUs) into six newly defined recovery units consistent with Distinct Population Segment (DPS) policy. Drainages west of the Divide on the Helena portion of the Helena-Lewis & Clark NF fall within the Columbia Headwaters recovery unit.

Recovery units are broken down into bull trout core areas defined as a combination of core habitat (habitat that could supply all elements for long-term security of bull trout) and a core population (a group of one or more local bull trout populations that exist within core habitat). A local population is considered to be the smallest group of fish representing an interacting reproductive unit, which may occupy a single headwater tributary or complex of headwater tributaries. Therefore, core areas represent the functional equivalent of a meta-population for bull trout and the local populations within these core areas are interconnected by occasional dispersal amongst them thereby potentially sharing some genetic characteristics. Core areas constitute the basic unit on which to gauge bull trout recovery within a recovery unit. Within the Columbia Headwaters recovery unit there are 35 bull trout core areas of which two encompass drainages west of the Divide on the Helena and Lewis & Clark National Forests: 1) the Blackfoot River core area and 2) Upper Clark Fork River core area (formerly Clark Fork River Section 1).

The Upper Clark Fork River core area (UCFCA) includes all of the Clark Fork River and its tributaries upstream of the Blackfoot River (near the site of former Milltown Dam). Since 1906, Milltown Dam isolated bull trout populations in the UCFCA from the rest of the basin till its removal in 2008. Currently, there are believed to be approximately 100 to 250 adult bull trout remaining in the UCFCA and most bull trout are resident. Three local populations make up the bulk of bull trout within this core area. They include: Warm Springs, Twin Lakes and Boulder Creek outside of the Helena National Forest. Harvey Creek (Lolo NF) and Little Blackfoot River (Helena National Forest) are also included but both are no longer designated as local populations by the Fish and Wildlife Service. Together, these five resident populations are currently not functioning as a connected fluvial population. It is possible that a few individual bull trout from the various local populations migrate downstream to the Upper Clark Fork River

or to lower reaches of streams within a given local population, but have escaped detection. Hence, there is some possibility for a remnant fluvial population.

Bull trout in the Little Blackfoot River drainage are believed to be nearly extinct based on extensive sampling efforts by Montana Fish, Wildlife and Parks and Forest Service fisheries crews from 2007 to 2010 and therefore, considered the weakest local population in the Upper Clark Fork River core area. The 2010 final rule on bull trout critical habitat removed the Little Blackfoot as critical habitat; therefore, its relative importance to the core area was assessed as low. Currently, bull trout are known present only in three of 16 6th field HUCs on Helena National Forest lands. Table 65 shows the 6th field HUCs with the streams known to recently support bull trout. Although not shown on fish distribution maps or in Table 65, bull trout were also documented in lower Dog Creek on private reaches below the Divide Travel Plan area.

Declines of bull trout in the Little Blackfoot drainage have been attributed largely to non-native species interactions. Bull trout have suffered from hybridization and competition with brook trout in the headwater reaches and tributaries of the Little Blackfoot (hybrids have been documented) and from brown trout competition and predation in the middle and lower reaches of the river. Additionally, multiple water diversions below the Forest contribute to low flows and increased water temperatures that inhibit fish movements and production capabilities in the river. Habitat alterations from highway and railroad locations in conjunction with sediment delivery from roads and agricultural development below the Forest has affected stream morphology and reduced fish habitat quality. There is general lack of connectivity from the river below the Forest to upper reaches of most tributaries during bull trout migration to traditional spawning areas.

Prior to bull trout listing under the ESA, the Inland Native Fish Strategy or INFISH (USDA 1995) amended Regional Guides and 22 Forest Plans for watersheds west of the Continental Divide in 1995, including the Helena National Forest. This strategy provides interim direction to protect habitat and native fish populations outside the range of anadromous fish habitat. The direction is in the form of riparian management objectives, standards and guidelines and monitoring requirements. In addition, priority watersheds were designated that have excellent habitat or strong assemblages of native fish, particularly bull trout, or where they provide for meta-population objectives, or watersheds that have a high restoration potential. Priority watersheds have the highest priority for monitoring and restoration efforts. On the Helena National Forest, priority drainages include Landers Fork/Copper Creek in the Blackfoot sub-basin and the Little Blackfoot River drainage upstream of the confluence of Dog Creek in the Upper Clark Fork sub-basin.

Besides the priority drainages, a secondary tier of bull trout Special Emphasis Watersheds were established under Additional Agency Commitments in the 1998 Biological Opinion for continued Land and Resource Management Plans (USDI 1998 page 24). Special Emphasis Watersheds were specified as a means of identifying a refugia network of streams that would assist in the protection and recovery of bull trout. On the Helena National Forest Special Emphasis Watersheds include Arrastra Creek, Beaver Creek, Moose Creek, Willow Creek, Poorman Creek, Hogum Creek, Alice Creek and upper Nevada Creek in the Blackfoot drainage. In the Little Blackfoot drainage, upper and lower Dog Creek were added as Special Emphasis Watersheds.

In support of the draft Fish and Wildlife Service Bull Trout Recovery Plan for the Montana portion of the proposed Columbia Headwaters, the Bull Trout Conservation Strategy on Forest Service lands in western Montana (USDA FS 2013) was developed. The USDA Bull Trout Conservation Strategy helps the Forest Service address Forest Plan Amendment requirements

under INFISH and provide a framework for planning and implementing actions to improve local bull trout habitat and populations. Importantly, this strategy forms the basis for an aquatic conservation approach during Forest Plan revisions (USDA FS 2013, page 4).

General Habitat Requirements for Bull Trout

The following discussion of bull trout habitat requirements in Montana is taken from Montana Bull Trout Scientific Group 1998. The majority of migratory bull trout spawning in Montana occurs in a small percentage of the total stream habitat available. Spawning occurs between late August and early November, principally in third and fourth order streams. Spawning adults use low gradient areas (< 2 percent) of gravel/cobble substrate with water depths between 0.1 and 0.6 meters and velocities from 0.1 to 0.6 meters per second. Proximity of cover for the adult fish before and during spawning is an important habitat component. Spawning tends to be concentrated in reaches influenced by groundwater where temperature and flow conditions tend to be more stable. The relationship between groundwater exchange and migratory bull trout spawning requires more investigation. Spawning habitat requirements of resident bull trout are poorly documented.

Successful incubation of bull trout embryos requires water temperatures below 8 degrees Celsius, spawning gravels with less than 35 to 40 percent of sediments smaller than 6.35 millimeters in diameter and high gravel permeability. Eggs are deposited as deep as 25 centimeters below the streambed surface and the incubation period varies depending on water temperature. Spawning adults alter streambed characteristics during redd construction to improve survival of embryos, but conditions in redds often degrade during the incubation period. Mortality of eggs or fry can be caused by scouring during high flows, freezing during low flows, superimposition of redds, or deposition of fine sediments or organic materials during the incubation period. A significant inverse relationship exists between the percentage of fine sediment in the incubation environment and bull trout survival to emergence. Embryo/fry entombment appeared to be the largest mortality factor in incubation studies in the Flathead drainage. Groundwater influence plays a large role in embryo development and survival by mitigating mortality factors.

Rearing habitat requirements for juvenile bull trout include cold summer water temperatures (15 degrees Celsius) provided by sufficient surface and groundwater flows. Warmer temperatures are associated with lower bull trout densities and can increase the risk of invasion by non-native species that could displace, compete with, or prey on juvenile bull trout. Juvenile bull trout are generally benthic foragers rarely straying from cover and they prefer complex forms of cover. High sediment levels and embeddedness can result in decreased rearing densities. Unembedded cobble/rubble substrate is preferred for cover and feeding and also provides for higher invertebrate production. Highly variable streamflow, reduced large woody debris, increased bedload movement and other forms of channel instability can limit the distribution and abundance of juvenile bull trout. Habitat characteristics that are important for juvenile bull trout of migratory (fluvial) populations are also important for stream resident sub-adults and adults. However, stream resident adults are more strongly associated with deep pool habitats than are migratory juveniles.

Both migratory and stream-resident bull trout move in response to developmental and seasonal habitat requirements. Migratory individuals can move great distances (up to 250 kilometers) among lakes, rivers and tributary streams in response to spawning, rearing and adult habitat needs. Stream-resident bull trout migrate within tributary stream networks for spawning purposes, as well as in response to changes in seasonal habitat requirements and conditions.

Open migratory corridors, both within and among tributary streams, larger rivers and lake systems are critical for maintaining bull trout populations.

Western Pearlshell Mussel (Margaritifera falcata)

After completion of the Montana Comprehensive Fish & Wildlife Conservation Strategy (CFWCS) for native species management in 2005 (MFWP 2005), it was apparent basic scientific information about the state's invertebrate species was lacking and that more comprehensive treatment specific to the state's mussels was needed. The Western pearlshell mussel had been listed as a potential species of concern in 2004 and later became a Tier I invertebrate species of greatest conservation need after completion of the 2005 Montana Comprehensive Fish & Wildlife Conservation Strategy. Subsequently, the Montana Natural Heritage Program launched a comprehensive survey plan in 2007 to determine the distribution and population viability of all three mussel species native to Montana, including the western pearlshell mussel. A report documenting populations of these freshwater mussels was completed in 2010 by Stagliano (2010). Information in this segment is based primarily on findings from Stagliano (2010) including information online from the Montana Natural Heritage Program site and the 2005 CFW Comprehensive Fish & Wildlife Conservation Strategy CS.

Western Pearlshell mussels are one of five freshwater mussels of the family Margaritiferidae in North America. Their range is reported in Pacific drainages from California to southern Alaska. In Montana, the western pearlshell is the only freshwater mussel found in coldwater trout streams west of the Continental Divide and east of the Divide in headwater streams of the Missouri River basin (MFWP 2005).

This mussel species appears to have crossed the Continental Divide from west to east in Montana with its host fish, the westslope cutthroat trout, when the upper Missouri River flowed south to the Snake River (Gangloff and Gustafson 2000, cited by Stagliano 2010). As glochidia (larvae on the fish gills), they use their fish host (generally salmonids) for upstream and downstream dispersal into suitable habitats. Adult pearlshell mussels are sedentary. Western pearlshell mussel habitat consists of cool-cold running low gradient (1 to 2 percent) streams, typically those of Rosgen type C4 morphology and the species prefers coarse sand and gravel substrates stabilized by cobbles and boulders that shelter mussel beds from significant bed scour during high flows from floods and storm events.

The western pearlshell mussel was added to Montana's Species of Concern (S2) list in 2008 due to declining and/or very limited numbers, range and/or habitat, making it vulnerable to extirpation in Montana. Mussel beds previously reported in larger rivers (Blackfoot, Big Hole and the Clark Fork) are extirpated or at such low densities that long-term viability is questionable. Surrounding states listed it as state threatened or unranked and declining in Wyoming, Idaho and Oregon (NatureServe 2005, online at http://www.natureserve.org/explorer). In Utah the species appears to have been extirpated.

Threats to western pearlshell mussel populations include extensive damming, diversions, hydroelectric and other water supply projects that have substantially reduced the range of this species. Agricultural runoff (eutrophication), unstable substrate and siltation have also been cited as major problems to the species (Western Pearlshell – MT Field Guide, online at http://fieldguide.mt.gov/detail_IMBIV27020.aspx). These ongoing disruptions of western pearlshell habitats together with the most recent delineation of the species viability in Montana (Stagliano 2010) has led to it being added to the Regional Forester's Sensitive Species list.

Systematic surveys in 2007 to 2009 by Stagliano (2010) showed the western pearlshell mussel is widespread in western Montana, but viability is threatened. Presently, only 14 western pearlshell populations from eight streams were ranked excellent (A-viability) statewide using ranks of occurrences online at http://www.natureserve.org/explorer/keyforgenericranking.pdf and described in Hammerson et al. (2008). Site revisits at 40 originally reported occurrences of pearlshell mussel found 25 ocurrences not viable or extinct. Of the six mussel species reported to occur in Montana (three native and three introduced), western pearlshell mussel had the highest percentage of negative mussel searches (no live individuals) at 81.2 percent or an 18.8 percent detection probability (Stagliano 2010, pg 21).

Of 70 occurrence records for western pearlshell mussel so far documented east of the Continental Divide in Montana (Stagliano 2010) only seven (10 percent) populations ranked excellent or good viability (A, B viability). Thirty-two (46 percent) other known western pearlshell populations east of the Divide ranked not viable (D viability) and five populations are now extinct. Of the remaining known eastside populations, all ranked fair (C viability) in that persistence is considered uncertain under current conditions.

For areas in and around the Helena National Forest, the latest surveys by Stagliano (2010) found six of western pearlshell mussel occurrences in the Blackfoot drainage; four in the Smith River; three in the Boulder River; and one each in Deep Creek and Dry Creek of the Big Belts range. According to Stagliano's surveys (2010) sampling for western pearlshell mussel in the Little Blackfoot River and major streams draining the east flank of the Divide Travel Plan area failed to find any occurrences of pearlshell mussel. There are no documented occurrences of western pearlshell in the Divide Travel Plan area. However, based on habitats where the species have been found throughout their range, a map provided by Stagliano (appendix A of the fisheries specialist report) shows current predicted western pearlshell reaches closest to the Divide Travel Plan area. The map shows no predicted pearlshell mussel habitat in the project area west of the Divide, but predicted western pearlshell mussel reaches may exist in the project area east of the Divide in the lower reach of Tenmile Creek where it exits the Helena National Forest.

Fish Habitat

Background

Trout habitat in the travel planning area is essentially the product of interactions among underlying geologies, soils, topography, vegetation, climate and hydrology unique to the area's watersheds (Meehan 1991, pg 5; Swanston 1991, pg 139). These drainage characteristics and processes remain fairly constant setting up conditions for optimum production of aquatic lifeforms (Meehan 1991, pg 5). When natural disturbance reshapes stream channels, the actual effects on aquatic organisms are often short-lived. In their natural context, accessory processes like fire, flood flows, insect infestations, disease, windthrow and animal activities (e.g. beaver) operate on the stream system to produce improved habitat quality and productivity in the long-term (Swanston 1991, pgs 139-142).

Human land-use activities can disrupt the delicate balance of these interactions producing persistent changes in habitat that can reduce natural fish production and population viability (Meehan 1991, pgs 1-6; Waters 1995, pgs 1, 17). The Divide Travel Plan area traditionally has been managed for non-fishery resources. These include timber harvest, mining, livestock grazing, forest transportation and recreation. Other human activities that affected fish habitat included beaver removal, irrigation withdrawals, development activities on private inholdings and utility corridors.

Cumulatively, these activities impair natural stream functions to varying degrees in the analysis area by accelerating erosion and sedimentation, altering surface flows, reducing vegetation cover and destabilizing or degrading stream channels. In general, any ground disturbing activity has potential to increase erosion and exacerbate excess sediment delivery within a watershed, in turn lowering the natural fish production capabilities (carrying capacity) of streams (Hicks et al. 1991). Hence, excessive sediment delivery that persists beyond natural background levels becomes the common denominator of various land-use activities affecting fish habitat (Meehan 1991). A list of ground disturbing activities, both past and ongoing, occurring within the travel plan project area is shown in appendix C of the fisheries specialist report. Table 71 references those land-use activities specific to each individual sub-watershed in the travel plan project area that likely contribute sediment to streams. Activities listed in appendix C of the fisheries specialist report that are confined to upland terrain or have no connection to the surface water system are discounted for consideration in Table 71 (cumulative effects) as sediment contributors to the stream network.

Forest roads have been tagged as producing the majority of excess sediment amongst forest activities and they often create conditions for mass soil failures and landslides (Anderson 1971; Anderson et al. 1976; Cederholm et al. 1981; Furniss et al. 1991; Waters 1995). The degree to which road construction and maintenance has on altering sediment production in a watershed varies substantially and is not possible to quantify accurately. In general, the magnitude and risk for sediment delivery from roads, including other land use activities, is a function of the amount of surface disturbance (acres disturbed) and proximity to streams within a given sub-watershed. The specific effects on trout and trout habitat from excessive erosion and sedimentation are discussed in more detail under the Environmental Consequences section.

The road/fisheries relationship extends beyond the risk of chronic excess sedimentation. A second risk element is road proximity to streams. Alterations in channel morphology also can result wherever roads are built parallel to streams and at flow restrictions such as culverts. When roads are constructed adjacent to a stream they constrain the channel resulting in a stream limited in its ability to access its historic floodplain and often result in the removal of riparian vegetation to accommodate the road right-of-way. Such roads change the physical attributes of trout habitat by reducing pools, meanders, undercut banks, streamside vegetation/shading, large woody debris recruitment and result in higher energy gradients all rendering the stream less productive for fisheries. An example in the Divide Travel Plan area is 0.35 miles of Forest Road #227 in the Hat Creek area that parallels the Little Blackfoot River.

Stream crossings represent a third road risk factor to fish habitat and fish populations. Roads that cross streams most frequently rely on culverts instead of bridges that often disrupt upstream fish migration. This limits a fish population's access to habitat types needed to fulfill their life stage requirements for spawning, rearing, feeding, over-wintering, security and escapement. Additionally, stream crossings, particularly culverts, can result in chronic sedimentation impacts during typical water years and catastrophic effects when floods trigger crossing failure (USDAFS 1998, pg 2). Ford crossings, especially unimproved fords, directly alter the bed and banks of fish habitat and act as chronic sources of sediment. Ford crossings located in or near spawning and nursery areas are particularly risky for sensitive incubating salmonid embryos and fry due to direct vehicular disturbance to the streambed and banks and traffic generally causes the streambanks to widen as the banks break down and wash away (Clarkin et al 2006. pg 5-1).

Stream/road intersections can also influence the probability for increased opportunities of concentrated recreational use alongside stream courses imposing increased effects on fish habitat (Clark and Gibbons 1991, pg 476). An example of this is the complex of user-created dispersed sites situated along the banks of the Little Blackfoot River associated with two ford crossings: one on National Forest System road # 4100 that accesses Negro Mountain from the west and another ford on a user-create route off of NFS road # 123 (Ontario Creek road).

Integrating the three risk factors of roads into this analysis relies on two important indicators or measures to evaluate: stream/road intersections and high risk roads (defined as those roads within 300 feet of fish-bearing streams or 150 feet of non-fish-bearing streams). This is consistent with INFISH riparian habitat conservation areas (RHCA buffers). Together they serve to help quantify these important interactions of the road-fisheries relationship and respond most predictably and reliably to the action alternatives as a barometer of change. However, it is important to point out that not all stream/road intersections and high risk roads have the same effect in terms of the magnitude and risk to salmonid habitat. For instance, crossings in prime bull trout or westslope cutthroat trout habitat present far greater risks to these populations than do crossings located in areas much more isolated from occupied fish habitat. Therefore, more detailed discussions address those crucial crossing sites where stream habitat and the trout that depend on those areas are at substantially higher risk from direct vehicular disturbance than other crossings.

Other aquatic habitat criteria are not considered in detail in this travel plan as the decision will not affect them. More discussion about fish habitat conditions in various sub-watershed units west of the Continental Divide in the analysis area is available in watershed baselines for the Little Blackfoot River portion of the Upper Clark bull trout section 7 watershed (USDA 2000) including updates to the Fish and Wildlife Service.

Two Measures to Evaluate the Stream-Road Relationship

Stream/road intersections are a measure of all points within the planning area where roads intersect streams and relate specifically to road/stream crossings including culverts, bridges and fords. Measuring this indicator aids in assessing the environmental risk of flow restrictions or potential fish migration barriers at culverts, hydrologic connectivity and sedimentation and alterations in channel morphology that result from stream crossings. Culverts are the most common type of stream crossing. Bridges impact fish habitat the least of the three types of stream crossings. An overview of existing conditions in each 6th field HUC relative to this measurement indicator is provided in Table 66.

Table 66: Stream-Route Intersections per 6th field NRCS HUC

6th Field HUC sub-watershed (name)	Forest Service (FS) stream-road intersections			Non- FS Total
	Open road	Closed road	Total	
Upper Missouri Sub-basin watersheds				
100301011401 (Upper Tenmile Cr)	20	11	31	25
100301011402 (Middle Tenmile Cr)	12	3	15	7
100301011406 (Lower Tenmile Cr)	2	0	2	0
100301011403 (Greenhorn Cr)	9	0	9	24
100301011404 (Skelly G)	2	1	3	0
100301011502 (Upper Silver Cr)	1	0	1	0
100301011801 (Iron Horse Cr)	6	2	8	4
Sub-total:	52	17	69	60
Upper Clark Fork Sub-basin watersheds				
170102010501 (Ontario Cr)	20	16	36	1
170102010502 (L.Blackfoot-Larabee)	11	15	26	1
170102010503 (Telegraph Cr)	32	19	51	8
170102010504 (Mike Renig G)	1	2	3	0
170102010505 (Upper Dog Cr)	38	2	40	28
170102010506 (Lower Dog Cr)	10	0	10	1
170102010507 (L.Blackfoot-Hat)	4	13	17	4
170102010601 (North Trout Cr)	16	0	16	1
170102010602 (Snowshoe Cr)	14	5	19	0
170102010603 (L.Blackfoot-Ellliston)	4	3	7	1
170102010604 (Carpenter Cr)	6	15	21	0
170102010605 (Trout Cr)	1	0	1	5
170102010606 (So.Fork. Dog Cr)	1	1	2	0
170102010607 (Upper Dog Cr)	7	3	10	0
170102010610 (Threemile Cr)	0	1	1	0
Sub-total:	165	95	260	50
Grand Total:	217	112	329	110

In summary, 25 percent (110) of the 439 total stream crossings in the Divide Travel Plan area are not under Forest Service jurisdiction. These crossings on lands of other ownership are considered an ongoing cumulative effect to aquatics resources in the project area. Forest Service roads account for the other 329 crossings in the planning area and 34 percent (112) of these crossings are currently closed to wheeled motorized use. On the Upper Missouri sub-basin side of the project, Upper Tenmile Creek has the highest incidence of Forest Service stream/road intersections with 31. On the Upper Clark Fork River side, Telegraph Creek has the highest incidence of stream/road intersections with 51, but Upper Dog Creek (north of highway 12) has the highest number of crossings open to wheeled motorized traffic with 38. Four crossings are fords in bull trout occupied habitat: two fords are on Ontario Creek and two are on the mainstem of the Little Blackfoot River.

High risk roads are a measure used to evaluate potential effects in this analysis, which attempts to address the issue of road/stream proximity especially as it relates to excessive sediment delivery risk and stream physical alteration. Essentially, this element provides a measure of the degree of hydrologic connectivity between roads and streams. A hydrologically connected road is defined as any road segment having a continuous surface flow path to a stream channel. Wherever any hydrologic connection exists, excessive fine sediment and other pollutants associated with roads (oils, dust abatement, spill) are provided an efficient route directly into the natural surface water system.

During the 2002 Forestwide Roads Analysis project, fisheries personnel produced a guide to help rate the risk of a particular road or road segment on aquatic resources within the context of 6th field HUCs or sub-watershed units. The product of that roads analysis was a fish risk rating for roads that assigned one of three specified risk categories: high, moderate and low risk.

Generally, high risk roads were those associated with high value fisheries, which involved recreational or listed and sensitive species habitat. These commonly included stretches of road over 0.5 miles long with two or more road crossings, or were within the stream corridor and had one or more road crossings (culverts, fords, bridges). Moderate risk roads were those that posed the same problems as high risk roads except they generally involved stretches less than 0.5 mile in the stream corridor with one or no crossings. They also exhibited qualities similar to high risk roads except they occurred in watersheds that lacked high value fisheries. Low risk roads represent little or no problems to the stream system since they typically occur over upland terrain outside stream corridors such as along ridgelines where there is no perennial or intermittent surface connection to the stream system. Therefore, low risk roads are not considered in the fisheries analysis. More information about the rationale used at deriving these risk ratings for roads can be found in the project file.

Because the two measures to evaluate potential effects on fish habitat (stream/road intersections and high risk roads within INFISH buffers) used for this analysis integrate the same environmental risks implied in the fisheries risk rating system discussed above, they serve as an excellent surrogate for the concept of high and moderate risk roads commonly relied upon to rate the road-fisheries relationship under the 2002 Forest Road Analyses project. For this analysis, roads within INFISH buffers (as they pertain west of the Divide) will be referred to as high risk roads and encompass both high and moderate risk roads under the 2002 Forestwide Roads Analysis Project. In general, roads within INFISH buffer zones (within 300 feet of streams) present a high risk for non-channelized sediment inputs to stream surface waters for lack of insufficient vegetated buffer widths to filter out road-sourced sediment from accessing streams (Belt et al. 1992).

An overview of existing conditions in each 6th field HUC relative to this particular measurement indicator is provided in Table 67 below. The unit of measure used for assessing the amount of high risk roads in this analysis is by miles per sub-watershed.

Table 67: High Risk Roads (in miles) per 6th Code HUC

6th Field HUC sub-watershed (name)	Forest Service (FS) high risk roads (miles)			Non-FS Total (miles)
	Open road	Closed road	Total	
Upper Missouri Sub-basin watersheds				
100301011401 (Upper Tenmile Cr)	7.76	2.87	10.63	14.12
100301011402 (Middle Tenmile Cr)	3.73	0.29	4.02	0.76
100301011406 (Lower Tenmile Cr)	1.10	0	1.10	0
100301011403 (Greenhorn Cr)	4.18	0.14	4.32	6.31
100301011404 (Skelly G)	1.29	0.06	1.35	0
100301011502 (Upper Silver Cr)	0.56	0	0.56	0
100301011801 (Iron Horse Cr)	2.27	1.37	3.64	2.29
Sub-total:	20.89	4.73	25.62	23.48
Upper Clark Fork Sub-basin watersheds				
170102010501 (Ontario Cr)	6.2	2.64	8.84	0.11
170102010502 (L.Blackfoot-Larabee)	8.71	4.33	13.04	0.15
170102010503 (Telegraph Cr)	11.75	3.86	15.61	2.65
170102010504 (Mike Renig G)	0.21	2.90	3.11	0.01
170102010505 (Upper Dog Cr)	13.48	0.29	13.77	9.00
170102010506 (Lower Dog Cr)	2.11	0	2.11	0.19
170102010507 (L.Blackfoot-Hat)	8.42	2.48	10.9	2.25
170102010601 (North Trout Cr)	4.62	0	4.62	0.99
170102010602 (Snowshoe Cr)	4.87	1.76	6.63	0.05
170102010603 (L.Blackfoot-Elliston)	2.90	1.32	4.22	0.53
170102010604 (Carpenter Cr)	2.71	4.45	7.16	0.09
170102010605 (Trout Cr)	3.52	0	3.52	0
170102010606 (So.Fork. Dog Cr)	0.81	0.13	0.94	0
170102010607 (Upper Dog Cr)	4.76	0.25	5.01	0
170102010610 (Threemile Cr)	0	0.10	0.10	0
Sub-total:	75.07	24.51	99.58	16.02
Grand Total:	95.96	29.24	125.20	39.50

In summary, approximately 165 miles (22.9 percent) of 719 total miles of roads inside the planning area are considered high risk roads to the stream system (see map appendix B of the fisheries specialist report). About 76 percent (125.2 miles) of them are under Forest Service jurisdiction, which would warrant further ground surveys in many sub-watersheds to quantify sediment delivery to nearby streams. The other 24 percent (39.5 miles) of high risk roads are on lands of other ownership, which would be considered an ongoing cumulative effect in the planning area beyond Forest Service control. Of the Forest Service high risk roads, approximately 29.24 miles or 23 percent are currently closed to motorized vehicle traffic. Another way of looking at it is 95.96 miles or 77 percent of the high risk roads under Forest Service jurisdiction in the planning area are currently open to wheeled motorized use.

On the Upper Missouri sub-basin side of the planning area (or east of the Divide), the Upper Tenmile Creek 6th field HUC has the most miles of Forest Service high risk roads with about 10.63 miles. On the Upper Clark Fork side of the planning area (or west of the Divide), the Telegraph Creek 6th field HUC has the highest miles of Forest Service high risk roads with about 15.61 miles.

Road sediment source surveys performed by Forest watershed staff in the years 2008 – 2014 were completed for some watersheds at the 6th field HUC level in the Divide Travel Planning area south of Hwy 12. Watersheds north of Hwy 12 have not had comprehensive surveys completed. These road surveys are ongoing and hinge upon staff and funding availability. Preliminary data show a relationship between the miles of high risk roads occurring in a sub-watershed and the number of sediment delivery sites documented. East of the Divide in Upper Tenmile Creek, 177 sediment delivery points on open Forest Service roads have been recorded, which corresponds directly with the most miles of high risk roads in a 6th HUC watershed south of Hwy 12. West of the Divide in Telegraph Creek, which has the most miles of high risk roads, there were 39 road sediment delivery points recorded on open Forest Service roads, which is the next highest amount of sediment delivery sites for all 6th HUC watersheds south of Hwy 12. Ontario Creek with 8.84 miles of high risk roads the most sediment delivery points at 40 recorded on both open and closed Forest Service roads. The data so far show a relationship between the amount of high risk roads and frequency of road sediment delivery points occurring in a 6th HUC watershed.

Other (secondary) measures to evaluate associated with roads:

Dispersed recreational sites

Dispersed recreational sites associated with the transportation system can impact fish habitat ranging from minor where use is infrequent to substantial when use is more concentrated such as along trails or popular campsites (Clark and Gibbons 1991, pg 475). The Little Blackfoot River corridor is a popular recreational zone (Kurt Cuneo, pers comm. 5/14/2009) based on observations by Forest Service recreation and resource staff over the past 25 years. West of the Continental Divide most campsites have been found occupied or full on weekends, especially over the holidays and variably during the hunting season. At least 75 to 80 percent of campsites along the Little Blackfoot River and its main tributaries, Ontario Creek and Telegraph Creek, were observed as occupied especially over the weekends during onsite visits by Forest recreation staff (Dave Payne, pers. comm. 5/14/2009).

In 2004, the Helena Ranger District conducted a comprehensive inventory of dispersed recreational campsites within four sub-watersheds of the Little Blackfoot River drainage south of Hwy 12. The purpose for the survey was to collect information for planning about the extent and characteristics of dispersed campsites associated with National Forest System roads 227 and 4100 (Little Blackfoot River), NFS roads 123 and 4104 (Ontario Creek), NFS roads 4104 and 1801 (Monarch Creek) and NFS road 495 (Telegraph Creek).

Additionally, this inventory was used to help determine both the specific locations and degree of riparian impacts caused from dispersed recreational sites often associated with high risk roads within the INFISH buffer (300 feet of inland native fish habitat) by assessing which campsites were contributing sediment or retarding riparian management objectives or both under the INFISH amended Forest Plan. Findings from the 2004 inventory show there were at least 46 dispersed recreational sites associated with stream corridor roads and ford crossings within the four 6th field HUC watersheds as displayed in Table 68 below. Nine dispersed campsites were

documented as retarding the attainment of riparian management objectives or continue risking adverse effects to listed bull trout because of observed bank erosion, sediment delivery and lost vegetation ground cover or bare mineral soil within one hundred feet of nearby surface water. The nine sites which retard the attainment of riparian management objectives are considered as having the highest priority for post-implementation monitoring and possible rehabilitation work in the future.

Table 68: Summary of Dispersed Campsites Associated with High Risk Roads

6th Field HUC sub-watershed (name)	Number dispersed recreation camps on NFS land	Number of dispersed campsites that retard attainment of RMOs[1]	Observed impacts on fish habitat at sites that retard attainment of RMOs
170102010501 (Ontario Cr)	13	1	Bank disturbance; soil compaction; erosion; loss of ground cover adjacent to stream.
170102010502 (L.Blackfoot-Larabee G)	17	5	Bank disturbance; soil compaction erosion; increased sedimentation; removal of riparian understory.
170102010503 (Telegraph Cr)	7	0	
170102010507 (L.Blackfoot-Hat Cr)	9	3	Bank disturbance; soil compaction; erosion; increased sedimentation; removal of riparian understory; wading pools.
Total:	46	9	

[1]RMO is an acronym for Riparian Management Objectives used to describe six environmental features used as habitat indicators of ecosystem health for inland native fish under the INFISH amendment to the Forest Plan. The term "retard" under INFISH means to slow the rate of recovery below the near natural rate of recovery if no additional human caused disturbance was placed on the system.

Figure 2 shows one of the nine dispersed recreation campsites representative of the observed impacts to inland native fish habitat in the Little Blackfoot River. This site is located upstream from Elliston on the Helena National Forest, which is a designated priority watershed under INFISH. A priority watershed serves as an anchor for the potential recovery of depressed stocks with a priority on bull trout populations (USDA 1995, pg A-13). The intent of designating priority watersheds is to provide a pattern of protection where habitat for inland native fish receives special attention and treatment.

Figure 2: Dispersed campsite LB 13, (sec.13, T8N, R7W) next to Little Blackfoot River.

Access road descending into site on left shows sediment plume reaching surface waters next to campsite. This dispersed recreation site has observable effects of soil compaction, bank disturbance, riparian vegetation removal and sediment delivery to nearby surface waters. (Photo by Archie Harper, July 2004).

High Risk Fords of Concern to Threatened, Endangered, Sensitive (TES) Fish Habitat

There are two fords located on the Little Blackfoot River and two fords on Ontario Creek all in documented bull trout habitat. Three of these fords are of special concern to fisheries management because they are open to wheeled motorized use that risks direct disturbance to fish habitat on an ongoing basis including the potential for direct mortality to listed bull trout and sensitive westslope cutthroat trout. The largest open ford in the entire Divide Travel Plan area occurs on the mainstem Little Blackfoot River in occupied bull trout and westslope cutthroat habitat and is associated with NFS road # 4100. This ford crossing is located near the beginning of the access route to the Golden Anchor abandoned mine site. The second Little Blackfoot River ford is located at the mouth of Larabee Gulch where a bridge was removed in 1994. This crossing provides important access to the Larabee trail. Because the old (closed) bridge was removed, there currently is no safe way to cross the stream via full sized wheeled motorized vehicles and users are fording it on foot, horseback and to a lesser degree ATVs.

In Ontario Creek, one open ford occurs near its mouth where the stream crosses the floodplain of the Little Blackfoot River and is associated with non-system road # 123-013. The other ford is located several miles upstream on Ontario Creek near Bison Creek and is associated with a short segment of the Continental Divide National Scenic Trail (CDNST) that bisects Ontario Creek between NFS roads 4104-A2 and 495-D1. This upper ford in Ontario Creek is currently closed to motorized wheeled traffic, but has experienced violations of the closure.

Three additional fords of concern to fisheries management are all located in occupied westslope cutthroat trout habitat. One ford is located on Sawmill Creek (Upper Dog Creek 6th HUC watershed north of Hwy 12); a second is located on an unnamed westslope cutthroat trout tributary to Ontario Creek; and the third ford occurs east of the Divide in Skelly Gulch (Skelly Gulch 6th HUC watershed). All three fords are currently open to wheeled motorized use and are considered an ongoing risk to the local westslope cutthroat trout populations that occur in each respective stream due to hydrologically connected road segments associated with each ford and the potential for direct westslope cutthroat trout egg/fry mortality due to wheeled motorized traffic through each ford during the spawning and incubation period for this species of trout.

Therefore, there are seven unimproved fords in the planning area considered to be high risk fords of concern where ongoing motorized vehicle traffic has caused the stream to widen substantially and the raw banks in conjunction with the road approaches provide a continuous surface flow path for road sediment into fish habitat that support both bull trout and westslope cutthroat trout. No riparian vegetation remains on the banks either side of each ford for a distance at least twice the width of each crossing. The approach topography at all fords is variable, but each slopes directly into their respective streams resulting in direct sediment delivery during periods of storm runoff and spring breakup.

Observations of traffic disturbance of the channel bottom at all unimproved fords show where most gravel typically associated with trout spawning and rearing habitat was lost and moved from locations where vehicle traffic disrupted the streambed. Common at all ford sites was the lack of coarse and fine woody debris components important for pool formation and retention of streambed material during bankfull discharge. Results of an experimental removal of woody debris from a gravel-bed stream in a forested environment have shown a four-fold increase in bedload transport at bankfull flows (Smith et.al. 1993 pg 153-178). The streambed in the vicinity of all unimproved fords often displays a coarser bottom or higher energy gradient.

Fine sediment becomes re-suspended into the water column during vehicular contact at fords, which is soon replaced during storm runoff events. Sediment plumes at two ford sites were personally observed during vehicle passage. It has also been shown how fords provide opportunities for concentrated recreation use next to fish habitat. Disturbance of riparian areas is often tied to concentrated recreational use along high risk routes as documented in Table 68 (above). The largest ford associated with NFS road # 4100 is an example how recreational use and its impacts on inland native fish habitat tend to increase use is allowed (**Figure 3**).

Figure 3: Large ford on Little Blackfoot River showing dispersed campsite #20 (sec.12, T8N, R7W).

Fish habitat disturbance increases according to the extent and nature of concentrated recreational activities at stream crossings and repeated motorized traffic through ford risks disturbance to gravel bed used by spawning trout. (Photo by Archie Harper, July 2004)

Fisheries, Environmental Consequences and Biological Evaluation

Introduction

The direct, indirect and cumulative effects of the action alternatives relative to no action (baseline conditions) on fisheries resources within this travel planning area are presented in this section. Secondary measures used to evaluate effects are also included to further clarify specific effects from fords and dispersed campsites. This analysis relies on a GIS based quantitative approach which is partially field verified and supplemented with supporting qualitative discussions about crossings and high risk roads for projecting potential effects of all the action alternatives relative to baseline conditions on the fisheries resource in the Divide Travel Plan area.

Fisheries Background Summary Related to Road Effects

Direct and Indirect Effects

Fish Habitat

An overview of road effects on streams and fish habitat is distilled from Furniss et al (1991), Waters (1995), the Water/Road Interaction Technology Series (USDAFS 1998), the USDA Forest Service Roads Analysis guide (USDAFS 1999) and the Montana Bull Trout Scientific Group report (MBTSG 1998). The primary impacts of roads on fish habitat and populations can be organized under three main categories: 1) accelerated erosion and sedimentation; 2) physical alterations of channel morphology; and 3) fragmentation of fish populations and habitat. Other ways roads

impact streams involve changes in hill slope drainage (Hauge et al 1979), changes in organic debris in channels, reduction in streamside vegetative cover, potential chemical contamination and increased human access to sensitive fish habitat that can impact key habitat components and increase angling/poaching pressure.

Chronic excessive sedimentation generated as anthropogenic erosion and sediment deposition degrades streams and lowers the natural fish production capabilities of stream bottoms (Waters 1995). Trout use redds (nests dug by fish in bottom gravels) in flowing waters for their reproductive strategy. When chronic excessive sediment derived from roads and other sources accrues to trout spawning and rearing areas, it can substantially reduce trout egg/fry survival rates compared with stream conditions in pristine or unmanaged watersheds. Incubating salmonid eggs and sac-fry rely on gravel permeability for oxygen delivery and the flushing of metabolic wastes. Gravel permeability and in turn egg-to-fry survival can be reduced markedly by modest increases in streambed sediment (Everest et al. 1987). Additionally, emerging fry suffer entrapment if an armor of excess fine sediments accrues to spawning beds (Waters 1995, pg 109 citing Hall and Lantz, 1969).

The scientific consensus about forest roads is that they generate the most sediment amongst all forest management activities (Anderson et al. 1976; Furniss 1991). Bechta and Jackson (1979, pg 209) report that flushing of fine sediments from gravels during high flow periods can be offset by stream energy used to transport and intrude additional sediment load as a consequence of upstream land-use activities. Therefore, the greatest attention to techniques for restoring streams and protecting fish habitat has been directed toward more careful planning and design of roads compatible with stream systems (Furniss et al. 1991).

Beyond the problems of excessive sediment upon the embryo and fry stages of trout life, other life history stages can suffer the deleterious effects of excessive sediment. The filling of interstitial spaces of cobble/rubble substrate can seriously reduce critical juvenile rearing habitat for salmonids (MBTSG 1998, pg 10; Waters 1995, pgs 113-114). Pool volume reduced by excessive sediment decreases physical carrying capacity for sub-adult and adult fish during summer growth stages (Waters 1995, pg 111-115; Bjornn and Reiser 1991 pg 122; MBTSG 1998, pg 10). Chronic sedimentation from roads is considered as damaging as that from catastrophic sediment inputs (e.g. wildfire); then again, the particles are finer and delivered over longer periods than burned drainages (Furniss et al. 1991). Everest et al. (1987) concluded trout species can cope with natural variability in sediments, but population viability can be reduced by persistent sedimentation that exceeds the natural background levels they evolved in.

Second, paralleling roads and road crossings often result in stream adjustments detrimental to fish habitat (Furniss et al 1991). Streams are dynamic and migrate within historic flood plains transporting large woody and organic debris that provides critical physical structure and diversifies aquatic habitat. Floodplain dynamics and processes are modified by road alignment and road fills resulting in the loss of habitat for riparian and aquatic species. Streams constrained by roads and crossings self-adjust resulting in less pool frequency or structure, fewer spawning beds, less bank cover, higher energy gradients and less stable hillslopes wherever streamflows are necessarily diverted to the opposite banks. These changes, in turn, lower the fish production capabilities of stream-riparian habitat.

Third, forest roads often cross streams and culverts are by far the most common type of crossing structure. Preferred bridge crossings in the project area make up less than 0.1 percent of all stream crossings. All migratory and many resident trout move extensively upstream and downstream during their life cycles to seek food, cover, spawning areas and escape detrimental

changes in water quality. Culvert crossings often restrict migration of fishes and other stream organisms which can have consequences for fish population viability (USDAFS 1999, pg 67). When culvert crossings fail, they often do so catastrophically causing failure of fill material at crossings, local scour, streambank erosion and excessive sediment delivery into downstream fish habitat (Furniss et al. 1991, pg 300). Wood debris and sediment are prone to becoming trapped behind culvert crossings reducing downstream transport and increasing the risk of crossing failure (USDAFS 1999, pg 65-66). The consequences are often major increased sediment loading and persistent channel damage downstream of failed crossing structures.

Ford crossings associated with the transportation system present another risk element to inland native and non-native fisheries. Fords provide a more direct surface link of road top sediment and chemical transport to the stream channel than culvert crossings and bridges. In addition to sediment transported during periods of rainfall and spring runoff, vehicles crossing unimproved fords degrade water quality as they move through the ford (Sample et al 1999; Taylor 2006). Another risk other than fine sediment is pollution by engine fluids. Taylor (2006) reported oil on gravel beds of the Nueces River from vehicles frequently crossing fords deep enough to dislodge or wash off engine fluids into the stream. Repeat traffic through fords located in sensitive spawning and rearing habitats disturbs these areas so that the risk of direct mortality to incubating trout and swim-up fry becomes a concern as motorized traffic on streams directly disturbs bottom substrates where trout lay eggs or emergent fry seek rearing space in the substrates. These risks on TES fish species are shared amongst fords located on NFS road # 4100, the Larabee ford on mainstem Little Blackfoot River, three fords in the Ontario Creek drainage and fords on westslope cutthroat trout habitat in Skelly Gulch (NFS road # 1853-A1) and Sawmill Gulch (NFS road # 4005).

On non-fish-bearing streams, an open ford exists directly above Kading campground (west of the Continental Divide) where road 227-E1 bisects a small perennial tributary approximately 300 feet above its confluence with the Little Blackfoot River. Although situated in unoccupied fish habitat, this site occurs directly upstream from occupied bull trout and westslope cutthroat trout habitat in the Little Blackfoot River where road sediment transports directly to surface waters during periods of storm runoff and becomes re-suspended whenever motorized traffic passes through the ford.

Ford crossings likewise provide access opportunities for recreationists that may inadvertently lead to changed patterns of use in riparian habitat and subsequently the potential for detrimental effects on fish (increased fishing pressure and/or poaching) and fish habitat like loss of vegetation, soil compaction, bank disturbance and increased sedimentation (Clark and Gibbons 1991 pg 476; MBTSG 1998, pg 41-42). Brown trout and westslope cutthroat trout occupy the Little Blackfoot River along with bull trout and brook trout where more concentrated recreational uses associated with dispersed campsites occur, including the developed Kading campground. As such, risks for direct effects increase near popular streamside camping areas like the large ford site (NFS road #4100) on the Little Blackfoot River.

Patterns of more concentrated recreational use have been documented and mapped in the dispersed recreational campsite inventory completed by the Helena Ranger District in 2005. At that time there were 46 dispersed recreational sites associated with stream corridor roads and ford crossings within four west side sub-watersheds south of Hwy 12. Nine of the dispersed campsites posed a direct adverse impact on trout habitat. At least four of those dispersed campsites were associated with the large ford crossing on the Little Blackfoot River and two others were tied to the ford crossing in upper Ontario Creek near the confluence of Bison Creek.

These risks on the fisheries resource are common and ongoing to all alternatives for the Divide Travel Plan area because the physical presence of the transportation system and all its crossings remain on the landscape regardless of the decision to administratively close and/or open roads in the planning area. Excess sediment delivery, stream alteration and habitat fragmentation are all implicated as common effects under this analysis and the two measurement indicators used for integrating these impacts on fisheries include: 1) number of stream/road intersections; and 2) miles of high risk roads (those within INFISH buffers). The term indicator used here refers to a measure or characteristic of man-made features that can be interpretable in terms of effects of roads on fisheries values (USDAFS 1999, pg 46).

The extent and location of much of the road system within the inner valley corridors in much of the planning area implies an ongoing cumulative disturbance regime upon streams and the fish communities they support (Furniss 1991, pg 297). The magnitude and extent of the primary and secondary indicators is used in this report in making inferences about road hazards because they help determine whether a geomorphic or hydrologic process may be impacting the resource of concern or endpoint (USDAFS 1999, pgs 144 and 179).

Table 69 reflects a quantitative overview of baseline effects as measured by the primary and secondary indicators (columns 2 through 5) to evaluate the Forest Service road system throughout the Divide Travel Plan area.

Table 69: Summary of Primary and Secondary Indicators of Roads on Fisheries

6th Field HUC (name)	Stream/road Intersections	Miles high risk road	No. of High Risk Campsites[1] in TES habitat	No. of Fords in TES habitat
Upper Missouri Sub-basin watersheds				
100301011401 (Upper Tenmile Cr)	31	10.63		
100301011402 (Middle Tenmile Cr)	15	4.02		
100301011406 (Lower Tenmile Cr)	2	1.10		
100301011403 (Greenhorn Cr)	9	4.32		
100301011404 (Skelly G)	3	1.35		1
100301011502 (Upper Silver Cr)	1	0.56		
100301011801 (Iron Horse Cr)	8	3.64		
Sub-total:	69	25.62		1
Upper Clark Fork Sub-basin watersheds				
170102010501 (Ontario Cr)	36	8.84	1	3
170102010502 (L.Blackfoot-Larabee)	26	13.04	5	1
170102010503 (Telegraph Cr)	51	15.61		
170102010504 (Mike Renig G)	3	3.11		
170102010505 (Upper Dog Cr)	40	13.77		1
170102010506 (Lower Dog Cr)	10	2.11		
170102010507 (L.Blackfoot-Hat)	17	10.9	3	1
170102010601 (North Trout Cr)	16	4.62		
170102010602 (Snowshoe Cr)	19	6.63		
170102010603 (L.Blackfoot-Ellliston)	7	4.22		
170102010604 (Carpenter Cr)	21	7.16		
170102010605 (Trout Cr)	1	3.52		
170102010606 (So.Fork. Dog Cr)	2	0.94		
170102010607 (Upper Dog Cr)	10	5.01		
170102010610 (Threemile Cr)	1	0.1		
Sub-total:	260	99.58	9	6
Grand Total:	329	125.20	9	7

[1]High risk campsites in this context relate to those retarding INFISH RMOs or adversely affecting TES fish species or habitat.

In summary, there are approximately 329 stream/road intersections and 125.2 miles of high risk roads in the planning area under Forest Service jurisdiction. Currently about 34 percent (112) of the Forest Service stream crossings and 23 percent (29.24 miles) of Forest Service high risk roads are closed to wheeled motorized use in the planning area. Indirect effects associated with the transportation system relate specifically to access opportunities for concentrated recreational uses along the stream-valley corridor as well as disturbance associated with the presence of high risk ford crossings. There are nine undeveloped Forest Service dispersed campsites along the Little Blackfoot River and seven fords in TES fish habitat; six fords occur west of the Divide and one ford occurs east of the Divide in Skelly Gulch. The importance of Skelly Gulch is it is one of very few streams that support a core conservation (100 percent genetically pure) population

of westslope cutthroat trout east of the Continental Divide in Montana. As a general reference point, under pristine or unmanaged conditions the measurement indicators evaluated and summarized under Table 69 would zero out for this exercise.

Table 66, Table 67 and Table 69 provide clear evidence how the current existing transportation system in the planning area is the primary contributor for accelerated erosion and sediment loading, altered channel morphology and fragmented fish habitat and populations in most sub-watersheds in the Divide Travel Plan area. A screening of 6th field HUCs in the Divide area shows that Upper Tenmile Creek, Telegraph Creek and Upper Dog Creek appear the most heavily impacted sub-watersheds as a function of the transportation network. Those HUCs experiencing additional risks from dispersed campsites and high risk fords include Little Blackfoot River-Hat Creek, Little Blackfoot River-Larabee Gulch and Ontario Creek. This represents a departure from optimum salmonid habitat compared to unmanaged/pristine conditions and an ongoing effect of the transportation system discussed further under the cumulative effects discussion below.

Amongst westslope cutthroat trout sub-watersheds east of the Continental Divide, Skelly Gulch and Greenhorn Creek are most at risk from the transportation system. The Greenhorn Creek westslope cutthroat trout population may have already become extinct based on 2010 to 2012 electrofishing surveys by Forest Service and Montana Department Fish Wildlife and Parks fisheries crews. For westslope cutthroat trout sub-watersheds west of the Divide, those most at risk from roads support isolated (resident) westslope cutthroat trout populations. These include Snowshoe Creek, Carpenter Creek and North Trout Creek. The remaining westslope cutthroat trout fishery west of the Divide appears mostly to be a connected network of fish habitat (metapopulation) with a fluvial component occurring in Dog Creek and the Little Blackfoot River upstream from Elliston. For bull trout habitat in the planning area, Dog Creek downstream of the Forest boundary and the mainstem Little Blackfoot River and Ontario Creek remain at high risk as a function of the primary and secondary indicators outlined in Table 69.

Population Viability

Westslope cutthroat trout are the fish management indicator species of concern for the Helena National Forest that represent a measure of the effects of management activities on habitat with the objective of ensuring population viability (Forest Plan pg II-17).

A formal population viability analysis is restricted to the use of quantitative modeling that estimates risk of extinction over a specified time period, typically 100 years (Ralls et al. 2002, pgs 522-523). These mathematical exercises can be expensive requiring comprehensive data about many factors influencing probability of extinction for a population. Moreover, there are no consensus guidelines on when and how population viability analysis should be applied (Ralls et al 2002, pg 521) and insufficient data to build an appropriate model has proven not feasible to this situation. In practice, agency biologists must assess whether a proposed action will increase the likelihood of loss of viability or lead to a trend toward federal listing of a sensitive species from more limited information and resources.

This viability analysis focuses on westslope cutthroat trout and relies on a recommended alternative method of risk assessment based on viability models by Ruggiero et al. (1994) that center on criteria established by Rieman et al. (1993). More detailed physical and biological effects upon sensitive westslope cutthroat trout and listed bull trout are reserved for two separate framework documents, a biological evaluation for westslope cutthroat trout and a biological assessment for bull trout.

Briefly, these more in depth biological analyses borrow from concepts presented in Ruggiero et al. (1994) in conjunction with criteria established by Rieman et al. (1993) such that an analysis of population viability is fundamentally about birth, death, immigration and emigration rates and how environmental factors affect these rates over time (Ruggiero et al. 1994, pg 366). Select habitat attributes considered significant to fish and sensitive to land management disturbances were reviewed in Overton et al. (1995, pg 1). Research has shown how increasing and decreasing levels of sediment in trout reproductive habitat is the common denominator affecting trout embryo and fry survival rates negatively and positively (Waters 1995).

Once fine sediments increase beyond average natural levels in trout spawning habitat (typically 28 to 30 percent on Helena National Forest streams), the reproductive quality of that habitat diminishes proportionately resulting in corresponding declines in fry production. Risk of increasing the amount of fine sediments in fish spawning habitat rises in drainages as the amount of high risk roads and stream/road intersections increases.

In reference to the indicators in Table 69, direct and indirect effects to sensitive westslope cutthroat trout and listed bull trout (and other salmonids) vary amongst the 6th field HUCs as a function of changes in the amount of open stream/road intersections and miles of high risk road open in a sub-watershed. Generally, the risk for negative effects to salmonid embryo/fry production including growth and survival increases when more crossings and high risk roads become open and vice versa. Exceptions to this rule can occur whenever key crossings or high risk roads occur in TES habitat that do not change in spite of a net increase/decrease of crossings or roads in other non-fish-bearing streams within the same HUC or sub-watershed. Details how these effects indicators relate to the effects specific to each 6th field HUC are reserved for the biological evaluation and biological assessment for the selected alternative. A qualitative overview for the Divide Travel Plan area concerning road effects upon listed bull trout, sensitive westslope cutthroat trout and western pearlshell mussel common to all alternatives is provided below in Table 70.

Table 70: Effects Projected for Westslope Cutthroat Trout, Bull Trout and Western Pearlshell Mussel Common to All Alternatives

Fish Species and Habitat	Ongoing Effect of Current Transportation System Common to All Alternatives[1]
Bull Trout	May Affect, Likely to Adversely Affect based on ongoing cumulative effects evidenced by magnitude of road hazard indicators in most impacted 6th field HUCs and scarcity of bull trout in the Little Blackfoot River local population of Upper Clark Fork River core area.
Westslope Cutthroat Trout	May Impact Individuals, but will not likely contribute to a trend toward federal listing or loss of viability of the population or species for populations both sides of the Continental Divide.
Western Pearlshell Mussel	No Effect based on lack of western pearlshell occurrences and predicted habitat in the Little Blackfoot River drainage and unlikelihood for a change in habitat in lower Tenmile Creek east of the Divide from slight potential changes in sediment delivery resulting from any adjustments in open/closed status of roads.

[1] Effect determination on TES aquatic species and habitat based on determination for most impacted 6th field HUCs in planning area.

Cumulative Effects

When examining cumulative effects the geographic unit of preference is at the 6th field HUC because fish habitat and fish populations are subject to land use activities unique to those sub-

watersheds. There are 22 6th field HUC watersheds of which seven occur east of the Divide in the Upper Missouri River sub-basin and 15 occur west of the Divide (see figures 1 and 2, appendix A of the fisheries specialist report).

Past and Present (ongoing) Actions

Past and ongoing land-use activities in planning area sub-watersheds are cataloged in Table 71 below as numbers assigned to each activity from a master list of past and ongoing activities in appendix B. Additionally, cumulative effects from past/ongoing activities in drainages west of the Divide are reflected in 6th field HUC evaluations for the Little Blackfoot portion of the Upper Clark Fork Watershed Baseline (USDA 2000). The combined effects of these activities are impossible to measure exactly and the science of watershed management has not produced the tools or techniques to allow managers the capability to quantify cumulative effects with precision and accuracy. Natural ecosystems exhibit wide variation, complexities and uncertainties that result in generalized expressions of combined effects.

McNeil core sampling data for the planning area streams has not been completed in all sub-watersheds, but ample sampling between 1988 and the present has been obtained from 17 of 21 fish-bearing sub-watersheds in the planning area. Numbers under column 2, Table 71 assigned to the individual 6th field HUCs correspond to activities listed in appendix B and are intended to show which past and ongoing activities are likely responsible for elevated sediment levels in spawning habitat for individual sub-watersheds. Sampling data under column 4 reflect the sediment-generating effects of ongoing land use disturbance and background sediment by sub-watershed. It shows a range of fine sediments by depth (<1/4 inch in diameter) in select Divide Travel Plan area streams as a consequence of the cumulative effect from the existing transportation system combined with other ongoing activities in appendix C. Some past or ongoing activities having no effect or risk upon the surface water system have been excluded from consideration in Table 71. More information about the application of McNeil core sampling methodologies as applied to this travel project follows the table below.

Table 71: Summary of Past and Ongoing Actions by 6th field HUC *

6th Field HUC sub-watershed (name)	Past and ongoing activities[1]	Stream(s) sampled for sediment	Mean % fines in gravels	Helena NF reference (%)	L.Blackfoot reference (%)
Upper Missouri Sub-basin watersheds					
100301011401 (Upper Tenmile Cr)	1, 2, 21, 40, 50, 56, 63, 73, 78, 91, 92, 93, 104, 106, 108, 100, 110, 120, 140, 142	Minnehaha Cr	38.7	30.0	31.9
100301011402 (Middle Tenmile Cr)	11, 24, 49, 63, 96, 106, 108, 111, 120, 121	Walker Cr	52.5	30.0	31.9
100301011403 (Greenhorn Cr)	65, 88, 89, 106, 108, 113	Greenhorn Cr	53.4	30.0	31.9
100301011404 (Skelly G)	74, 106, 118	Skelly G	38.4	30.0	31.9
100301011502 (Upper Silver Cr)	106	- unsampled -	--	30.0	31.9
100301011801 (Iron Horse Cr)	106, 119, 126	Lost Horse Cr	46.3	30.0	31.9
Upper Clark Fork Sub-basin watersheds					
170102010501 (Ontario Cr)	21, 48, 88, 89, 106, 108, 129	Ontario Cr	36.9	30.0	31.9
		Bison Cr	36.9		
		Monarch Cr	37.7		
170102010502 (L.Blackfoot-Larabee)	5, 9, 17, 21, 106, 108, 110, 117	L.Blackfoot @ Larabee G	35.4	30.0	31.9
170102010503 (Telegraph Cr)	4, 6, 10, 21, 34, 45, 48, 56, 66, 72, 75, 88, 89, 94, 106, 108, 129, 134	Telegraph Cr	38.2	30.0	31.9
		Booth G	35.1		
		Sally Ann Cr	43.1		
170102010504 (Mike Renig G)	68, 106, 120	Mike Renig G	50.5	30.0	31.9
170102010505 (Upper Dog Cr)	3, 8, 12, 16, 44, 51, 52, 63, 64, 70, 77, 82 106, 113, 114, 115, 118, 123, 126, 129	Hope Cr	42.8	30.0	31.9
		LaSalle G	40.4		
170102010506 (Lower Dog Cr)	16, 65, 83, 96, 106, 111, 113, 121	- unsampled -	--	30.0	31.9
170102010507 (L.Blackfoot-Hat Cr)	17, 21, 22, 39, 41, 60, 63, 84, 87, 94, 99, 106, 116, 117	L.Blackfoot @ Hat Cr	37.8	30.0	31.9
170102010601 (North Trout Cr)	7, 106, 123, 129	- unsampled -	--	30.0	31.9
170102010602 (Snowshoe Cr)	19, 38, 59, 63, 82, 106, 115, 129	Snowshoe Cr	60.7	30.0	31.9
170102010603 (L.Blackfoot-Elliston)	13, 30, 69, 83, 85, 106, 116, 129	Elliston Cr	36.7	30.0	31.9
170102010604 (Carpenter Cr)	61, 63, 71, 86, 106, 108, 115	Carpenter Cr	48.3	30.0	31.9
		N.Fk. Ophir Cr	22.2		
170102010605 (Trout Cr)	18, 95, 106, 116, 125	Trout Cr	36.1	30.0	31.9
170102010606 (So.Fork. Dog Cr)	18, 106, 122	- unsampled -	--	30.0	31.9
170102010607 (Upper Dog Cr)	18, 95, 106, 122, 125, 129	Spotted Dog Cr	39.9	30.0	31.9
170102010610 (Threemile Cr)		Threemile Cr	33.3	30.0	31.9

***Using mean percent fines (<1/4 inch diameter) in spawning habitat of select streams as a measure of cumulative effects.**

[1] [1] Numbers correspond to an activity listed in appendix C of the fisheries specialist report as a potential to add or mitigate sedimentation in a specific 6th code HUC.

Although measuring the effects of any project in the context of past and ongoing actions cannot be predicted or measured precisely, it is commonly accepted in watershed practice that the streambed is the ultimate integrator of land-use activities including natural processes unique to a given drainage. The common denominator of various land-use actions affecting fish habitat is excess sediment in the streambed beyond natural background levels (Meehan 1991, pg 5-6). Hence, baseline conditions and the cumulative effect of proposed actions are best measured in the streambed where sediment accrues in critical reaches. Fine sediment in salmonid spawning gravels is the accepted indicator of current habitat conditions and trends on the Helena National Forest.

Helena National Forest fish biologists rely on critical (response) reaches for sampling fine sediments in spawning habitat using McNeil substrate core sampling methodologies (Platts et al. 1983, pgs 17-20; Bunte and Abt 2001, pgs 30-31 and 203-205). Critical reaches are representative stream segments that reflect changes in fish habitat as a function of altered sediment yields upstream of the reach of interest (Stowell et al. 1983). This approach is applied as a practical means to assess existing (baseline) conditions of salmonid spawning habitat from a host of land-use activities, particularly roads. It is also useful to help monitor trends in the quality of salmonid spawning habitat in response to disturbance activities in a drainage.

Reference sediment levels for the Helena National Forest gathered in the 1980s to 2000s relied on McNeil core data from unmanaged drainages or undisturbed portions of drainages on the Helena National Forest. It was found that 30 percent fines represented a plausible mean reference value of fine sediment levels in salmonid spawning habitat and ± 9.9 percent about the mean is assumed to be a reasonable measure of natural variation for fisheries management goals based on data collected from Helena National Forest streams matching Lake Helena 303(d) listed streams. This would equate to fine sediment levels within the range of approximately 20 to 40 percent at most sites in unmanaged drainages.

McNeil core data was obtained from four streams in unmanaged tributaries in the planning area. Two streams, No Grass Creek and Bison Creek, lie within the Electric Peak roadless area. The other two are unnamed tributaries that lie outside roadless areas but have no roads or vehicle crossings upstream from the sampled reach. Average sediment levels for these streams measured 28.9 percent, 36.9 percent, 31.4 percent and 30.2 percent respectively with a weighted average of the means for all four streams at 31.9 percent. For this analysis, 30 percent and 31.9 percent are used as benchmarks to judge the degree of cumulative effects on area streams using ± 9.9 percent either side of the mean as a reasonable measure of natural variation for salmonid spawning habitat.

Reasonably Foreseeable Future Actions

Reasonably foreseeable projects or programs considered for review were drawn from the master list provided (see appendix B). Foreseeable actions are discussed qualitatively in terms of how they might influence trends in sedimentation and subsequently, salmonid spawning habitat.

The Telegraph Creek Mountain Pine Beetle (MPB) Salvage project involves the removal of mountain pine beetle infested stands of mostly lodgepole pine trees on about 8,000 acres of land within the Telegraph Creek, Ontario Creek and Mike Renig 6th field HUCs. This also includes a pre-commercial thinning component. There may be accelerated erosion and sediment delivery into downstream fisheries habitat from high risk roads proposed for log hauling and access to and from treatment units. Each large-scale vegetation treatment project has a road

improvement package with mitigation and design measures intended to sequester sediment as an important resource protection measure of the project. With implementation of the road improvement component, the risk of accelerating sediment delivery into streams within the three sub-drainages is predicted to be low. There would be high risk for short-term sediment increases during initial road improvement stages as specified segments of high risk roads would be subject to temporary ground disturbance in preparation for hauling logs.

An important element common to all alternatives has been added to the Telegraph Creek Mountain Pine Beetle Salvage project. This would involve the replacement of the large ford on the Little Blackfoot River **Figure 3** associated with road # 4100 with a bridge. This would markedly mitigate the ongoing impacts from the current large ford by reducing sediment delivery to surface waters and eliminating direct instream disturbance from wheeled motorized use in TES fish habitat. In addition, there would be permanent removal of the bridge upstream of the ford associated with road # 123 (Ontario Creek Road), including removal of all road fill (and two overflow pipes) that bisects the Little Blackfoot River floodplain. This would return an area of the Little Blackfoot River floodplain back to natural functioning condition. Access to Ontario Creek would be via a new road segment that branches off from road # 4100 on the east side of the Little Blackfoot River and connects back to road # 123 avoiding the Little Blackfoot and Ontario Creek floodplains.

On the Upper Missouri River sub-basin side of the planning area, the Tenmile Road Improvement project would likely reduce sediment levels in Tenmile Creek. This project involves re-aligning several road segments, replacing three bridges and paving about six miles of county road # 695 from Hwy 12 to the community of Rimini. Therefore, this project would likely risk delivering some fine sediment into nearby Tenmile Creek in the short-term because it parallels Tenmile Creek up to the Rimini townsite and involves some instream work associated with replacing three bridges. Ground disturbance activities associated with the project would increase sediment risk until paving and re-vegetation of disturbed areas is complete. In the long-term, there would be some decreases in the amount of road sediment into nearby Tenmile Creek due to the paving of this road. This may be offset somewhat by county winter sanding operations expected for this route.

Road drainage repairs are planned on roads 136 (Ophir Cr), 314 (Elliston Cr to Spotted Dog Cr), 335 (Sweeney Cr), 571 (Dog/Hope Cr), 708 (Snowshoe Cr), 1805 (Austin Cr) and 1855 (upper Dog Cr). A total of about 54 miles of road would be re-bladed/reshaped with approximately 286 drain dips installed and 12 cattle guards cleaned of silt. One new 18 inch diameter CMP culvert is proposed at an existing crossing. These improvements would likely risk short-term sediment increases to fish habitat from initial disturbance of the road bed. There would be a long-term sediment reduction from the road bed with these drainage improvements in Upper Dog, Snowshoe Creek, Ophir Creek, Greenhorn Creek and the Little Blackfoot River-Elliston 6th field HUCs.

Effects Common to All Alternatives

The physical presence of the transportation system as it relates to high risk road segments and associated stream crossings and dispersed campsites outlined in Table 69 remain on the landscape as an ongoing (cumulative) effect regardless of any decision to administratively close or open roads. No alternative under this decision would directly eliminate or relocate the physical presence of those features from stream corridors as the Divide Travel Plan Decision includes only open or closed designations. Therefore, sediment delivery from high risk roads

remains a common element in all alternatives simply due to where and how certain road segments are hydrologically connected to the stream system. Additionally, large volumes of sediment held in storage as roadfills associated with some culverts remain at risk of being unleashed downstream into fish habitat. Where stream crossings and roads encroach on streams there would continue to be alterations of channel morphology and disruption to floodplain processes resulting in less pool frequency, less bank cover, reduced spawning gravels, higher energy gradients and partially fragmented fish habitat.

A reasonably foreseeable federal action common amongst all alternatives is additional review of roads to determine which segments on both open and closed roads are having adverse effects to inland native fish habitat prerequisite to developing a plan to minimize those effects. Such future federal action would move the Forest closer in meeting the intent of the Conservation Strategy for Bull Trout in Western Montana by cataloging road sediment sources and identifying opportunities to reduce sediment delivery.

Effects Common to All Action Alternatives

Each action alternative has the common element to either close or open a pre-determined amount of high risk roads and associated crossings and to place seasonal restrictions on some routes in the planning area. This would directly affect the nature and extent of motorized recreational use in riparian corridors and indirectly affect fish habitat (Clark and Gibbons 1991, pg 476). Opening high risk routes that are currently closed would potentially accelerate sedimentation and disturb fish habitat while closing high risk routes would have the reverse effect.

On the other hand, closing most high risk roads and associated crossings would likely result in road surfaces becoming passively re-vegetated over the long-term, thereby reducing sediment runoff into the stream system. Roads proposed for closure would also improve opportunities for future road obliteration and removal of crossings under an implementation plan that would help restore watershed function and fish habitat.

Under action alternatives 2 through 4, the proposed 300 foot language for the planning area would allow wheeled motorized travel off designated routes up to 300 feet with some restrictions intended to mitigate potential resource damage. Unless signed, wheeled motorized travel would be allowed within 300 feet of designated routes as long as:

- No new permanent routes are created;
- No damage to existing vegetation, soils or water resource occurs;
- Travel off-route does not cross streams; and
- Travel off-route does not traverse riparian or wet areas.

Without clearly defined designated routes to dispersed campsites, however, there is potential for the creation of new user-created routes and dispersed camps at public user's discretion.

Under alternative 5, dispersed camping and associated parking would be more limited to 70 feet or less from the edge of a designated route using the same restrictions (above) under the 300 foot language for action alternatives 2 through 4. In addition, vehicle travel would be limited no closer than 30 feet from streams or other bodies of water. Consequently, the potential for creation of additional user-created routes and dispersed campsites that could risk damage to streams at public users' discretion becomes substantially reduced or minimized under alternative 5. Clearly defined restrictions in this sense would help reduce confusion amongst

users how far is acceptable to travel off designated routes and what constitutes damage to vegetation, soils, or water resources.

Alternative 1, No Action

Direct and Indirect Effects

The no action alternative has the direct effect of maintaining the status quo in terms of open high risk roads and stream crossings in the planning area see Table 66 and Table 67. Currently there are 125.2 miles of high risk Forest Service roads and 329 stream crossings in the planning area. Approximately 77 percent of the Forest Service high risk roads and 66 percent of Forest Service stream crossings would remain open to wheeled motorized use. The indirect effect of no action would be continued risk for accelerated sediment delivery into the surface water system and sediment accrual into fish habitat over natural background levels due to roads.

Dispersed recreational campsites associated with the Forest Service transportation system in the planning area south of Hwy 12 totaled 46 in 2005. Nine of these dispersed campsites are located adjacent to streams: eight are on the Little Blackfoot River and one is on Ontario Creek. Surveys found these nine dispersed campsites inhibit attainment of riparian management objectives under INFISH. Lacking measures to address concentrated recreation use at each of these sites, the direct effect of the no action alternative would be continued concentrated recreation use at these nine campsites that indirectly generates observable impacts see Table 68 to stream-riparian habitat at these dispersed campsites.

Seven unimproved fords on TES fish habitat associated with the existing transportation system would also remain under this alternative. Six fords are currently open and one closed to motorized vehicle use. Four fords (three are open) occur in documented bull trout habitat and the other three open fords occur on sensitive westslope cutthroat trout streams. The direct effect of no action would be to maintain the status quo of leaving open six fords to recurring wheeled vehicle traffic. The indirect effect would be ongoing motorized vehicle disturbance to the channel at open fords, which exacerbates sediment delivery and risks direct mortality to the embryonic and fry life stages of bull trout and/or westslope cutthroat trout at those crossings.

Irreversible and Irretrievable Commitments

There would be no irreversible commitment or permanent loss of future options in regards to the existing road system. Under no action there is always the possibility for any road, closed or open, that is adversely affecting water quality, stream function, TES fish habitat or public safety, to be removed or relocated so that stream processes can be restored that would benefit water quality and fish populations. This would occur under a separate NEPA analysis.

There would be an irretrievable (temporary) commitment of resources in the matter of ongoing road sediment delivery to fish-bearing habitat due to some road locations resulting in a direct surface flow path (hydrologic connection) to planning area streams. Approximately 17.4 percent of the entire transportation system consists of Forest Service high risk roads, including associated Forest Service stream/road intersections that can cause an irretrievable commitment or temporary reduction in fish habitat quality restorable by eliminating or relocating those particular roads. High risk roads when left untreated would continue being an ongoing cumulative effect that diminishes the fish production capabilities of fish habitat within the project area.

Culverts present an ongoing risk for releases of substantial stores of sediment in the form of roadfills at culvert crossings including potential barriers to fish migration. Culverts that either have not been removed or upgraded with bridges or aquatic organisms passage-compliant structures designed to pass 100-year floods impose an irretrievable commitment upon stream-riparian dependent fisheries.

Cumulative Effects

Past, present and reasonably foreseeable future actions applicable to Divide Travel Plan project sub-watersheds are addressed in appendix B. The transportation system in the project area was excluded from this list as it is addressed in detail here and in the background discussion for fish habitat under the fisheries affected environment section above.

Table 66 and Table 67 of the affected environment section provide a quantitative overview of all the stream/road intersections and miles of high risk roads for the various 6th field HUCs (sub-watersheds) of the planning area. Each table treats these two indicators of effect by addressing them as either open or closed status per sub-watershed.

There is a total of about 719 miles of road in the planning area including National Forest System routes and routes under other ownership. About 165 miles are considered high risk roads that pose a risk for chronic excessive sediment delivery to the surface water system, fragment stream habitat and/or alter stream-floodplain functions. The Forest Service maintains jurisdiction on about 125.2 miles of the high risk roads and 29.24 miles (23 percent) of these are closed under the no action alternative. Non- Forest Service roads account for the remaining 39.5 miles of high risk roads; these roads represent an ongoing cumulative effect to the surface water system in the planning area outside Forest Service management.

There are also currently 439 stream/road intersections (crossings) in the planning area. The Forest Service has jurisdiction on about 329 crossings and 112 Forest Service crossings (33 percent) are closed under the no action alternative. Stream crossings are principal access sites for road sediment into the stream system. Due to their presence in the various planning area drainages, chronic road sediment delivery and physical alteration of stream habitat would remain an ongoing cumulative effect on fisheries habitat in the planning area.

Additionally, Forest Service dispersed recreation campsites and fords open to public access contribute to ongoing cumulative effects under this alternative. Nine dispersed campsites are directly adjacent to TES fish habitat and six open fords occur on TES fishery streams that risk chronic disturbance of the streambed from direct motorized wheeled vehicle use and potentially direct mortality of incubating trout eggs and fry. A seventh ford located in Ontario Creek is currently closed to wheeled motorized traffic.

In non-fish-bearing streams, a ford occurs on an unnamed tributary to the Little Blackfoot River above Kading campground. This ford does not directly risk mortality to salmonid embryos and fry, but provides an avenue for chronic sediment delivery into inland native fish habitat in nearby Little Blackfoot River.

An important project common amongst all alternatives is currently under consideration for funding to help improve access needs prerequisite to the foreseeable Telegraph Creek Mountain Pine Beetle Salvage project. This project would replace the large ford on the Little Blackfoot River with a bridge associated with road # 4100 (Negro Mountain Road). Consequently, there would be the permanent removal of 0.1 mile of high risk road and three other stream crossings in TES fish habitat. There would also be foreseeable future direction under a biological opinion

for bull trout to determine which segments of roads are having adverse effects to inland native fish habitat prerequisite to developing a plan to eliminate or minimize those impacts.

Forest Plan Consistency

Numerous road segments and crossings that have risks to inland native fish and fish habitat are quantified under Table 66 and Table 67 and would continue to remain open under the no action alternative. Even with future reviews on roads having adverse effects to streams to help determine what actions are needed to avoid adverse effects on native fish and habitat, the no action alternative results in the slowest pace in meeting the Forest Plan INFISH amendment for avoiding adverse effects on fisheries. This is because no action closes no roads and crossings that are impacting fish habitat as a tool considered very effective at removing sediment sources in the long-term.

A reasonably foreseeable federal action under this alternative (and other action alternatives) is additional review of roads to determine which segments on both open and closed roads are having adverse effects to inland native fish habitat prerequisite to developing a plan to minimize those impacts. This future federal action moves the Forest closer in meeting the intent of avoiding adverse effects to inland native fish and fish habitat.

Alternative 2

Direct and Indirect Effects

Alternative 2 would have the direct effect of closing a net additional 5.89 miles (4.7 percent) of Forest Service high risk roads to motorized wheeled vehicle use from the current status. Table 72 summarizes the changes in the miles of open high risk roads for each 6th field HUC in the planning area. Ten sub-watersheds would experience a reduction in open high risk roads; therefore, these same sub-watersheds would potentially experience varying reductions in long-term road sediment delivery as an indirect effect of closing some segments of high risk roads. In addition, there would likely be increased opportunities to obliterate roadbeds to restore natural drainage and stream habitat especially in those drainages that would experience half-a-mile or more of high risk roads being closed. Nine sub-watersheds would experience no change from the current miles of open high risk roads so the indirect effect for these drainages (see Table 72) reflects the no action alternative in terms of road sediment delivery risk. The 0.02 mile of road in the Little Blackfoot-Hat 6th HUC for this exercise is not likely a sediment risk based on its short distance and upper location in the INFISH zone and lack of crossings. The small number may also relate to GIS mapping inconsistencies

Four sub-watersheds west of the Divide would undergo a net increase in open high risk roads from their current levels as a direct effect of this alternative (see Table 72). These include Ontario Creek, Mike Renig Gulch and the Elliston sub-watershed portion of the Little Blackfoot River drainage. The Hat Creek sub-watershed portion of the Little Blackfoot River drainage also experiences some minor increase in open high risk roads; however, the 0.02 miles as show in the table probably relate more to a GIS mapping error so this sub-watershed likely experiences no change from the current open status of high risk roads. The increased miles of open high risk roads are a mainly a result of proposals to open closed road # 4104-A1 in Ontario Creek; road # 1856 in the Mike Renig drainage; and roads 314-A1 and 314-E1 in Elliston Creek.

The indirect effect of opening these high risk roads to wheeled motorized use relates to increasing risk of sediment production and delivery to streams that can impact trout

reproduction. Road traffic is recognized to increase production of road sediment ranging from two to 30 times the sediment production compared to roads without traffic (Luce and Black 2001, pg 1). Surface rutting resulting from repeat traffic was reported to increase sediment production 200 to 500 percent in contrast to unrutted roads (Burroughs and King 1989, pg 1; Kennedy 1997). Foltz (1999, pg 3) reported 96 percent to 99 percent of the sediment generated from road surfaces of high to marginal aggregate surface quality was less than 6 millimeters in diameter. A major concern for fisheries management is the accrual of excess sediment less than 6.4 millimeters in size into salmonid spawning and rearing habitat. Waters (1995, pgs 86-109) provides an overview of research on sediment that show most reductions in egg-embryo success result when sediment particles of 0.83 millimeters and smaller occur in redds in proportions of about 15 percent or higher. Fry mortality increases as larger sediment particles (3 to 6 millimeters in size) increase in overlying strata.

Table 72 - Miles and Net Changes of Open High Risk Roads by Watershed

6th Field HUC	Alt 1	Alt 2	Net change
Upper Tenmile Cr	7.76	7.70	-0.06
Middle Tenmile Cr	3.73	3.52	-0.21
Lower Tenmile Cr	1.10	1.10	0
Greenhorn Cr	4.18	1.35	-2.83
Skelly G	1.29	0.27	-1.02
Upper Silver Cr	0.56	0	-0.56
Iron Horse Cr	2.27	2.27	0
Ontario Cr	6.20	7.06	+0.86
L.Blackfoot-Larabee	8.71	7.58	-1.13
Telegraph Cr	11.75	11.67	-0.08
Mike Renig Cr	0.21	2.18	+1.97
Upper Dog Cr (N)	13.48	10.07	-3.41
Lower Dog Cr	2.11	1.98	-0.13
L.Blackfoot-Hat Cr	8.42	8.44	+0.02
North Trout Cr	4.62	4.62	0
Snowshoe Cr	4.87	4.39	-0.48
L.Blackfoot-Elliston	2.90	4.07	+1.17
Carpenter Cr	2.71	2.71	0
Trout Cr	3.52	3.52	0
So.Fork Dog Cr	0.81	0.81	0
Upper Dog Cr (S)	4.76	4.76	0
Threemile Cr	0	0	0
Total:	95.96	90.07	-5.89

Table 73 - Numbers and Net Change of Open Stream/Road Intersections by Watershed

6th Field HUC	Alt 1	Alt 2	Net change
Upper Tenmile Cr	20	20	0
Middle Tenmile Cr	12	13	+1
Lower Tenmile Cr	2	2	0
Greenhorn Cr	9	2	-7
Skelly G	2	1	-1
Upper Silver Cr	1	0	-1
Iron Horse Cr	6	6	0
Ontario Cr	20	25	+5
L.Blackfoot-Larabee	11	9	-2
Telegraph Cr	32	35	+3
Mike Renig Cr	1	3	+2
Upper Dog Cr (N)	38	34	-4
Lower Dog Cr	10	9	-1
L.Blackfoot-Hat Cr	4	4	0
North Trout Cr	16	16	0
Snowshoe Cr	14	11	-3
L.Blackfoot-Elliston	4	6	+2
Carpenter Cr	6	6	0
Trout Cr	1	1	0
So.Fork Dog Cr	1	1	0
Upper Dog Cr (S)	7	7	0
Threemile Cr	0	0	0
Total:	217	211	-6

Alternative 2 also has the direct effect of closing six more stream crossings to motorized wheeled vehicle use in the planning area from the current status (alternative 1). Table 73 summarizes the changes in the amount of open stream route intersections for each sub-watershed. Ten sub-watersheds would experience no change in the current open status of stream crossings so the indirect effect in these drainages reflects the no action alternative in terms of sediment risk and opportunity in improving drainage. Seven sub-watersheds would experience varying reductions in open stream crossings; therefore, an indirect effect would be the potential for variable reductions in long-term road sediment delivery in these drainages with increased opportunities to remove crossing structures for restoring natural drainage and stream habitat.

Five sub-watersheds (one east of the Divide and four west of the Divide) would experience increases in crossings open to wheeled motorized vehicle use from their current levels as a direct effect of this alternative (see Table 73). These include Middle Tenmile Creek (east of the Divide), Ontario Creek, Telegraph Creek, Mike Renig Gulch and the Elliston sub-watershed portion of the Little Blackfoot River drainage. The additional open crossings are the result of proposals to open closed road # 4104-A1/A2 in Ontario Creek; road #1856 in the Mike Renig drainage; and roads 314-A1 and 314-E1 in Elliston Creek. East of the Divide two stream crossings that would be opened to wheeled motorized vehicle use are associated with opening road # 335-A in Sweeney Creek to wheeled motorized traffic.

The indirect effects of opening these closed crossings to wheeled motorized use relates to increased risk for sediment production and delivery to streams including establishment of new dispersed camps in the riparian area.

Effects of Alternative 2 Specific to Occupied Bull Trout Habitat and Westslope Cutthroat Trout Habitat:

Seven fords are located on streams supporting westslope cutthroat trout and four of these occur in habitat that also supports listed bull trout. A direct effect of alternative 2 would be the closing of all four fords in bull trout occupied habitat to wheeled motorized traffic. One ford (non-system road 123-013) would be permanently closed and three other fords (roads 4100, 227-D1, 4104-A1/A2) temporarily closed until a bridge or other bottomless aquatic organism passage (AOP) compliant structure would be installed under a mitigation plan that protects native aquatic species. This therefore helps reduce risk for direct mortality to the early life history stages of bull trout and westslope cutthroat trout in Ontario Creek and the Little Blackfoot River. In upper Ontario Creek the ford (road 4104-A1/A2) in bull trout habitat is currently closed but would be opened seasonally (from May 16th to October 14th) under this alternative. To protect instream habitat and early life stages of native trout, this ford would remain closed until a bridge or other bottomless structure could be installed in its place. Risk for direct mortality to bull trout in the Little Blackfoot River or Ontario Creek is considered to be very low currently due to their extremely low numbers as observed and documented in the latest electrofishing surveys between 2008 and 2012 by Forest Service and Montana Fish, Wildlife and Parks fisheries crews.

The balance of open fords on fish-bearing streams occurs in westslope cutthroat trout habitat in Skelly Gulch east of the Divide (road 1853-A1), Sawmill Gulch (road 4005) and an unnamed tributary to Ontario Creek (road 495-D1). Because of its high importance to westslope cutthroat trout conservation east of the Divide, the ford (and its associated high risk road) on Skelly Gulch would be closed. The direct effect therefore would be the elimination of wheeled motorized traffic in westslope cutthroat trout habitat in upper Skelly Gulch, which is documented as spawning habitat for that population. The indirect effect would be the reduction of chronic sediment delivery into westslope cutthroat trout habitat and the protection of incubating westslope cutthroat trout embryo and fry from direct mortality due to wheeled motorized traffic through the stream at ford crossing. In Sawmill Gulch and the unnamed Ontario tributary, proposed mitigation to protect westslope cutthroat trout would be to close the crossings until an approved aquatic organism passage compliant structure sized to pass 100-year flood flows could be installed. This would have the indirect effect of protecting westslope cutthroat trout from potential direct mortality from wheeled motorized traffic through the creek bed.

Four dispersed campsites accessed by non-system road 123-013 would be closed as a direct effect of closing road 123-013 under this alternative. This would eliminate concentrated recreation activity along 0.25 miles of the Little Blackfoot River associated with the dispersed campsites and have the indirect effect of passive re-vegetation on disturbed ground along this segment of the Little Blackfoot River.

Three sub-watersheds that have a net increase of both high risk roads and stream crossings open in TES fish habitat are Ontario Creek, Mike Renig Gulch and Little Blackfoot River-Elliston. However, in the Little Blackfoot River-Larabee, road 227-E1, which extends about 0.9 mile beyond Kading campground, would remain open to wheeled motorized vehicles seasonally from May 15th to October 14th. Approximately 0.6 miles of high risk road, one ford crossing on a fishless tributary and two high risk dispersed campsites associated with the road would be open. Keeping this route open would have a direct effect for potential adverse effects on inland native fish habitat.

In the Little Blackfoot-Elliston HUC, the direct effect of this alternative would be opening over one mile of high risk road including two crossings on Elliston Creek and indirectly increasing the risk for sediment delivery into westslope cutthroat trout habitat. In Telegraph Creek, opening roads 1857-D1 and 1857-D2 to wheeled motorized use would have the direct effect of allowing wheeled motorized use on currently closed segments of road having three stream crossings. The indirect effect of this decision relates to increased risk for sediment delivery into westslope cutthroat trout habitat in Booth Gulch.

With these exceptions, the overall direct effect on westslope cutthroat trout drainages in the planning area would be the elimination of wheeled motorized traffic travel on 1.02 miles of high risk road in westslope cutthroat trout habitat east of the Divide and approximately 5.23 miles of high risk road in westslope cutthroat trout drainages west of the Divide. The westslope cutthroat trout drainage east of the Divide that would benefit is Skelly Gulch where approximately one mile of high risk road and an active ford would be closed as a direct effect of this alternative. Greenhorn Creek is doubtful whether it still supports any westslope cutthroat trout based on extensive surveys by Forest Service and Montana Fish, Wildlife and Parks fisheries crews in 2009 to 2012. This drainage would experience the direct effect of having 2.8 miles of high risk road including seven more stream crossings closed to wheeled motorized traffic. The indirect effect of these closures on fish habitat in the planning area is the long-term trend of reduced sedimentation into the surface water system for ten sub-watersheds that support fish populations; six of these support westslope cutthroat trout.

Effects of Alternative 2 Specific to Western Pearlshell Mussel Habitat

Western pearlshell mussels do not occur in the Little Blackfoot River or its tributaries in the planning area. Additionally, with the exception of Tenmile Creek (east of the Divide) below the confluence of Walker Creek, no stream reaches have been designated as predicted western pearlshell habitat based on surveys by Stagliano (2010). The Divide Travel Plan area therefore is not likely to impact western pearlshell mussels or habitat in or downstream of the project area west of the Divide.

In the fisheries analysis, increased excess sedimentation was discussed as an environmental stressor most probable to adversely affect salmonids from open roads and crossings. Increased sedimentation is also one of the stressors of concern to western pearlshell mussels (Box and Mossa 1999). Research has found that eliminating ongoing vehicular disturbance on existing roads reduces the amount of sediment delivered to streams from those routes. Sediment yields

from the project area transportation system are unlikely to increase because there would be no increases in the amount of high risk roads and crossings open to wheeled motorized vehicle use in the Upper Tenmile 6th HUC. The single crossing in Middle Tenmile Creek opened under this alternative is remotely located from predicted pearlshell mussel habitat in lower Tenmile Creek and lacks connectivity to lower stream reaches of Tenmile Creek.

Irreversible and Irretrievable Commitments

There would be no irreversible commitment or permanent loss of future options in regards to the existing road system under alternative 2. There is always the possibility for any Forest Service road, closed or open, that is adversely affecting water quality, stream function, TES fish habitat or public safety, to be removed or relocated so that stream processes can be restored that benefit water quality and fish habitat. This would occur on a separate NEPA analysis.

There would be an irretrievable (temporary) commitment of resources in the matter of ongoing road sediment delivery to fish-bearing habitat due to some road locations resulting in a direct surface flow path (hydrologic connection) to planning area streams. Approximately 17.4 percent of the entire transportation system consists of Forest Service high risk roads including associated Forest Service stream/road intersections that can cause an irretrievable commitment or temporary loss of fish habitat quality restorable by eliminating or relocating those particular roads or applying some other adjustment measures on the roads. High risk roads when left untreated would continue being an ongoing cumulative effect that decreases the overall fish-production capabilities of fish habitat within the project area.

Under-designed culverts present an ongoing risk for releases of substantial stores of sediment in the form of roadfills at culvert crossings and potential barriers to fish migration. Culverts at risk that have not been removed or upgraded with aquatic organism passage -compliant ones designed to pass 100-year floods impose an irretrievable commitment upon stream-riparian dependent fisheries.

Cumulative Effects

Past, present and reasonably foreseeable future non-road actions applicable to the Divide Travel Plan project area are addressed in appendix B. The transportation system was not included in that list as it is addressed in detail in this report. Table 72 and Table 73 in the affected environment section provide a quantitative overview of all stream/road intersections and miles of high risk roads in each 6th field HUC as an ongoing effect from the transportation system in the Divide Travel Plan area. Both tables further refine the two road measures by outlining the amounts currently open versus closed for each sub-watershed.

There are approximately 719 miles of road in the planning area including National Forest System (NFS) routes and routes under other ownership. About 165 miles are considered high risk roads that pose a risk for chronic excessive sediment delivery to the surface water system, fragment stream habitat and/or alter stream-floodplain functions. The Forest Service maintains jurisdiction on about 125.2 miles of high risk roads and 95.96 miles are currently open (29.24 miles closed). Under alternative 2, about 90.07 miles of high risk Forest Service roads would remain open and the other 35.13 miles (29.24 miles currently closed plus 5.89 proposed miles) or 28 percent would be closed to wheeled motorized vehicle use. Non- Forest Service roads account for 39.5 miles of high risk roads; these roads represent an ongoing cumulative effect to the surface water system in the planning area outside of Forest Service management.

There are also currently 439 stream/road intersections (crossings) in the planning area. The Forest Service has jurisdiction on 329 crossings and 217 crossings are currently open (112

closed). Alternative 2 would result in 211 crossings remaining open to motorized use and the other 118 (112 currently closed plus 6 proposed) crossings or 35.9 percent would be closed to wheeled motorized vehicle use. Because stream crossings are principal access sites for road sediment into the stream system and localized physical alteration of stream habitat, their presence in the various planning area drainages would remain an ongoing cumulative impact on fish habitat in the planning area. Closing six crossings under this alternative represents less than 2 percent of the total stream crossings in the planning area with potential for permanent removal.

Additionally, nine Forest Service dispersed campsites are directly adjacent TES fish habitat, but wheeled motorized access to four of these campsites would close under this alternative. The other five dispersed campsites would remain open to public users with risk for ongoing adverse effects to TES fish habitat without effective adjustment measures to meet riparian management objectives in riparian habitat conservation areas. Six open fords on TES fish streams would experience permanent or temporary closures to reduce exacerbating sediment delivery to fish habitat and risk of direct mortality to westslope cutthroat trout and bull trout. A seventh ford currently closed in Ontario Creek would remain closed to wheeled motorized traffic until a bridge or other bottomless structure replaces it under an implementation plan. The physical presence of these fords would continue as a risk for chronic sediment delivery to TES fish habitat until measures under an implementation plan could replace the fords or rehabilitate crossings proposed for closure in this alternative.

In non-fish-bearing streams, the ford on an unnamed tributary to the Little Blackfoot River above Kading campground remains open so would continue to be a source of chronic sediment delivery into inland native fish habitat in nearby Little Blackfoot River. However, there would be no risk for direct fish mortality from motorized vehicle traffic through this ford crossing.

An important project common amongst all alternatives is currently under consideration for funding to help improve access needs prerequisite to the foreseeable Telegraph Creek Mountain Pine Beetle Salvage project. This project would replace the large ford on the Little Blackfoot River with a bridge associated with road # 4100 (Negro Mountain Road). Consequently, there would be the permanent removal of 0.1 mile of high risk road and three other stream crossings in TES fish habitat. There would also be foreseeable future direction under a biological opinion for bull trout to determine which segments of roads are having adverse effects to inland native fish habitat prerequisite to developing a plan to eliminate or minimize those impacts.

Forest Plan Consistency

Numerous roads and crossings that have risks to inland native fish and fish habitat were quantified under Table 66 and Table 67, which would continue to remain open under alternative 2. Alternative 2 would, however, result in closing a net 5.89 miles of Forest Service high risk roads including six stream crossings that are having some adverse effects on native fishes and fish habitat. Hence, this alternative would incrementally move the Forest forward in helping meet the intent of the Forest Plan amendment compared to the no action alternative. There is some tradeoff in that a few currently closed roads and crossings would be opened to wheeled motorized use under this alternative potentially increasing risk for adverse effects to native fishes and fish habitat. To maintain consistency with the Forest Plan, an element common to all action alternatives is that opened fords on TES fish habitat would be closed to wheeled motorized vehicles until appropriate mitigation measures are in place that minimize or

eliminate ongoing adverse effects from high risk roads and wheeled motorized use through fords.

Additionally, a reasonably foreseeable federal action under this alternative (and other alternatives) is further review of roads to confirm which segments on both open and closed motorized routes are having adverse effects to inland native fish habitat. This would be required particularly west of the Divide in order to develop a plan to minimize or eliminate those effects from roads. This future federal action helps meet the intent of INFISH amendments by identifying specific roads and needed actions to avoid adverse effects to inland native fish and fish habitat.

Alternative 3

Direct and Indirect Effects

Alternative 3 would have the direct effect of closing an additional 21.17 miles (16.9 percent) of Forest Service high risk roads currently open to motorized wheeled vehicle use in the planning area. Table 74 summarizes the changes in the amount of open high risk roads for each 6th field HUC. Fourteen sub-watersheds would experience reductions in miles of open high risk roads; therefore, an indirect effect for these sub-watersheds would be the potential for long-term reductions in sediment delivery to streams in these drainages with increased opportunities to obliterate roadbeds to help restore natural drainage and stream habitat. Eight sub-watersheds would experience no change in the miles of high risk roads currently open to motorized traffic so the indirect effect for those drainages reflects the no action option in terms of sediment delivery and opportunities for watershed restoration. The 0.05 mile of road in the Little Blackfoot-Elliston 6th HUC is not likely a sediment risk based on its short length and upper location in the INFISH zone and lack of crossings. This sub-watershed is therefore judged having virtually no change in its open high risk roads.

Alternative 3 would also have the direct effect of closing 46 more Forest Service stream/road intersections (crossings) to wheeled motorized vehicle use in the planning area from the current status (alternative 1). Table 75 summarizes the changes in the amount of open crossings by sub-watershed. Thirteen drainages would realize a reduction in open stream crossings to wheeled motorized vehicle use with an indirect effect for potential long-term decreases in sediment delivery and increased opportunities at removing culverts that restore natural drainage and stream habitat. Nine sub-watersheds would experience no change in the current open status of stream crossings; the indirect effect in these drainages reflects the no action alternative in terms of sediment risk and opportunity at restoring drainage. Unlike the other action alternatives, no drainages in the planning area would experience any increase in open high risk roads or stream crossings.

Table 74 - Miles and Net Changes of Open High Risk Roads by Watershed

6th Field HUC	Alt 1	Alt 3	Net change
Upper Tenmile Cr	7.76	7.70	-0.06
Middle Tenmile Cr	3.73	0.96	-2.77
Lower Tenmile Cr	1.10	0.07	-1.03
Greenhorn Cr	4.18	1.35	-2.83
Skelly G	1.29	0.27	-1.02
Upper Silver Cr	0.56	0	-0.56
Iron Horse Cr	2.27	2.27	0
Ontario Cr	6.20	6.20	0
L.Blackfoot-Larabee	8.71	5.57	-3.14
Telegraph Cr	11.75	10.80	-0.95
Mike Renig Cr	0.21	0.21	0
Upper Dog Cr (N)	13.48	10.07	-3.41
Lower Dog Cr	2.11	1.98	-0.13
L.Blackfoot-Hat Cr	8.42	6.45	-1.97
North Trout Cr	4.62	4.62	0
Snowshoe Cr	4.87	4.39	-0.48
L.Blackfoot-Elliston	2.90	2.95	+0.05
Carpenter Cr	2.71	2.71	0
Trout Cr	3.52	3.52	0
So.Fork Dog Cr	0.81	0	-0.81
Upper Dog Cr (S)	4.76	2.70	-2.06
Threemile Cr	0	0	0
Total:	95.96	74.79	-21.17

Table 75 - Numbers and Net Change of Open Stream/Road Intersections by Watershed

6th Field HUC	Alt 1	Alt 3	Net change
Upper Tenmile Cr	20	20	0
Middle Tenmile Cr	12	2	-10
Lower Tenmile Cr	2	0	-2
Greenhorn Cr	9	2	-7
Skelly G	2	1	-1
Upper Silver Cr	1	0	-1
Iron Horse Cr	6	6	0
Ontario Cr	20	20	0
L.Blackfoot-Larabee	11	6	-5
Telegraph Cr	32	28	-4
Mike Renig Cr	1	1	0
Upper Dog Cr (N)	38	34	-4
Lower Dog Cr	10	9	-1
L.Blackfoot-Hat Cr	4	2	-2
North Trout Cr	16	16	0
Snowshoe Cr	14	11	-3
L.Blackfoot-Elliston	4	4	0
Carpenter Cr	6	6	0
Trout Cr	1	1	0
So.Fork Dog Cr	1	0	-1
Upper Dog Cr (S)	7	2	-5
Threemile Cr	0	0	0
Total:	217	171	-46

In effect, Alternative 3 closes over 15 miles more high risk roads and 40 more crossings to wheeled motorized vehicle traffic compared to alternative 2. Therefore, compared to alternative 2 it has the potential to amplify reductions in sediment production and delivery to streams in sub-watersheds showing net reductions in these indicators. There would also be more opportunity to obliterate and restore drainage than alternative 2. Research has demonstrated how minimizing or eliminating motorized use over roads and crossings substantially reduces road sediment delivery to streams (Luce and Black 2001, pg 1; Burroughs and King 1989, pg 1; Kennedy 1997; Foltz 1999). Waters (1995, pgs 86-109) provides an overview of research on sediment that show most reductions in egg-embryo success result when sediment particles of 0.83 millimeter and smaller occur in redds in proportions of about

15 percent or higher and fry mortality increases as larger sediment particles (3 to 6 millimeters in size) collect in the overlying strata. Alternative 3 would help minimize long-term sediment delivery to fish habitat in the planning area because this option provides for the second highest miles of high risk roads and stream crossings (after alternative 5) that could potentially be obliterated or removed respectively to restore natural drainage and eliminate sources of chronic sediment delivery in 14 sub-watersheds.

Effects of Alternative 3 Specific to Occupied Bull Trout Habitat and Westslope Cutthroat Trout Habitat:

The overall direct effect on westslope cutthroat trout drainages in the planning area would be the elimination of wheeled motorized traffic travel on about one mile of high risk road in one westslope cutthroat trout drainage east of the Divide and approximately 12.95 miles of high risk roads in eight westslope cutthroat trout drainages west of the Divide. Skelly Gulch is the westslope cutthroat trout drainage on the east side that would benefit from closing approximately 0.4 miles of hydrologically connected road and an active ford in westslope cutthroat trout habitat. Another east-side drainage, Greenhorn Creek, is doubtful whether it still supports any westslope cutthroat trout based on the latest findings by Forest Service and Montana Fish, Wildlife and Parks fisheries crews in 2009 to 2012. This drainage would experience approximately 2.8 miles of high risk roads and seven stream crossings being closed to wheeled motorized traffic. The indirect effect on westslope cutthroat trout habitat in the planning area translates to a long-term trend of reduced sedimentation into the surface water system in 14 sub-watersheds that support fish populations; nine of these support westslope cutthroat trout.

Other direct effects from alternative 3 relate to fords and dispersed campsites tied to existing open high risk roads. Under this alternative four fords (roads 4100, 227-D1, 4104-A1/A2, 123-013) in documented bull trout habitat would be closed to wheeled motorized vehicle use. This would eliminate risk for direct mortality to the early life history stages of bull trout and westslope cutthroat trout in Ontario Creek and the Little Blackfoot River from wheeled motorized vehicle traffic through fords. In addition, a ford crossing (road 227-E1) on a fishless tributary above Kading campground would be closed permanently. In upper Ontario Creek the ford (road 4104-A2) in bull trout habitat is currently closed and would remain permanently closed. Therefore, the risk for direct mortality to bull trout and westslope cutthroat trout in the Little Blackfoot River and Ontario Creek as a function of wheeled motorized traffic through fords would be discountable under this alternative. Due to extremely low numbers of bull trout observed and documented in the latest Forest Service and Montana Fish, Wildlife and Parks electrofishing surveys from 2008 to 2012, risk of mortality to bull trout from wheeled motorized vehicle traffic in the Little Blackfoot River and Ontario Creek is considered to be very low.

Three other open fords occur in westslope cutthroat trout habitat and each are located in Skelly Gulch east of the Divide (road 1853-A1) and in Sawmill Gulch (road 4005) and an unnamed tributary to Ontario Creek (road 495-D1) west of the Divide. As discussed above, a ford (and its associated high risk road) on Skelly Gulch would be permanently closed having the direct effect of eliminating wheeled motorized traffic through westslope cutthroat trout habitat including a hydrologically connected segment of road 1853-A1. The indirect effect would be the minimization of chronic road sediment delivery into westslope cutthroat trout habitat and protection of incubating westslope cutthroat trout embryos and fry at risk from wheeled motorized traffic through the streambed. In Sawmill Gulch and the unnamed Ontario tributary, proposed mitigation to protect westslope cutthroat trout would be the temporary closing of the

two fords until an approved aquatic organism passage compliant structure sized to pass 100-year flood flows could be installed. This would have the indirect effect of preventing potential direct mortality of westslope cutthroat trout fry and eggs and reduce sedimentation from direct wheeled motorized traffic through the creek bed.

Four dispersed campsites all accessed by non-system road 123-013 and two other dispersed campsites accessed by road 227-E1 (the extension beyond Kading campground) would be closed as a direct effect of closing these roads. Alternative 3 would also close the Larabee ford and the large ford on road 4100 including 1.4 miles of road 4100. The direct effect would be the cessation of the concentrated recreation activity along the banks of the Little Blackfoot River next to these six dispersed campsites and an indirect effect of passive re-vegetation on disturbed ground adjacent the Little Blackfoot River. Projects to fully accomplish road and crossing closures would follow in a separate implementation plan for this planning area.

Effects of Alternative 3 Specific to Western Pearlshell Mussel Habitat

Effects of alternative 3 on western pearlshell mussels or habitat match those under alternative 2 based on the rationale that discusses potential affects to western pearlshell mussels.

Irreversible and Irretrievable Commitments

There would be no irreversible commitment or permanent loss of future options in regards to the existing road system under alternative 3. There is always the possibility for any Forest Service road, closed or open, that is adversely affecting water quality, stream function, TES fish habitat or public safety, to be removed or relocated so that stream processes can be restored benefiting water quality and fish habitat. This would occur under a separate NEPA analysis.

There would be an irretrievable (temporary) commitment of resources in the matter of ongoing road sediment delivery to fish-bearing habitat due to some road locations resulting in a direct surface flow path (hydrologic connection) to planning area streams. Approximately 17.4 percent of the entire transportation system consists of Forest Service high risk roads including associated Forest Service stream/road intersections that can cause an irretrievable commitment or temporary loss of fish habitat quality restorable by eliminating or relocating those particular roads or applying some other adjustment measures on the roads that protect and restore aquatic habitats. High risk roads where left untreated would continue being an ongoing cumulative effect that decreases the overall fish-production capabilities of fish habitat within the planning area.

Under-designed culverts present an ongoing risk for releases of substantial stores of sediment in the form of roadfills at culvert crossings and they pose potential barriers to fish migration. Culverts at risk that have not been removed or upgraded with aquatic organism passage compliant ones designed to pass 100-year floods present an irretrievable commitment upon stream-riparian dependent fisheries.

Cumulative Effects

Past, present and reasonably foreseeable future non-road actions applicable to the Divide Travel Plan area are addressed in appendix B. The transportation system was not included in the list in appendix B as it is addressed in detail within this report. Table 66 and Table 67 in the affected environment section provide a quantitative overview of all stream/road intersections and miles of high risk roads in each 6th field HUC as a measure of ongoing effects related to the transportation system in the Divide Travel Plan area. Both tables refine the two road measures by outlining the amounts currently open versus closed for each sub-watershed.

There are 719 miles of road in the planning area including NFS routes and routes under other ownership. About 165 miles are considered high risk roads that present a risk for chronic excess sediment delivery to the surface water system, fragment stream habitat and/or alter stream-floodplain functions. The Forest Service maintains jurisdiction over 125.2 miles of high risk roads and 95.96 miles are currently open (29.24 miles closed). Under action alternative 3, about 74.79 miles of high risk Forest Service roads would remain open and the other 50.41 miles (29.24 miles currently closed plus 21.17 proposed miles) or 40.2 percent would be closed to wheeled motorized vehicle use. Non- Forest Service roads account for 39.5 miles of high risk roads in the planning area; these roads represent an ongoing cumulative effect to the surface water system in the planning area.

There are in addition some 439 stream/road intersections (crossings) throughout the planning area. The Forest Service has jurisdiction on 329 crossings and 217 crossings are currently open (112 are closed). Alternative 3 would result in 171 crossings remaining open to motorized use and the other 158 (112 currently closed plus 46 proposed closed) or 48 percent would be closed to wheeled motorized vehicle use. Because stream crossings are principal access sites for road sediment into the stream system with localized physical alteration of stream habitat, their presence in the various planning area drainages would remain an ongoing cumulative impact on fish habitat in the planning area. Closing 46 crossings under this alternative represents about 10.5 percent of the total stream crossings in the planning area with potential for permanent removal. Permanent removal of closed crossings and mitigating open crossings would substantially reduce ongoing adverse effects on fish habitat under an implementation plan that would follow this decision.

Additionally, nine, Forest Service, dispersed campsites associated with high risk roads are directly adjacent TES fish habitat and six of these would close under this alternative. These sites are predicted to trend toward pre-disturbance conditions. The other three dispersed recreation campsites would remain open to public users with likely adverse effects to TES fish habitat without effective adjustment measures to meet riparian management objectives in riparian habitat conservation areas.

Six currently open fords on TES fish streams would experience permanent or temporary closures that reduce risk of direct mortality to early life stages of westslope cutthroat trout and bull trout. A seventh ford located in Ontario Creek would remain closed as is to wheeled motorized traffic. The physical presence of these fords would remain an ongoing risk for sediment delivery to TES fish habitat until measures under an implementation plan would replace fords with bottomless structures on roads planned to be open or rehabilitate those proposed for closure in this alternative. In non-fish-bearing streams, a ford on an unnamed tributary to the Little Blackfoot River above Kading campground would be closed to wheeled motorized vehicle traffic favoring a long-term trend for eliminating or minimizing road sediment delivery into inland native fish habitat downstream from the ford.

An important project common amongst all alternatives is currently under consideration for funding to help improve access needs prerequisite to the foreseeable Telegraph Creek Mountain Pine Beetle Salvage project. This project would replace the large ford on the Little Blackfoot River with a bridge associated with road # 4100 (Negro Mountain Road). Consequently, there would be the permanent removal of 0.1 mile of high risk road and three other stream crossings in TES fish habitat. There would also be foreseeable future direction under a biological opinion for bull trout to determine which segments of roads are having adverse effects to inland native fish habitat prerequisite to developing a plan to eliminate or minimize those impacts.

Forest Plan Consistency

Roads and crossings having risk to inland native fish and fish habitat were quantified under Table 66 and Table 67. Under alternative 3, approximately 21.17 added miles Forest Service high risk roads and 46 Forest Service stream crossings having risk upon native fish and habitat would be closed. This alternative leaves the least amount of high risk roads and crossings open that may have adverse effects to native fishes and fish habitat after alternative 5 and therefore, moves the project area forward at the next most rapid pace for fully meeting the intent of the INFISH amendments. To help maintain consistency with the Forest Plan, an element common amongst action alternatives is that opened fords in TES fish habitat would be closed to wheeled motorized vehicles until appropriate mitigation measures are in place to minimize or eliminate ongoing adverse effects from high risk roads and wheeled motorized use through fords.

Additionally, a reasonably foreseeable federal action under this alternative (and other action alternatives) is further review of roads to confirm what segments on both open and closed motorized routes are having adverse effects on inland native fish habitat. This would be required particularly west of the Divide to develop a plan to minimize or eliminate those road effects. This future federal action helps to meet the intent of INFISH amendments by identifying specific roads and needed actions to avoid adverse road effects to inland native fish and fish habitat.

Alternative 4

Direct and Indirect Effects

Alternative 4 would have the direct effect of closing an additional 17.82 miles (14.2 percent) of Forest Service high risk roads currently open to motorized wheeled vehicle use in the planning area. Table 76 summarizes changes in the miles of open high risk roads for each 6th field HUC. Fifteen sub-watersheds would experience various reductions in miles of open high risk roads; therefore an indirect effect for those sub-watersheds is the potential for long-term reductions in road sediment delivery in these drainages with increased opportunities to obliterate roadbeds to help restore natural drainage and stream habitat. Six sub-watersheds would experience no change in the miles of high risk roads currently open to motorized traffic so the indirect effect in these drainages reflects the no action option in terms of sediment delivery and opportunities for watershed restoration. The 0.05 mile of road in the Little Blackfoot-Elliston 6th HUC is an unlikely sediment risk based on its short length and upper location in the INFISH zone and lack of any crossings. This sub-watershed is therefore considered having virtually no substantive change from existing conditions.

Alternative 4 also has the direct effect of closing 37 more Forest Service stream crossings to motorized wheeled motorized vehicle use in the planning area compared with alternative 1. Table 77 summarizes the changes in amount of open stream crossings in each sub-watershed. Thirteen drainages would realize a reduction in open stream crossings to wheeled motorized vehicle traffic with an indirect effect for potential reductions in long-term sediment delivery and increased opportunities at removing culverts to help restore natural drainage and stream habitat. Eight sub-watersheds would experience no change in the current numbers of open stream crossings to motorized vehicle traffic so the indirect effect in these drainages reflects the no action alternative in terms of sediment risk and opportunity at restoring drainages.

Table 76 - Miles and Net Changes of Open High Risk Roads by Watershed

6th Field HUC	Alt 1	Alt 4	Net change
Upper Tenmile Cr	7.76	7.70	-0.06
Middle Tenmile Cr	3.73	1.08	-2.65
Lower Tenmile Cr	1.10	0.07	-1.03
Greenhorn Cr	4.18	1.35	-2.83
Skelly G	1.29	0.27	-1.02
Upper Silver Cr	0.56	0	-0.56
Iron Horse Cr	2.27	2.27	0
Ontario Cr	6.20	7.00	+0.80
L.Blackfoot-Larabee	8.71	5.97	-2.74
Telegraph Cr	11.75	10.80	-0.95
Mike Renig Cr	0.21	0.21	0
Upper Dog Cr (N)	13.48	10.07	-3.41
Lower Dog Cr	2.11	1.98	-0.13
L.Blackfoot-Hat Cr	8.42	7.75	-0.67
North Trout Cr	4.62	4.62	0
Snowshoe Cr	4.87	4.39	-0.48
L.Blackfoot-Elliston	2.90	2.95	+0.05
Carpenter Cr	2.71	2.34	-0.37
Trout Cr	3.52	3.52	0
So.Fork Dog Cr	0.81	0	-0.81
Upper Dog Cr (S)	4.76	3.80	-0.96
Threemile Cr	0	0	0
Total:	95.96	78.14	-17.82

Table 77 - Numbers and Net Change of Open Stream/Road Intersections by Watershed

6th Field HUC	Alt 1	Alt 4	Net change
Upper Tenmile Cr	20	20	0
Middle Tenmile Cr	12	4	-8
Lower Tenmile Cr	2	0	-2
Greenhorn Cr	9	2	-7
Skelly G	2	1	-1
Upper Silver Cr	1	0	-1
Iron Horse Cr	6	6	0
Ontario Cr	20	25	+5
L.Blackfoot-Larabee	11	7	-4
Telegraph Cr	32	28	-4
Mike Renig Cr	1	1	0
Upper Dog Cr (N)	38	34	-4
Lower Dog Cr	10	9	-1
L.Blackfoot-Hat Cr	4	4	0
North Trout Cr	16	16	0
Snowshoe Cr	14	11	-3
L.Blackfoot-Elliston	4	4	0
Carpenter Cr	6	3	-3
Trout Cr	1	1	0
So.Fork Dog Cr	1	0	-1
Upper Dog Cr (S)	7	4	-3
Threemile Cr	0	0	0
Total:	217	180	-37

In effect, alternative 4 closes about 11.9 miles more high risk roads and 31 more crossings to wheeled motorized vehicle traffic compared to alternative 2. Therefore, this alternative has potential to amplify reductions in sediment production and delivery to streams in sub-watersheds showing net reductions in these indicators. However, it does not achieve the potential reductions in sediment production as much as alternative 3. This is due to proposals that would maintain more open high risk roads particularly in Ontario Creek, Little Blackfoot-Hat Creek and Upper Dog Creek (south of Hwy 12).

Effects of Alternative 4 Specific to Occupied Bull Trout Habitat and Westslope Cutthroat Trout Habitat:

The overall direct effect on westslope cutthroat trout drainages in the planning area would be elimination of wheeled motorized traffic on about one mile of high risk road in one westslope cutthroat trout drainage east of the Divide and approximately 10.52 miles of high risk road in nine westslope cutthroat trout drainages west of the Divide. Skelly Gulch is the westslope cutthroat trout drainage on the east side that would benefit from closing 0.4 miles of hydrologically connected road and an active ford in westslope cutthroat trout habitat. Another east-side drainage, Greenhorn Creek, is unlikely to support westslope cutthroat trout any longer based on the latest findings by Forest Service and Montana Fish, Wildlife and Parks fisheries crews in 2009 to 2012. This drainage would experience the direct effect of having 2.8 miles of high risk road and seven stream crossings closed to wheeled motorized traffic. The indirect effect on westslope cutthroat trout habitat in the planning area translates to the long-term trend of reduced sedimentation into the surface water system for 15 sub-watersheds that support fish populations; ten of these support westslope cutthroat trout.

Other direct effects from alternative 4 relate to fords and dispersed campsites tied to current open high risk roads. Under alternative 4, one ford (road 123-013) would be permanently closed and three other fords (roads 4100, 227-D1, 4104-A1A2) temporary closed. All are located in documented bull trout and westslope cutthroat trout habitat. Therefore, risks for direct mortality upon the early life history stages of bull trout and westslope cutthroat trout in Ontario Creek and the Little Blackfoot River from wheeled motorized vehicle traffic through fords is minimized or eliminated. Due to extremely low numbers of bull trout observed and documented in the latest Forest Service and Montana Fish, Wildlife and Parks electrofishing surveys between 2008 and 2012, risk of mortality to bull trout from wheeled motorized vehicle traffic in the Little Blackfoot River or Ontario Creek is considered very low.

Ontario Creek (west of the Divide) is the only drainage that would experience a net increase in opening high risk roads and crossings from their current closed status under this alternative. Approximately 0.8 miles of high risk road would be opened to wheeled motorized vehicle use as a result of a proposal to open road # 4104-A1/A2 for a loop experience. Ontario Creek would, in addition, experience an increase of five stream crossings as open to wheeled motorized vehicle use from current levels (see Table 77). Opening these stream crossings includes a ford on Ontario Creek as a result of the proposal to open closed roads 4104-A1/A2 and 495-A3. The indirect effect of opening these closed crossings to wheeled motorized use would be an increased risk of sediment delivery into Ontario Creek and direct mortality of bull trout and westslope cutthroat trout early life stages at the ford crossing. To protect TES fish and habitat from wheeled vehicle disturbance at ford crossings, those crossings would be temporarily closed until a bridge or other aquatic organism passage compliant bottomless structure could be installed under a mitigation plan to protect water quality and native fish species. This resource protective measure greatly reduces risk of direct mortality to the early life history stages of bull trout and westslope cutthroat trout in Ontario Creek.

Three other open fords occur in westslope cutthroat trout habitat and are located in Skelly Gulch east of the Divide (road 1853-A1), in Sawmill Gulch (road 4005) and an unnamed tributary to Ontario Creek (road 495-D1) west of the Divide. As discussed above, a ford (and its associated high risk road) on Skelly Gulch would be closed having the direct effect of eliminating wheeled motorized traffic through westslope cutthroat trout habitat including the hydrologically connected segment of road 1853-A1. The indirect effect would be minimization of chronic road

sediment delivery into westslope cutthroat trout habitat and protection of incubating westslope cutthroat trout embryos and fry at risk from wheeled motorized disturbance through the streambed. In Sawmill Gulch and the unnamed Ontario tributary, proposed mitigation to protect westslope cutthroat trout would be in the form of temporary closing both fords until an approved aquatic organism passage compliant structure sized to pass 100-year flood flows could replace each ford. This has the indirect effect of avoiding potential direct mortality of westslope cutthroat trout eggs/fry and reducing sedimentation from wheeled motorized disturbance of the creek bed.

Four dispersed campsites accessed by non-system road 123-013 and two other dispersed campsites accessed by road 227-E1 would be closed as a direct effect from closing these roads. The direct effect would be the cessation of concentrated recreation activity along the banks of the Little Blackfoot River associated with these six dispersed campsites. An indirect effect would be the passive re-vegetation and reduced sedimentation at each dispersed campsite along the Little Blackfoot River.

Alternatives 3 and 4 differ from alternatives 1 and 2 with regard to the existing open road 227-E1, which extends beyond Kading campground 0.9 miles. This extension road would be permanently closed to wheeled motorized vehicles under alternatives 4 and 3. Consequently, approximately 0.6 miles of high risk road including one ford crossing and two high risk dispersed campsites associated with this road would all close. The indirect effect translates to reduced risk for chronic sedimentation and streambank alteration on inland native fish habitat in the Little Blackfoot River.

Effects of Alternative 4 Specific to Western Pearlshell Mussel Habitat

Effects of alternative 4 on western pearlshell mussels or habitat are match those under alternative 2 based on the rationale that discusses potential affects to western pearlshell mussels.

Irreversible and Irretrievable Commitments

There would be no irreversible commitment (permanent loss) of future options in regards to the existing road system under alternative 4. The possibility remains to remove or relocate any Forest Service road, closed or open, that is adversely affecting water quality, stream function, TES fish habitat or public safety. This would occur under a separate decision with the purpose of restoring stream processes that benefit water quality and fish populations.

There would be an irretrievable (temporary) commitment of resources related to ongoing road sediment delivery to fish-bearing habitat due to some road locations resulting in a direct surface flow path (hydrologic connection) to planning area streams. Approximately 17.4 percent of the entire transportation system consists of Forest Service high risk roads including associated Forest Service stream/road intersections that can cause an irretrievable commitment or temporary loss of fish habitat quality restorable by eliminating or relocating those particular roads or by applying some other adjustment measures on the roads to protect and restore aquatic habitats. High risk roads where left untreated represent an ongoing cumulative effect that decreases the overall fish production capabilities of fish habitat within the planning area.

Under designed culverts present an ongoing risk for releases of substantial stores of sediment in the form of roadfills at culvert crossings and they pose potential barriers to fish migration. Culverts at risk that have not been removed or upgraded with aquatic organism passage compliant ones designed to pass 100-year floods present an irretrievable commitment upon stream-riparian dependent fisheries.

Cumulative Effects

Past, present and reasonably foreseeable future non-road actions applicable to the Divide Travel Plan are addressed in appendix B. The transportation system was not included in the list in appendix B as it is addressed in detail within this report. For roads, Table 66 and Table 67 in the affected environment section provide a quantitative overview of all stream/road intersections and miles of high risk roads in each 6th field HUC as a measure of ongoing effects related to the transportation system in the Divide Travel Plan area. Both tables refine the two road measures by outlining totals currently open versus closed by 6th field HUC.

There are 719 miles of roads in the planning area including NFS routes and routes under other ownership. About 165 miles are considered high risk roads that present risks for chronic excessive sediment delivery to the surface water system, fragment stream habitat and/or alter stream-floodplain functions. The Forest Service maintains jurisdiction on about 125.2 miles of high risk roads and 95.96 miles are currently open (29.24 miles are closed). Under alternative 4, about 78.14 miles of high risk Forest Service roads would remain open and the other 47.06 miles (29.24 miles currently closed plus 17.82 proposed miles) or 37.6 percent would be closed to wheeled motorized vehicle use. Non- Forest Service roads account for 39.5 miles of high risk roads in the planning area; these roads represent ongoing cumulative effects to streams in the planning area.

There are in addition some 439 stream/road intersections throughout the planning area. The Forest Service has jurisdiction on 329 crossings and 217 of those are currently open (112 are closed). Alternative 4 would result in 180 crossings remaining open to motorized use and the other 149 (112 currently closed plus 37 proposed closed) or 45.3 percent would be closed to wheeled motorized vehicle use. Because stream crossings are principal access sites for road sediment with localized physical alteration of stream habitat, their presence in the various planning area drainages would constitute an ongoing cumulative impact on fish habitat. Closing 37 crossings under this alternative represents 8.4 percent of the total stream crossings in the planning area with potential for permanent removal. Permanent removal of closed crossings and mitigating open crossings would substantially reduce adverse effects on fish habitat under an implementation plan that removes closed crossings and mitigates open crossings; however, this would be slightly less than under alternative 3.

Additionally, nine Forest Service dispersed campsites associated with high risk roads remain directly adjacent TES fish habitat and six of these would be closed under this alternative. These sites would trend toward pre-disturbance conditions. Three dispersed recreation campsites would remain open to public users risking adversely affects to TES fish habitat without effective adjustment measures to meet riparian management objectives in riparian habitat conservation areas.

Six currently open fords on TES fish streams would experience permanent or temporary closures to reduce risk of direct mortality to early life stages of westslope cutthroat trout and bull trout. A seventh closed ford in Ontario Creek would remain closed to wheeled motorized traffic. The physical presence of these fords would remain an ongoing risk for sediment delivery to TES fish habitat until measures under an implementation plan would replace fords with bottomless structures on roads planned to be open or rehabilitate those proposed for closure in this alternative. In non-fish-bearing streams, a ford on an unnamed tributary to the Little Blackfoot River above Kading campground would be closed to wheeled motorized vehicle traffic leading to a long-term trend of eliminating or minimizing road sediment delivery downstream into native fish habitat.

An important project common amongst all alternatives is under consideration for funding to help improve access needs prerequisite to the foreseeable Telegraph Creek Mountain Pine Beetle Salvage project. This project would replace the large ford on the Little Blackfoot River with a bridge associated with road # 4100 (Negro Mountain Road). Consequently, there would be the permanent removal of 0.1 mile of high risk road from the Little Blackfoot floodplain and three other stream crossings in TES fish habitat. There would also be foreseeable future direction under a biological opinion for bull trout to confirm what segments of roads are having adverse effects to inland native fish habitat prerequisite to developing a plan to eliminate or minimize those impacts.

Forest Plan Consistency

Table 66 and Table 67 quantify the amount of roads and crossings having risk to inland native fish and fish habitat. Under alternative 4, approximately 17.82 miles of Forest Service high risk roads and 37 stream crossings in the planning area having risk to native fish and fish habitat would be closed. Therefore, this alternative is less aggressive than alternatives 3 and 5 at moving the planning area toward consistency with INFISH amendments to the Forest Plan. Alternative 4 would move the planning area forward to help meet the intent of the INFISH amendments more aggressively than action alternative 2. To help maintain consistency with the Forest Plan, an element common amongst action alternatives is that opened fords in TES fish habitat would be closed to wheeled motorized vehicles until appropriate mitigation measures are in place to minimize or eliminate ongoing adverse effects from high risk roads and wheeled motorized use through fords.

Additionally, a reasonably foreseeable federal action under this and other action alternatives would be further review of roads to confirm what segments on both open and closed motorized routes are having adverse effects to inland native fish habitat. This would be required particularly west of the Divide to develop a plan to minimize or eliminate road effects on streams. This future federal action helps to meet the intent of INFISH by identifying specific roads and needed actions to avoid adverse road effects to inland native fish and fish habitat.

Alternative 5

Direct and Indirect Effects

Alternative 5 would have the direct effect of closing an additional 29.23 miles (23.3 percent) of Forest Service high risk roads currently open to motorized wheeled vehicle use in the planning area. Table 78 summarizes the changes in the miles of open high risk roads for each 6th field HUC. Eighteen sub-watersheds would experience various reductions in miles of open high risk roads; therefore, an indirect effect for these sub-watersheds would be the potential for substantial reductions in long-term road sediment delivery to streams with maximum opportunities to obliterate roadbeds to help restore natural drainage and stream habitat. Two sub-watersheds would experience no change in the miles of high risk roads currently open to motorized traffic so the indirect effect in these drainages reflects the no action option in terms of road sediment delivery and opportunities for watershed restoration as it applies to road obliteration.

Alternative 5 also has the direct effect of closing 67 more Forest Service stream crossings to wheeled motorized vehicle use in the planning area from the current levels (alternative 1). Table 79 summarizes these changes for each sub-watershed. Fifteen drainages undergo various

reductions in the number of open stream crossings with an indirect effect to minimize long-term road sediment delivery with maximum opportunity to remove crossing structures compared to all other alternatives. Removing the most crossings, especially culverts, under this alternative would provide the highest level of restoration to stream habitat amongst alternatives. Six sub-watersheds would experience no change in the current open status of stream crossings; the indirect effect in these drainages reflects the no action alternative in terms of sediment risk and opportunities for restoring drainage and stream habitat.

Table 78 - Miles and Net Changes of Open High Risk Roads by Watershed

6th Field HUC	Alt 1	Alt 5	Net change
Upper Tenmile Cr	7.76	6.13	-1.63
Middle Tenmile Cr	3.73	0.96	-2.77
Lower Tenmile Cr	1.10	0.07	-1.03
Greenhorn Cr	4.18	0.90	-3.28
Skelly G	1.29	0	-1.29
Upper Silver Cr	0.56	0	-0.56
Iron Horse Cr	2.27	2.76	+0.49
Ontario Cr	6.20	5.83	-0.37
L.Blackfoot-Larabee	8.71	5.71	-3.00
Telegraph Cr	11.75	9.37	-2.38
Mike Renig Cr	0.21	0.21	0
Upper Dog Cr (N)	13.48	7.31	-6.17
Lower Dog Cr	2.11	0.81	-1.30
L.Blackfoot-Hat Cr	8.42	8.06	-0.36
North Trout Cr	4.62	4.27	-0.35
Snowshoe Cr	4.87	2.74	-2.13
L.Blackfoot-Elliston	2.90	3.03	+0.13
Carpenter Cr	2.71	1.65	-1.06
Trout Cr	3.52	3.12	-0.40
So.Fork Dog Cr	0.81	0	-0.81
Upper Dog Cr (S)	4.76	3.80	-0.96
Threemile Cr	0	0	0
Total:	95.96	66.73	-29.23

Table 79 - Numbers and Net Change of Open Stream/Road Intersections by Watershed

6th Field HUCoo	Alt 1	Alt 5	Net change
Upper Tenmile Cr	20	17	-3
Middle Tenmile Cr	12	2	-10
Lower Tenmile Cr	2	0	-2
Greenhorn Cr	9	1	-8
Skelly G	2	0	-2
Upper Silver Cr	1	0	-1
Iron Horse Cr	6	6	0
Ontario Cr	20	17	-3
L.Blackfoot-Larabee	11	6	-5
Telegraph Cr	32	32	0
Mike Renig Cr	1	1	0
Upper Dog Cr (N)	38	27	-11
Lower Dog Cr	10	3	-7
L.Blackfoot-Hat Cr	4	4	0
North Trout Cr	16	15	-1
Snowshoe Cr	14	6	-8
L.Blackfoot-Elliston	4	5	+1
Carpenter Cr	6	3	-3
Trout Cr	1	1	0
So.Fork Dog Cr	1	0	-1
Upper Dog Cr (S)	7	4	-3
Threemile Cr	0	0	0
Total:	217	150	-67

In effect, alternative 5 closes about 23.34 miles more high risk roads and 61 more stream crossings to wheeled motorized vehicle traffic compared to initial proposed alternative 2. Therefore, this alternative has potential to substantially amplify reductions in sediment production and delivery to streams in sub-watersheds showing net reductions in these indicators. This alternative in fact would achieve the potential to minimize sediment production and maximize opportunities for watershed restoration as a function of road obliterations and culvert removals amongst all the alternatives.

Effects of Alternative 5 Specific to Occupied Bull Trout Habitat and Westslope Cutthroat Trout Habitat:

The overall direct effect on westslope cutthroat trout drainages in the planning area would be elimination of wheeled motorized traffic on at least one mile of high risk road in one westslope cutthroat trout drainage east of the Divide (Skelly Gulch) and approximately 19.29 miles of high risk road throughout twelve westslope cutthroat trout drainages west of the Divide. In Skelly Gulch approximately 0.4 miles of hydrologically connected road and an open ford would be closed as a direct effect of this alternative. Although Greenhorn Creek remains questionable in terms of westslope cutthroat trout present based on the latest findings by Forest Service and Montana Fish, Wildlife and Parks fisheries crews, this drainage would experience the direct effect of closing 3.28 miles of high risk road including eight stream crossings to wheeled motorized traffic. The indirect effect of all road closures on fish habitat relates to the long-term trend of reduced sedimentation into the surface water system of 18 sub-watersheds that support fish populations in the planning area; 13 of these support westslope cutthroat trout. With few exceptions, alternative 5 surpasses alternative 3 overall regarding improving trends on TES habitat from proposals that close high risk roads and crossings in the planning area.

Other direct effects under alternative 5 relate to fords and dispersed campsites associated with current open high risk roads. This alternative would have the effect of closing four fords (roads 4100, 227-D1, 4104-A1/A2, 123-013) to wheeled motorized vehicle use in documented bull trout habitat. The ford (road 4104-A2) in upper Ontario Creek is currently closed and would remain so under this alternative. Additionally, a ford on a fishless tributary above Kading campground would become permanently closed in conjunction with closing road 227-E1, which includes a 0.6 mile segment of high risk road. The indirect effect is predicted reduction in sediment delivery at this ford. Therefore, risk for direct mortality to bull trout and westslope cutthroat trout in Ontario Creek and the Little Blackfoot River as a function of wheeled motorized traffic through fords becomes discountable. Due to extremely low numbers of bull trout observed and documented in the latest Forest Service and Montana Fish, Wildlife and Parks electrofishing surveys between 2008 and 2012, risk of mortality to bull trout from wheeled motorized vehicle traffic in the Little Blackfoot River or Ontario Creek is considered to be very low.

Three other open fords are in westslope cutthroat trout habitat. One is located in Skelly Gulch east of the Divide (road 1853-A1) and two others are in Sawmill Gulch (road 4005) and an unnamed tributary to Ontario Creek (road 495-D1) west of the Divide. As discussed above, a ford including its associated high risk road on Skelly Gulch would be closed having the direct effect of eliminating wheeled motorized traffic through westslope cutthroat trout habitat including the hydrologically connected segment of road 1853-A1. The indirect effect would be minimization of chronic road sediment delivery into westslope cutthroat trout habitat and protection of incubating westslope cutthroat trout embryos and fry potentially at risk of direct mortality related to wheeled motorized traffic through the streambed. Two fords west of the Divide in Sawmill Gulch and the unnamed Ontario tributary would have proposed mitigation to protect westslope cutthroat trout by temporarily closing the fords until an approved aquatic organism passage compliant structure sized to pass 100-year flood flows could replace the existing fords. That would have the indirect effect of preventing potential direct mortality of westslope cutthroat trout fry and eggs and reducing sedimentation from wheeled motorized traffic through the creek bed and crossing approaches.

Four dispersed campsites accessed by non-system road 123-013 and two dispersed campsites accessed by road 227-E1 would be closed as a direct effect of closing those roads. This has the additional direct effect of eliminating concentrated recreation activity along the banks of the Little Blackfoot River in association with these six dispersed campsites with the indirect effect of passive re-vegetation and reduced sedimentation in the long-term at each of these dispersed campsites next to the Little Blackfoot River.

Modifications proposed under alternative 5 serve as tradeoffs for maximizing the miles of high risk roads and stream crossings proposed closed compared to all the other alternatives. West of the Divide these changes indirectly affect Elliston Creek, Ontario Creek and Telegraph Creek headwater tributaries. East of the Divide these changes indirectly affect streams only in the Iron Horse sub-watershed.

A direct effect of this alternative would be the addition of 0.13 miles of high risk road including a stream crossing opened to wheeled motorized vehicle use in Elliston Creek (see Table 78 and Table 79) as a result of adding motorized trail #1871-001 to the system of designated routes open for wheeled motorized vehicle use. The indirect effect of opening this road segment for wheeled motorized use relate primarily to increasing the risk for road sediment production and delivery into westslope cutthroat trout habitat in Elliston Creek including risk for direct mortality to westslope cutthroat trout embryo and fry at the new stream crossing in Elliston Creek without mitigation to replace the ford with a bottomless pipe structure.

For Ontario Creek, maintaining closure of roads 4104-A1 and A2 and instead adding route 123-001 as a seasonal motorized trail results in a net reduction of only 0.05 miles of high risk road and three less stream crossings open to wheeled motorized use. Other proposed road closures in Ontario Creek increases the amount of high risk road that would be closed overall in this drainage to 0.37 miles; therefore, there is potential to decrease road sediment delivery in the long-term in westslope cutthroat trout and bull trout habitat. The closure of the ford associated with road 4104-A2 is offset by opening a new ford associated with opening route 123-001 to seasonal motorized trail use. To protect early life stages of TES fish at this ford, it would remain closed until the proper aquatic organism passage compliant structure designed to pass 100-year flood flows could be installed.

In Telegraph Creek the direct effect is a net total of 2.38 miles of high risk road being closed and potentially a long-term reduction in road sediment delivery into westslope cutthroat trout habitat as an indirect effect under this alternative. However, there would be no net reduction in open stream crossings compared to alternatives 3 and 4 even with this amount of high risk roads proposed for closure (see Table 79). This is primarily due to opening routes 1857 and 1859, including some ancillary routes, on the southwest side of the Telegraph drainage to provide additional opportunity for seasonal motorized trail use. Four stream crossings closed under the action alternatives 3 and 4 remain closed under this alternative; however, the proposed seasonal motorized trail system under this alternative would bisect four other headwater tributaries cancelling out crossing closures elsewhere in this drainage. These crossings do not occur in fish-bearing streams and do not occur on fords so there would be no risk of direct mortality to trout at these crossings.

On the east side of the Divide the Iron Horse Creek 6th HUC would likely experience increases in sediment delivery as a function of opening an additional 0.49 miles of high risk road primarily in Lost Horse Creek. However, no conservation populations of westslope cutthroat trout occur in that creek and there would be no changes in amount of open stream crossings.

Effects of Alternative 5 Specific to Western Pearlshell Mussel Habitat

Effects of alternative 5 on western pearlshell mussels or habitat are the same as under alternative 2 based on rationale that discusses potential affects to western pearlshell mussels.

Irreversible and Irretrievable Commitments

There is no irreversible commitment (permanent loss) of future options in regards to the road system under alternative 5. The possibility remains for any Forest Service road, closed or opened, that is adversely affecting water quality, stream function, TES fish habitat or public safety to be removed or relocated under a separate decision so that stream processes can be restored that benefit water quality and fish populations.

There would be an irretrievable (temporary) commitment of resources related to ongoing road sediment delivery to fish habitat under this alternative due to some road locations having a direct surface flow path (hydrologic connection) to project area streams. Approximately 17.4 percent of the entire transportation system consists of Forest Service high risk roads including associated Forest Service stream/road intersections that can cause an irretrievable commitment or temporary loss of fish habitat quality restorable by eliminating, relocating, or applying some other project design features on those roads to restore and protect aquatic habitat. High risk roads where left untreated represent an ongoing cumulative effect that decreases the overall fish production capabilities of fish habitat within the planning area.

Under-designed culverts present an ongoing risk for releases of substantial stores of sediment in the form of roadfills at culvert crossings and they pose potential barriers to fish migration. Culverts at risk that have not been removed or upgraded with aquatic organism passage compliant ones designed to pass 100-year floods present an irretrievable commitment upon stream-riparian dependent fisheries.

Cumulative Effects

Past, present and reasonably foreseeable future non-road actions applicable to the Divide Travel Plan area are addressed in appendix B. The transportation system was not included in the list in appendix B as it is addressed in detail within this report. Table 66 and Table 67 under the affected environment section provide a quantitative overview of all stream/road intersections and miles of high risk roads in each 6th field HUC as a measure of ongoing effects related to the transportation system in the Divide Travel Plan area. Both the tables refine the two road measures by outlining the totals currently open versus closed by 6th field HUC.

There are approximately 719 miles of roads in the planning area including NFS routes and routes under other ownership. About 165 miles are considered high risk roads that risk chronic excessive road sediment delivery to the surface water system, fragment stream habitat and/or alter stream-floodplain functions. The Forest Service maintains jurisdiction over 125.2 miles of high risk roads and about 95.96 miles are currently open to wheeled motorized vehicle use (the other 29.24 miles are currently closed).

Under alternative 5, about 66.73 miles of high risk Forest Service roads would remain open and 58.47 miles (29.24 miles currently closed plus 29.23 proposed miles) or 46.7 percent would be closed to wheeled motorized vehicle use. Non- Forest Service roads account for 39.5 miles of the high risk roads in the planning area; these roads represent an ongoing cumulative effect to the surface water system and fish habitat in the planning area.

There are also 439 stream/road intersections throughout the planning area and the Forest Service has jurisdiction over 329 crossings. Currently 217 Forest Service crossings are currently

open (112 are closed). Alternative 5 would result in 150 crossings remaining open to wheeled motorized use and the other 179 (112 currently closed plus 67 proposed closed) or 54.4 percent would be closed to wheeled motorized vehicle use. Because stream crossings are principal access sites for road sediment with localized physical alterations of stream habitat, their presence in planning area drainages would constitute an ongoing cumulative impact on fish habitat. Closing 67 crossings under this alternative represents 15.3 percent of the total stream crossings in the planning area with potential for permanent removal. Alternative 5 provides the highest measure to close crossings with the prospect to remove more than 50 percent of the crossings in the planning area. In conjunction with mitigation applied to the remaining open crossings, this alternative has the potential to reduce or minimize ongoing effects on fish habitat the most amongst alternatives under an implementation plan that could follow this decision.

Additionally, nine Forest Service dispersed campsites associated with high risk roads are directly adjacent TES fish habitat and six of these would close under this alternative. Therefore, activities associated with concentrated recreation use next to TES fish habitat at six campsites would cease. Subsequently, disturbance to riparian vegetation, streambank disturbance and compacted soils at these sites are predicted to trend toward pre-disturbance conditions in the long-term. Three other dispersed recreation campsites would remain open to public users having some risk to adversely affect TES fish habitat without effective adjustment measures to meet riparian management objectives in riparian habitat conservation areas.

Six fords currently open on TES fish streams would experience permanent or temporary closures that would minimize or eliminate risk of direct mortality to early life stages of westslope cutthroat trout and bull trout. A seventh ford located in Ontario Creek would remain closed to wheeled motorized vehicle disturbance. The physical presence of these fords, however, remain an ongoing risk for sediment delivery to TES fish habitat until measures under an implementation plan would result in replacing temporarily closed fords with bottomless structures or rehabilitate crossings proposed to be closed under this alternative. In non-fish-bearing streams, the ford on the Little Blackfoot River unnamed tributary above Kading campground would be permanently closed to wheeled motorized vehicle traffic subsequently leading to a long-term trend of eliminating or minimizing road sediment delivery downstream into native fish habitat from this site.

One potential project related to this project is under consideration which would improve access needs prerequisite to the foreseeable Telegraph Creek Mountain Pine Beetle Salvage project. This project would replace the large ford on the Little Blackfoot River with a bridge associated with road # 4100 (Negro Mountain road) in conjunction with rerouting a portion of road # 123 (Ontario Cr road). Consequently, there would be the permanent removal of 0.1 mile of high risk road from the Little Blackfoot floodplain and three other stream crossings in TES fish habitat. There would also be foreseeable future direction under a biological opinion for bull trout to determine which segments of roads are having adverse effects to inland native fish habitat prerequisite to developing a plan to eliminate or minimize those impacts.

Forest Plan Consistency

Table 66 and Table 67 quantify the amount of roads and crossings having risk to inland native fish and fish habitat. Alternative 5 would result in closing 29.23 miles of Forest Service high risk roads and 67 stream crossings potentially at risk to native fish and fish habitat in the planning area. This alternative leaves the least amount of roads and stream crossings open that pose risk for adverse effects to native fishes and fish habitat. For instance, alternative 5 closes up to 54

percent of road/stream crossings and 46.7 percent of all high risk roads in the planning area. Therefore, it moves the travel planning area toward consistency with INFISH amendments to the Forest Plan most aggressively amongst all alternatives. To help maintain consistency with the Forest Plan, an element common in all action alternatives is that opened fords in TES fish habitat would be closed to wheeled motorized vehicles until appropriate mitigation measures are in place that minimize or eliminate ongoing adverse effects from high risk roads and wheeled motorized use through fords.

Additionally, a reasonably foreseeable federal action under this and other alternatives would be further review of roads to confirm what segments on both open and closed motorized routes are having adverse effects to inland native fish habitat. This would be required particularly west of the Divide to develop a plan to minimize or eliminate road impacts on streams. This future federal action helps to meet the intent of INFISH amendments by identifying specific roads and needed actions to avoid adverse road effects to inland native fish and fish habitat.

Conclusions

The transportation system in the Divide Travel Plan area consists of approximately 719 miles of roads that extend throughout portions of 22 sub-watersheds on the Helena Ranger District. The project area extends to both sides of the Continental Divide. The majority of planning area roads is under Forest Service jurisdiction while the remaining roads are on lands of other ownership. This report examines only the Forest Service roads as various segments are proposed to be designated closed to wheeled motorized vehicle use while a few others would be designated opened compared to baseline conditions (no action).

Another element of the Divide Travel Plan relates to over-snow travel typically for motorized winter recreation. Motorized over-snow traffic would also realize some area and route changes compared to baseline conditions in the planning area. Because ground conditions for this type of recreation or travel activity are frozen and covered with snow, motorized over-snow travel is assumed having minimal or no sediment risk to streams. Therefore, this component of travel planning was essentially dismissed from consideration as a potential adverse effect or risk to streams and fish habitat.

The planning area supports over 140 miles of fish-bearing streams throughout 21 of 22 sub-watersheds. Not all sub-watersheds lie entirely within the planning area. The fish assemblage consists of a mix of native and non-native species. Non-native brook trout and rainbow trout account for 96 percent of the fishery in the upper Missouri River side of the planning area and non-native brown trout and brook trout comprise about 65 percent of the fishery in the Upper Clark Fork River basin side of the planning area. Native salmonids include westslope cutthroat trout both sides of the Divide and bull trout occur only west of the Divide in the planning area. Other native fish present in the planning area include mountain whitefish, longnose suckers and sculpins. Westslope cutthroat trout are designated a Regional Forester's Sensitive Species listed and are the fish management indicator species on the Helena National Forest. Bull trout are listed as threatened under the Endangered Species Act (ESA) of 1973. The western pearlshell mussel was added to the aquatic sensitive species list in June 2011 and they are therefore considered for potential effects from this project.

Evidence from all studies, reviews and bibliographies on effects of sedimentation constitutes a strong indictment how anthropogenic sediment exceeding natural background levels is a stressor to the biological integrity and productivity of clean freshwater streams. Roads have

been documented to produce the most sediment and stream alteration among all forest land-use activities. The major threat upon benthic invertebrates is the smothering of physical habitat by sediment deposition on the streambed. To trout, the threat from chronic excess sediment is to their reproductive success and loss of rearing habitat. Most roads in the planning area, however, are located far enough away from the stream network so that they do not pose such risks. Therefore, this report separates out only Forest Service roads that parallel and bisect streams. The focus for this analysis is on roads within INFISH buffers (as they pertain west of the Divide) but extended both sides of the Divide for consistency and referred in this report as high risk roads. Two measures used in discerning and quantifying the road/stream relationship are high risk roads (those within INFISH buffers) and road/stream intersections (crossings).

Currently there are approximately 125.2 miles of high risk roads and 329 stream crossings under Forest Service jurisdiction throughout the planning area. Under existing conditions, there are about 29.24 miles (23 percent) of the high risk roads and 112 (34 percent) stream crossings currently closed to wheeled motorized vehicle travel. Closing high risk roads has the direct effect of eliminating motorized vehicle traffic (and road maintenance) on the roadbed and indirectly allows exposed road surfaces to passively re-vegetate and accumulate duff, thus, reducing sedimentation. Closing roads additionally sets the stage for potential future road obliteration or storage opportunities as a tool to help restore watersheds and fish habitat.

Four action alternatives, with few exceptions, would close additional high risk roads and associated stream crossings in the planning area to wheeled motorized vehicle use. The administrative action of closing open roads and stream crossings helps to reduce their impacts on water quality and fish habitat by permanently discontinuing wheeled vehicle disturbance over the roadbed. The five alternatives for the Divide Travel Plan each have different levels of high risk road and crossing closures and those differences are quantified respectively in **Figure 4** and **Figure 5** below.

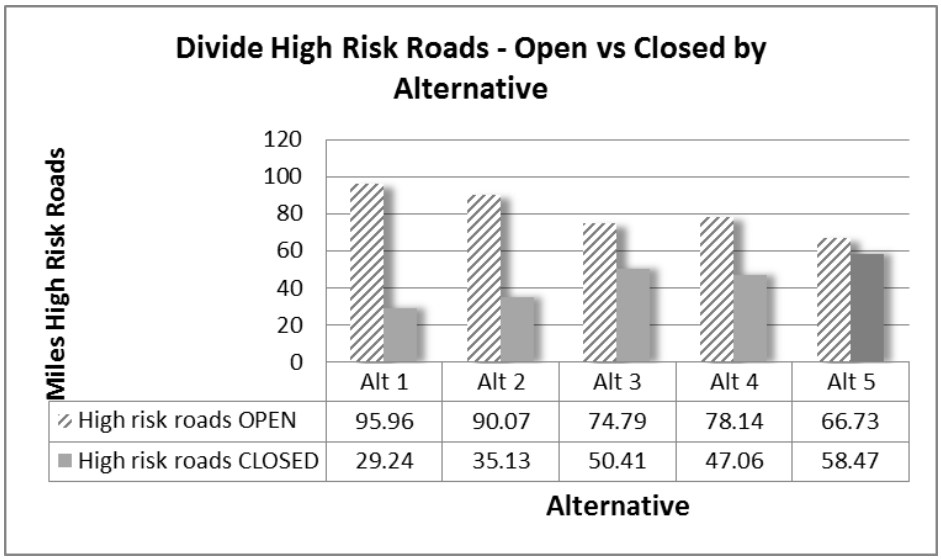

Figure 4: Chart comparing miles high risk roads open and closed by alternative.

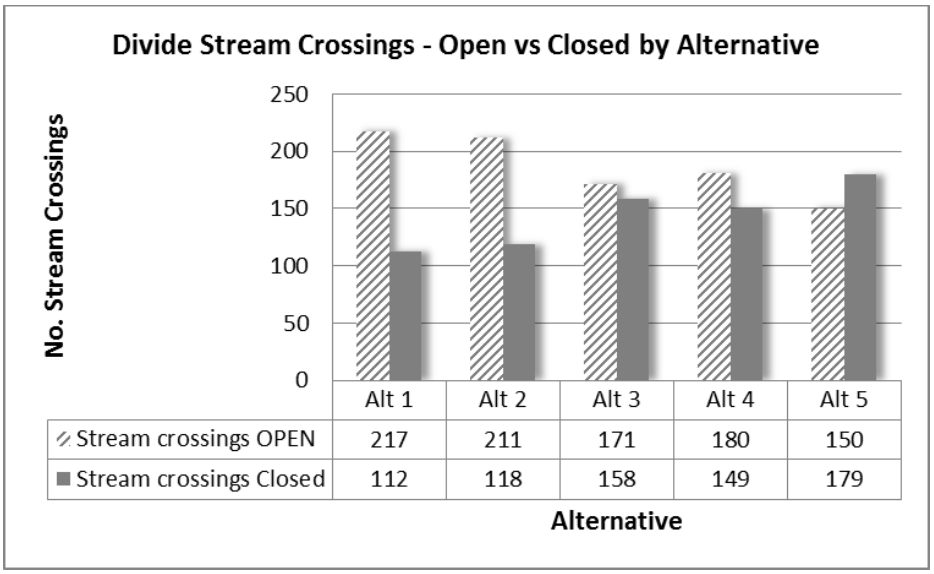

Figure 5: Chart comparing number stream crossings open and closed by alternative.

The general forestwide standard for fisheries is met in the action alternatives via close coordination with fisheries staff throughout the entire planning process as specified in the Forest Plan (pg II-22). No alternative involves road construction or reconstruction so standards for instream activities or structures do not apply, except under cumulative effects activities where all work in streams has been closely coordinated with fisheries staff and the state Fish, Wildlife and Parks department to ensure spawning habitats remain accessible and are not adversely affected by sediment and channel alteration. Road maintenance is covered in accordance with direction provided in the Transportation System Maintenance Handbook and special measures provided under the 1999 Programmatic Biological Assessment for Road Maintenance (MT Bull Trout Level 1 Team).

The no action alternative (existing condition) would maintain the current level of 95.96 miles of high risk roads and 217 stream crossings open for wheeled motorized vehicle travel while 29.24 miles and 112 crossings would remain closed. This meets general forestwide standards by means of coordinating with forest fisheries staff throughout the planning process and there are no proposals for road construction or reconstruction so standards for instream activities or structures do not apply. No action, however, would fall short of INFISH standards RF-2c and RF-3c because there would be no effort to move the transportation system forward to avoid the ongoing impacts associated with the existing road network such as closing additional high risk roads in inland native fish habitat.

Alternative 2 moves the planning area toward consistency with the INFISH amendment the least amongst all action alternatives by closing 5.89 miles (4.7 percent) of high risk Forest Service roads and six more stream crossings relative to existing conditions in the planning area. Only 1.21 miles of the proposed closures occur west of the Divide. The INFISH standards RF-2c and RF-3c are met by development of this Travel Management Plan and distinguishing those roads on the transportation system in need for closing, stabilizing or other future mitigation activities that help to avoid adverse impacts to inland native fish. Two fords located directly in occupied TES fish habitat would be closed permanently under this alternative and the five other fords closed temporarily until those fords are replaced with aquatic organism passage compliant structures sized for 100-year flood flows. Additionally, this alternative would close wheeled

motorized access to four (of nine) dispersed recreation campsites currently having ongoing adverse impacts on native fish habitat, including documented bull trout habitat, adjacent to those campsites. Recreation management standards RM-1 and RM-2 would be met for four campsites having adverse effects on native fish habitat since they would be closed while the other five high risk campsites are identified for future adjustments to avoid adverse effects on fish habitat under a separate NEPA analysis. This alternative therefore helps eliminate risk of direct mortality on TES fish and reduce habitat disturbance from fords and dispersed camping activity.

Alternative 3 would move the planning area toward consistency with the INFISH amendment to the Forest Plan aggressively because it would close 21.27 miles (16.9 percent) of high risk Forest Service roads and 46 more stream crossings relative to existing conditions in the planning area. This amounts to the most closures after alternative 5. INFISH standards RF-2c and RF-3c are met by development of this Travel Management Plan and distinguishing which roads on the transportation system are in need for closing, stabilizing or other future mitigation activities that help to avoid adverse impacts to inland native fish. Five fords located directly in occupied TES fish habitat would be permanently closed under this alternative and two others would be temporarily closed till replaced with aquatic organism passage compliant structures sized for 100 year flood flows. Additionally, this alternative would close wheeled motorized access to six (of nine) dispersed recreation campsites having adverse impacts on native fish habitat, including documented bull trout habitat, adjacent to those campsites. Recreation management standards RM-1 and RM-2 would be met for six campsites having ongoing impacts on native fish habitat since they would be closed. The other three high risk campsites are identified under this analysis for future adjustments to avoid adverse effects on fish habitat under a separate NEPA analysis. Thus, this alternative would be highly effective at eliminating risk of direct mortality on TES fish and reducing habitat disturbance from fords and dispersed camping activity in the planning area.

Alternative 4 would also move the planning area toward consistency with the INFISH amendment very aggressively because it results in the closure of 17.82 miles (14.2 percent) of high risk Forest Service roads and 37 more stream crossings relative to existing conditions in the planning area. This amounts to more closures than alternative 2, but fewer than alternatives 3 and 5. The INFISH standards RF-2c and RF-3c are met by development of this Travel Management Plan and distinguishing which roads on the transportation system are in need for closing, stabilizing or other future mitigation activities that help to avoid adverse impacts to inland native fish. Two fords located directly in occupied TES fish habitat would be closed permanently under this alternative and the five other fords closed temporarily till replaced with aquatic organism passage compliant structures sized for 100-year flood flows. Additionally, this alternative would close wheeled motorized access to six (of nine) dispersed recreation campsites having adverse impacts on native fish habitat, including documented bull trout habitat, adjacent to those campsites. Recreation management standards RM-1 and RM-2 would be met for six campsites having ongoing impacts on native fish habitat since they would be closed. The other three high risk campsites are identified under this analysis for future adjustments to avoid adverse effects on fish habitat under a separate NEPA analysis. This alternative would also be effective at eliminating risk of direct mortality on TES fish and reducing habitat disturbance from fords and dispersed camping activity in the planning area. Compared to alternative 3, this alternative would open a closed route (road 4104-A1/A2) in upper Ontario Creek and result in replacing an existing ford with a bridge on Ontario Creek as opposed to permanently closing the crossing under alternative 3.

Alternative 5 would move the planning area toward consistency with the Inland Native Fish Strategy (INFISH) amendment to the Forest Plan most aggressively of all the alternatives because it would close 29.23 miles (23.3 percent) of high risk Forest Service roads and 67 more stream crossings relative to existing conditions in the planning area. This amounts to the most closures of high risk roads amongst all alternatives. INFISH standards RF-2c and RF-3c are met by development of this Travel Management Plan and distinguishing which roads on the transportation system are in need for closing, stabilizing, or other future mitigation activities that help avoid adverse impacts to inland native fish. Five fords located directly in occupied TES fish habitat would be permanently closed under this alternative and two others would be temporarily closed until they could be replaced with aquatic organism passage compliant structures sized for 100-year flood flows. Additionally, this alternative would close wheeled motorized access to six (of nine) dispersed recreation campsites having adverse impacts on native fish habitat, including documented bull trout habitat, adjacent to those campsites. Recreation management standards RM-1 and RM-2 would be met for six campsites having ongoing impacts on native fish habitat since they would be closed. The other three high risk campsites are identified under this analysis for future adjustments to avoid adverse effects on fish habitat under a separate NEPA analysis. This alternative and alternative 3 would be most effective at eliminating risk of direct mortality on TES fish and reducing habitat disturbance from fords and dispersed camping activity in the planning area.

As evidenced by the magnitude and extent of high risk roads and crossings in the planning area, the Forest Service road system presents a high degree of risk for adverse effects on inland native fish and fish habitat in the planning area without meaningful measures to minimize those risks. Stream crossings and high risk road segments under other ownerships (see Table 66 and Table 67) represent road use activity considered an ongoing cumulative effect outside current Forest Service control. A Biological Evaluation/Assessment is needed to satisfy requirements of the Forest Service Manual (FSM) at FSM 2672.4 to review Forest Service actions for possible effects to listed, proposed or sensitive species. To that end, projected effects to the federally listed bull trout, the sensitive westslope cutthroat trout and sensitive western pearlshell mussel have been summarized in Table 80 below. A biological evaluation for sensitive westslope cutthroat trout and western pearlshell mussel will be completed for the preferred alternative. Because of adverse baseline conditions to listed bull trout habitat, formal consultation via a bull trout assessment will be prepared and submitted to the U.S. Fish & Wildlife Service.

Table 80: Effects projected for Bull Trout, Westslope Cutthroat Trout and Western Pearlshell Mussel Habitat

Fish Species and Habitat	Ongoing Effect of Current Transportation System Common to All Alternatives[1]
Bull Trout	May Affect, Likely to Adversely Affect based upon ongoing cumulative effects as evidenced by magnitude of road hazard indicators in most impacted 6th field HUCs and scarcity of bull trout in the Little Blackfoot River local population of Upper Clark Fork River core area.
Westslope Cutthroat Trout	May Impact Individuals, but will not likely contribute to a trend toward federal listing or loss of viability of the population or species for populations both sides of the Continental Divide based on extent and distribution of populations throughout planning area.
Western Pearlshell Mussel	No Effect based on lack of western pearlshell occurrences and predicted habitat west of the Divide and unlikelihood for a change in habitat in lower Tenmile Creek east of the Divide.

[1] Effect determination on TES aquatic species and habitat based on determination for most impacted 6th field HUCs in Divide Travel Plan area.

Summary of Determinations for Alternative 5

Alternative 5 (the preferred alternative) will have both beneficial and adverse effects on bull trout. Background sedimentation will still occur under all the alternatives due to the remaining high risk roads left open in the analysis area. This will continue to have adverse effects on bull trout into the foreseeable future. However, bull trout will experience the immediate and long-term beneficial effects of closures to high risk roads, crossings and associated recreation sites resulting in a reduction of sediment delivery to their habitat.

The actions in alternative 5 may impact individual westslope cutthroat trout by continuing to have some sediment delivery into their habitat by the remaining open roads. However, this will not likely cause an impact to the westslope cutthroat trout population in the analysis area and therefore will not result in a trend for listing. Westslope cutthroat trout will also experience the immediate and long-term beneficial effects of closures to high risk roads, crossings and associated recreation sites resulting in a reduction of sediment delivery to their habitat.

Westslope cutthroat trout will not be affected because of the location of their occurrences and predicted habitat will not be affected through the actions in alternative 5.

WILDLIFE

Introduction

The Divide landscape of the Helena National Forest (HNF) supports a diverse assemblage of wildlife populations typical of most National Forests in the northern Rockies. While the landscape encompasses numerous blocks of habitat in which human presence is fleeting and slight, roads and trails have been a prevalent feature of this landscape since the mid-late 19th century. Motorized routes concentrate human activity and harbor the potential to influence wildlife species and their habitats in a variety of ways. Wildlife response to roads can be highly variable depending on the inherent reaction of the species to human influences; the character, severity and longevity of the road impacts; the habitat context; the time of year; and so on.

The Divide Travel Plan is proposing a number of changes to the current road and motor trail system in the Divide landscape. The Draft Environmental Impact Statement (DEIS) for the *Travel Plan* presents 4 alternative scenarios for travel management in addition to the existing condition:

- *Alternative 1* would retain the existing condition, with 439 miles of Forest, County and private roads; 35 miles of trails available to public use via wheeled motor vehicles during all or part of the year (16 miles of which are currently unauthorized); and 418 miles of snowmobile routes.
- *Alternative 2* would support approximately 433 miles of open Forest, County and private access roads; 36 miles of motor trails; and 394 miles of snowmobile routes.
- *Alternative 3* would put more emphasis on non-motorized routes and would support approximately 394 miles of open Forest, County and private access roads; no authorized motor trails; and 416 miles of snowmobile routes.
- *Alternative 4* is a modified version of Alternative 3, with 403 miles of open Forest, County and private access roads; 4 miles of authorized motor trails; and 404 miles of snowmobile routes.
- *Alternative 5,* while designed to provide a variety of motorized loop trails, eliminates numerous parallel and dead-end roads and closes several other routes in an effort to

enhance big game security. It would provide 284 miles of open Forest, County and private access roads; 64 miles of authorized motor trails; and 403 miles of snowmobile routes

The above mileages include 118 miles of County and private access roads open to the public within National Forest administrative boundaries. These roads are open under all alternatives.

The Travel Plan deals with Helena National Forest lands in the Divide landscape of the Helena Ranger District. Not included are the Clancy-Unionville implementation area in the southeastern part of the landscape and most of the Little Prickly Pear drainage in the northern end, both of which have been covered by earlier travel planning efforts (Sound Wood Salvage Project, 1998; Clancy-Unionville Vegetation Manipulation and Travel Management Project, 2003;). This report describes the current environment for terrestrial wildlife in the Divide landscape with an emphasis on the influence of the existing road and motor trail network. It then examines the expected response of wildlife communities to each of the 5 proposed alternatives. The following components are addressed:

- General Habitat—including Old-Growth Forest
- Riparian Habitats
- Connectivity – Habitat Fragmentation, Movement Corridors and Linkage Zones
- Snags and Woody Debris
- Migratory landbirds and Shorebirds
- Big Game Species
- Threatened, Endangered and Sensitive (TES) species
- Forest Plan Management Indicator Species (MIS)

I have abbreviated analysis of species, groups of species and habitat components for which the probability of a meaningful effect is very low. This includes some species and habitat elements that figure prominently in assessments of timber harvest and prescribed burning projects, but will suffer few, if any, direct effects from the kind of travel management proposed here. The northern goshawk, for example, may suffer significant loss of nesting habitat from unconstrained timber harvest, but is unlikely to be affected in any meaningful way by Divide Travel Plan proposals. These species and components are addressed, but not at length. Quantitative analysis is reserved for species and habitat elements that may be influenced in measurable ways by implementation of any of the alternatives proposed by this travel planning effort. In some cases, detailed discussion of indicator species (such as elk) serves as a surrogate for other potentially affected species (such as mule deer and moose) that are addressed in less detail.

REGULATORY FRAMEWORK

National Forest Management Act

The Forest Service is charged with maintaining the viability of all existing native and desired non-native vertebrate species in a planning area under the National Forest Management Act of 1976 (NFMA) (36 CFR 219.19). A forest plan must identify “management indicator species” (MIS) that serve as proxies for fulfilling this NFMA viability requirement [see *Helena Forest Plan* (1986) page II/17]. The regulations impose a standard by requiring development of habitat objectives for maintaining viability of MIS throughout a planning area. In this report, an assessment of *Forest Plan* management indicator species (MIS) can be found in the *“Affected Environment”*

and *"Environmental Consequences"* sections. A further discussion of population viability of MIS is provided in *Appendix E.*

Forest Service Manual

The *Forest Service Manual (FSM)* provides direction for the management of terrestrial resources. *FSM* 2630 provides overall objectives for maintaining and improving wildlife habitat. Section 2670 establishes objectives and procedures for managing and protecting threatened, endangered and sensitive species. This latter section directs that the Forest Sevice prepare a biological evaluation for any of its activities that may affect threatened, endangered, proposed, or sensitive species. In this report, the assessment of threatened and sensitive species in the *"Affected Environment"* and *"Environmental Consequences"* sections serves as the Biological Evaluation for species known to be present in the Travel Plan Area. A summary of the evaluation for all species on the Helena NF can be found in *Appendix F.*

Helena Forest Plan

The *Helena Forest Plan (HFP),* developed in the early 1980s and released in 1986, sets the framework for management of wildlife species. Forestwide standards and guidelines for wildlife are identified on pages II/17 – II/21. In addition, the standards incorporate more detailed direction for elk and grizzly bears in Appendices C, D and E. The standards and guidelines are applied to all alternatives in the following analysis as appropriate.

Endangered Species Act

The Endangered Species Act (ESA) of 1973 requires all Federal agencies to review all projects to ensure that the action is not likely to jeopardize continued existence of any proposed, threatened, or endangered species. This is documented in a biological assessment for those listed or proposed species present in the project area. In cases where the assessment determines that a proposed action may affect a listed or proposed species, the ESA requires consultation with and concurrence from the U.S. Fish and Wildlife Service (USFWS) before a decision can be signed. A Biological Assessment for the 2 threatened terrestrial wildlife species in the Divide Travel Plan Area will be prepared as a separate document, once the *Record of Decision* for the project has been developed. [The Biological Evaluation of threatened, endangered and sensitive (TES) species is a requirement of Forest Service policy and is included within this report.]

National Environmental Policy Act

The National Environmental Policy Act of 1969 requires that all environmental analyses consider a full range of reasonable alternatives to the proposed action, alternatives that address the significant issues and meet the purpose and need for the proposed action. As the Divide Travel Plan has evolved over the past few years, the number of alternatives has expanded from three to five. The *Wildlife Specialist Report* presents an in-depth review of the potential effects of each of these alternatives on the wildlife environment. These findings are then presented in much the same form and detail in the *Environmental Impact Statement (EIS)* and will be used to shape the final decision presented in the *Record of Decision*.

Migratory Bird Memorandum of Understanding

In December 2008, the Forest Service and the U.S. Fish and Wildlife Service (USFWS) signed a "Memorandum of Understanding" to promote the conservation of migratory birds (USFS and

USDI 2008). Section D(3) of the Memorandum obliges the Forest Service, within its NEPA process, to "evaluate the effects of agency action on migratory birds, focusing first on species of management concern along with their priority habitats and key risk factors". A discussion of migratory birds of conservation concern in the Travel Plan Area and an assessment as to the potential effects of Travel Plan alternatives on these species is included in the *"Affected Environment"* and *"Environmental Consequences"* sections of this report.

Table 81, on the following pages, summarizes the assumptions, methodologies and basic information used in the analysis of different alternatives [40 CFR 1502.15]. More detailed information as to the construction and application of habitat models for threatened, endangered and sensitive species and for management indicator species (including elk) is included in the Project File. More complete discussion of the resource issues introduced here comes in following sections.

Table 81: Assumptions, information used, methodologies and scientific accuracy applied to wildlife parameters

WILDLIFE PARAMETER	ASSUMPTIONS AND INFORMATION USED	METHODOLOGIES AND SCIENTIFIC ACCURACY
General Habitat	Information on wildlife and wildlife habitat in the Divide Travel Plan Area has been extracted from 20 years of field survey work throughout the Divide landscape (1992-2012). Some of this information is summarized in the Divide Landscape Analysis (HNF 1996) and in environmental analyses conducted for a variety of projects across the landscape since 1992 [HRD/ HNF files]. I have also employed recent modeling and mapwork by HNF GIS specialists. This section focuses on direct effects of roads on forest and grassland/shrubland habitat (habitat loss, fragmentation, edge effects). Effects on riparian and wetland sites are addressed in the section on "Riparian Habitat". Edge effects are described for roads but not for trails. This derives from the observation that most trails on the HNF are narrow tracks that produce little, if any measurable edge. That is, trails in forest habitat run under the canopy rather than scouring out a contrasting corridor through the surrounding habitat. As a result, edge effects associated with these narrow travelways are assumed to be negligible.	Because wildlife species composition in any given area is primarily a product of available habitats, most wildlife is discussed at the "coarse filter" scale. That is, we assume that broad groups of similar vegetation will support similar arrays of wildlife species and levels of biodiversity (absent specific limitingfactors generated by human interference or natural factors). Likewise, we assume that roads in each of these broad vegetation types will affect associated wildlife communities in similar ways. In some cases, individual species and their specific habitat needs are discussed, especially in the case of uncommon species dependent on particular habitat components for which data is available. This is a "fine filter" approach. Effects on general habitat are discussed in terms of habitat loss, fragmentation and edge effects.
Old-Growth Forest	Information used to model old-growth is described in the documentation file created by HNF GIS specialists [Project File]. Modeling is based on sampling for the timber stand data layer (part of the Master Vegetation Layer). Effects generated by roads in old growth forest are assumed to be similar to those that occur in forested habitat in general.	Direct effects of roads are discussed briefly with regard to fragmentation, habitat loss (particularly with regard to snags) and edge effects. These data are not quantified.
Riparian Habitats	Information used to assess effects on riparian habitat is based on data summarized in the Fisheries and Watershed Specialist Report and analyses conducted by HNF GIS specialists. We assume that these assessments are sufficient to indicate effects on these focal habitat sites that are important not only to species of special concern (such as western toads) but to a wide variety of wildlife.	Methodologies for assessing effects of motorized use within the 300 foot riparian zone (Riparian habitat conservation Areas) are described in the Fisheries and Watershed reports. This analysis reports miles of open road expected in these riparian areas under different alternatives.
Connectivity:	The size and distribution of habitat patches away from the	Background concepts for estimating the relative quality of

WILDLIFE PARAMETER	ASSUMPTIONS AND INFORMATION USED	METHODOLOGIES AND SCIENTIFIC ACCURACY
Dispersal, Migration and Travel Corridors; Linkage Zones; Fragmentation	influence of open roads is used as a general indicator for comparing differences among alternatives. I made use of previous modeling efforts for portions of the Divide landscape (Walker and Craighead 1997; Olimb and Williamson 2006) to assess the general status of habitat connectivity in the Travel Plan Area and then looked at changes in non-motorized patch size in specific areas where alternatives differed from one another to come up with a relative indicator. I assume that the fewer and larger the unroaded patches, the better the connectivity (the less the fragmentation). Better connectivity may be partially a function of lower road density alone, but primarily it reflects *patterns* of open road dispersion (regardless of density) that allow ample blocks of wildlife habitat to function free from road influences.	connectivity among alternatives are from (1) a model developed by Walker and Craighead (1997) and expanded upon by Olimb and Williamson (2006) and (2) the FS Region-1 *Connectivity Protocol*. The 2 habitat models focus on the needs of animals needing the largest corridors (grizzly bears, mountain lions, elk) and employ habitat suitability, habitat complexity and weighted road density as key parameters. The Region-1 *Protocol* calculates the size and distribution of unroaded patches at least ½ mile from open roads, since research on several species (including elk and grizzly bears) indicates that ½ mile provides an adequate buffer. This assessment focuses on size and distribution of areas free from vehicle use. All unroaded and non-motorized patches larger than 1,500 acres are tallied and changes between alternatives calculated. This gives a general sense of relative differences between alternatives and of the potential effectiveness of the Continental Divide "linkage zone" or "corridor" for larger wildland species. Effectiveness of the linkage varies by species depending on their habitat needs, behavioral traits and reaction to humans. Lynx and marten, for example, prefer continuously forested environment, while grizzly bears and elk are best served by a mosaic of forest and non-forest.
Snags and Woody Debris	Primary information sources and assumptions are summarized in Bate and Wisdom (2002a, 2002b) and Hillis *et al.* (2003). Additional information and assumptions are described in the text files and analyses run by HNF GIS specialists [project file]. In analyzing woody debris, I assume that effects are qualitatively similar for all 3 alternatives since the 300-ft rule for off-road camping applies in each case and opportunities for firewood cutting are similar.	Since no new roads will be constructed under any alternative, I assume no direct effects from habitat loss. The methodology used to analyze indirect effects on snags and logs is described in "Analysis Methodology for Effects of Roads on Snags and Logs" in Appendix A. Indirect effects on snags and logs related to "edge" created by road prisms remaining on the landscape are described in the General Habitat section.
Motorized Use within 300-feet of Open Roads and	The magnitude of impacts to wildlife and wildlife habitat from legal vehicle use within 300 feet of motorized routes is obviously tied to the miles of open road under any given	*Open route miles* ("open" to wheeled vehicles) are used to determine habitat effects generated by motorized use within 300-feet of the routes. Any road that is open at any time of the

WILDLIFE PARAMETER	ASSUMPTIONS AND INFORMATION USED	METHODOLOGIES AND SCIENTIFIC ACCURACY
Trails	scenario. These effects are also analyzed under "Riparian Habitat" and "Snags and Woody Debris". Analyses by HNF GIS specialists yielded road miles. Effects apply to all open motorized routes regardless of habitat type. Effects on riparian habitat are analyzed by *Riparian Habitat Conservation Areas* (RHCA) which are buffers along stream corridor areas that vary from 150 to 300 feet wide on either side of streams.	year is included as an open route. This does not include snowmobile activity.
Elk	*Elk herd units (EHUs)* were delineated by Helena National Forest (HNF) and Montana Fish, Wildlife and Parks (MFWP) biologists in 2003 and modified in 2007 and 2011. Herd units extend 1.5 mi beyond HNF boundaries, which we assume accounts for the area used by most elk that regularly move on and off the Forest in winter. Assessment of the impacts of roads on elk are based on the road attribute layers for each alternative. With the exception of one herd unit(Greenhorn EHU), *Summer range* is assumed to be synonymous with the entire herd unit (though this is often an overestimation). *Hiding cover*, which underlies the *Forest Plan* standard for elk summer range quality, is based on modeling by HNF GIS analysts (USFS 2009). We use the MT Fish, Wildlife and Parks definition of hiding cover, which assumes that forest crown closure of 40% or more is an indicator of hiding cover. To delineate *Forest Plan winter range*, I used maps developed for the *HNF Oil and Gas Leasing EIS* (1995). I chose this delineation after comparing plots of several thousand winter elk locations (from MFWP aerial surveys and radio-telemetry) to 3 available winter range maps, "*Forest Plan"* (1981-86),"Oil and Gas" (1995) and MFWP (1999-2010). The "Oil and Gas" map covered 96% of winter elk locations within herd units. I used the more broadly defined MFWP winter ranges when discussing elk habitat use and movement patterns beyond the HNF.	Methodologies used to determine direct and indirect effects on elk include the following: Summer *Habitat Effectiveness* (Christensen *et al*. 1993) is based on open road density within each elk herd unit (including private roads) between May 16 and Sept. 30. Road locations and vehicle use patterns have been verified on the ground to the extent possible. Modeling of *hiding cover* (for *Forest Plan* compliance) provides a reasonably accurate estimate of percent cover over broad areas, but it is not useful for drawing local, site-specific conclusions as to elk habitat use. Crown closure, estimated from satellite imagery, served as a surogate for measuring hiding cover directly on the ground (as per *HFP, p. II/18)*. Effects of travel management on *winter range* are based on open road and snowmobile trail patterns on "HNF Oil and Gas EIS winter range" within HNF boundaries and on "MFWP winter range" in the 1.5 mile herd unit extension beyond those boundaries. Assessment of snowmobile use comes from the most recent Forest snowmobile trail maps and verification from discussion with local snowmobile groups that regularly use the trail system. Elk vulnerability during the hunting season is based on the percentage of fall home range occupied by effective *elk security areas*. Security areas are delineated via methodology developed by Hillis *et al.* (1991) and modified for "eastside" environments. Security areas are blocks of predominantly forested country at

WILDLIFE PARAMETER	ASSUMPTIONS AND INFORMATION USED	METHODOLOGIES AND SCIENTIFIC ACCURACY
	A *Forest Plan* amendment associated with this project substitutes *elk security areas* for the current hiding cover/road density index (the "Big Game Security Index" as a measure of elk security in the fall. Field research suggests that the security area methodology is the more accurate and sensitive of the two measures. Information on elk populations and seasonal distribution is based primarily on annual survey work by MFWP (including aerial cenuses and check-station data), but also from past MFWP radio telemetry studies.	least 1,000 acres in size with boundaries ≥ ½ mi from routes open to motor vehicles during the big hunting season (September 1 – December 1). Security area boundaries are also pulled back ½ mile from private land holdings with road access. Security is calculated for the portion of an elk herd unit within HNF administrative boundaries. The goal is for 50% of each herd unit to be maintained as elk security areas. Herd units below 50% security are considered to be in compliance with the *Forest Plan* security standard as long as % security does not decline (as a result of management activity). The assumption is that security is adequate as long as MFWP population objectives for elk are being met in local hunting districts, or in those portions of the distict subject to influence by the herd unit. Smaller non-motorized areas (250-999 acres) recognized as security areas in previous analyses are classified as "intermittent refuge areas". The need to maintain the integrity of these areas is recognized but their acreage is not calculated as part of % security for herd units.
Threatened and Endangered Species		
Canada Lynx	The *Northern Rockies Lynx Management Direction (NRLMD)* (USFS 2007b) provides the background information, standards, guidelines and general management underpinning for dealing with lynx. While this direction addresses all National Forest lands in the northern Rockies, I assume that our local survey work and habitat modeling are sufficient to allow us to tweak aspects of it to provide a better fit for the Divide landscape. Potential lynx habitat and suitable snowshoe hare habitat have been modeled by HNF GIS personnel using a combination of data from the timber stand management record system (TSMRS) (field-based stand data) and V-Map satellite imagery (USFS 2009). Road and snowmobile use are derived from GIS processes that tally miles of these routes in suitable lynx habitat in LAUs	Area-wide distribution of potential lynx and snowshoe hare habitat has been modeled and mapped by HNF GIS personnel, using criterea from the *NRLMD*. Field-based information for validating habitat modeling efforts has come from a variety of sources, including general wildlife surveys that have made note of habitat components useful to lynx throughout the landscape since the 1990s, lynx denning and foraging habitat surveys in the Tenmile drainage in 2003 and on-going Forestwide field surveys of potential snowshoe hare habitat conducted according to Regional protocols. The relative effects of snowmobiles are inferred from the miles of snowmobile trail in lynx habitat in different alternatives. Wild Things Unlimited (Bozeman) has run track surveys and collected DNA samples using established protocols since 2006 in

WILDLIFE PARAMETER	ASSUMPTIONS AND INFORMATION USED	METHODOLOGIES AND SCIENTIFIC ACCURACY
	[documented in the Project Record]. I assume, based on *NRLMD* guidance, that the effects of open roads and snowmobile routes in lynx habitat are imposed more by the access they provide competing carnivores and trappers than by the general presence of humans on these routes. Much of the background information for interpreting results of field surveys and modeled habitat data has come from the *Lynx Science Report* (USFS 1999), the *Lynx Conservation Assessment and Strategy* (Ruediger *et al*. 2000), *The Scientific Basis for Conserving Forest Carnivores* (USFS 1994) and recent fieldwork conducted in western Montana by several research workers.	the MacDonald Pass area and parts of the Little Blackfoot and Tenmile drainages (Gehman *et al.* 2007-2010). DNA from hair and scat samples have been analyzed by the USFS Rocky Mtn Research Station (Missoula) to identify species and individuals (Pilgrim 2007-2010). We have made use also of track survey transects run regularly by MFWP along the Divide for several years, as well as fortuitous observations by a number of individuals.
Grizzly Bear	Basic guidance for grizzly bear management comes from the *Grizzly Bear Recovery Plan* (1993) and the *Interagency Grizzly Bear Committee (IGBC) Guidelines* (1986) and the *Grizzly Bear Management Plan for Western Montana* (MFWP 2006). Application of this direction is modified by ongoing research, the slow expansion of occupied grizzly range southward across the HNF and the development of updated management documents. The entire Travel Plan Area lies within the Grizzly Bear "Distribution Zone", the area south of Northern Continental Divide Ecosystem (NCDE) Grizzly Bear Recovery Zone in which grizzlies are known to be present. The original Distribution Zone designated in 2005 was based on the pattern of grizzly sightings to that point and was limited to the area north of Mullan Pass. In 2013, however, based on field observation accumulated from a variety of sources, the Distribution Zone was expanded to cover the rest of the landscape down to the Beaverhead-Deerlodge NF boundary. Grizzly bear numbers throughout the landscape are assumed to be very low and as a result, environmental assessments in recent years have applied management guidelines for *IGBC* Management Situation #5, which I assume is appropriate in	No specific methodologies were used other than estimates, for each alternative, of (1) open road densities and of (2) large non-motorized habitat patches (>2,500 ac) more than 0.3 mi from open roads. These patterns are shown separately for the original Distribution Zone north of Mullan Pass and the newly expanded Zone south of there. . Information on distribution of grizzly bears and suitable habitat components across the Divide landscape has been derived from wildlife surveys by HNF biologists since the early 1990s, data from MFWP and observations by field-going personnel and Forest-users. Observations of bears have been ranked as to credibilty and the information applied accordingly. Criteria outlined in the Grizzly Bear Recovery Plan and the IGBC Guidelines were served as the basis for analysis. We do not have enough systematic observations by trained personnel to allow us to estimate population numbers for the Divide landscape or to determine if individuals are resident or transient.

WILDLIFE PARAMETER	ASSUMPTIONS AND INFORMATION USED	METHODOLOGIES AND SCIENTIFIC ACCURACY
	this case as well.	
Sensitive Species		
Northern Rocky Mountain Gray Wolf	U.S. Fish and Wildlife Service (USFWS) and MFWP biologists have provided information on the status of wolves in the Divide landscape regularly since the early 1990s. Much of this data has been documented in *Montana Wolf Program Weekly Reports* and *Rocky Mtn Wolf Recovery Annual Reports* (USFWS, MFWP 1995-2011). Other information has come from field observations by HNF biologists, HNF field crews, local residents and other Forest users. More recently, we have garnered data from tracking surveys by Wild Things Unlimited (Bozeman, MT). Because of the small number of wolves in the Divide landscape at any one time, their relatively high profile and the intense scrutiny given them by monitoring agencies, I assume that we have a more complete picture of local wolf populations than of any other wildlife group in the landscape.	The HNF used no specific methodology, only general field surveys. Wild Things Unlimited has located wolves using specific tracking and sample gathering protocols, although their efforts are focused on forest carnivores rather than wolves. Information on the whereabouts of wolves, wolf dens and rendezvous sites has come mostly from fieldwork by the USFWS and more recently, by MFWP. These efforts have included aerial and ground-based radio telemetry. In determining effects, we made use of local information from USFWS, MFWP and research as identified in "References Cited". Constant monitoring of the small local wolf population (by MFWP) results in periodic population estimates that are precise and accurate. Statewide wolf counts, however, tend to underestimate the total population, given its size and distribution: Recent Gray Wolf Annual Reports by MFWP (2010-2012) discuss methodologies employed to get at the actual size and configuration of the wolf population.
Wolverine	Information and assumptions used to analyze effects on wolverine are documented in Hillis and Kennedy (2003) and center around natal denning habitat. Since wolverines are most vulnerable to disturbance at these sites in late winter and early spring, I assume that the primary source of human disturbance will come from snowmobiles. Wolverines are often associated with large blocks of unroaded country with minimal human presence and I assume that these habitat zones are important to wolverine population viability. Assessment of unroaded habitat has employed information from elk security area analysis, grizzly bear habitat analysis and corridor/linkage zone analysis, each of which measures the size and arrangement of unroaded habitat blocks in a different way. The rationale for	Impacts to wolverine natal denning habitat typically come from snowmobile activity (Hillis and Kennedy 2003). As the current Regional habitat model has not identified any wolverine denning habitat in the Divide landscape, I've approached this parameter qualitatively. Fieldwork suggested areas that might provide viable denning sites and the potential for snowmobile presence was then inferred from Travel Plan alternative maps and the Helena RD Snowmobile Trail map (2003). The most robust field data on wolverines in the landscape comes from winter tracking surveys by Wild Things Unlimited coupled with DNA analysis by the USFS Rocky Mtn Research Station. Other field observations come from MFWP biologists, HNF field workers, local residents, recreationists and trappers. Since the needs of wolverines with regard to unroaded habitat are murky, such habitat blocks were

WILDLIFE PARAMETER	ASSUMPTIONS AND INFORMATION USED	METHODOLOGIES AND SCIENTIFIC ACCURACY
	and parameters associated with these analyses are provided in the appropriate sections that follow. Rigorous fieldwork by Wild Things Unlimited has revealed the presence of 2 resident wolverines, but the data is insufficient to estimate population size.	identified via 3 different methods (grizzly bear, elk security and linkage zone analyses) and results compared among alternatives. The result, while imprecise, provides a basis for relative comparison.
Fisher	Analysis of the fisher is based primarily on literature review. Habitat has been modeled by the HNF GIS shop (USFS 2009) and intermittantly field-checked during general wildlife surveys. Observations of fishers in this landscape have been so rare that little is known of their local distribution, numbers, or status as residents/transients. Although we have been able to identify potential pockets of suitable habitat, we have been unable to make useful estimates of local population size. Since research indicates that fishers do not shy away from Forest roads, I assume that road impacts are indirect, from access provided to trappers and to firewood cutters who remove large snags of use to fishers.	The only methodology employed was to compute open road miles in modeled fisher habitat (via GIS) and then calculate acres within the 600 ft wide road corridor from which firewood cutters could remove large snags and logs potentially useful to fishers. The results are useful primarily as a relative measure to compare alternatives. Systematic winter tracking surveys (Wild Things Unlimited, 2006-2012) have regularly detected lynx and wolverines in the central part of the Divide landscape, but have found no sign of fishers. Likewise, a grid of hair-snag survey stations in 2008 detected no fishers in the landscape. Reports of fishers in this area have been fortuitous and rare and have not been sufficient to allow an estimation of population numbers.
Black-backed Woodpecker	I assume that impacts of travel management on black-backed woodpeckers are indirect, related to firewood cutting and roadside hazard tree removal. Data used to analyze effects on habitat are derived from Hillis *et al*. (2002): *U.S. Forest Service Region One Black-Backed Woodpecker Assessment*. Other information and assumptions are described in *Black-backed Woodpecker Habitat Modeling Process* and in the text files and analyses run by the HNF GIS shop. With few recent fires in the Divide landscape, no black-backed woodpecker surveys have been conducted. I assume, however, that the woodpeckers are present in very low numbers, in pockets of old-growth, in small local burns (such as MacDonald Pass) and here and there in the extensive array of beetle-killed pine trees across the landscape. I also assume that in spite of the massive beetle-kill, black-backed woodpecker numbers will only escalate if parts of the landscape burn in the future.	Effects of travel management on dead and dying trees in road corridors have implications for black-backed woodpeckers, low though their numbers may be. The methodology used to determine these effects is described in the section on Snags and Woody Debris. While the survey and analysis methods used to characterize the dead tree resource in well-defined, accessible road corridors have generated estimates with a high degree of precision and accuracy, the ongoing bark-beetle outbreak has produced a moving target in terms of snag density and dispersion at any given time. We can say, however, that numbers of large dead trees are increasing significantly thoughout Divide road corridors and the Travel Plan area as a whole. No field surveys targeting black-backed woodpeckers have been conducted in the Divide landscape, but they have been reported in the MacDonald Pass burn (from 2009).

WILDLIFE PARAMETER	ASSUMPTIONS AND INFORMATION USED	METHODOLOGIES AND SCIENTIFIC ACCURACY
Western Toad	Potential effects of roads on boreal toads were based on a literature review. Site specific-information for some locations, particularly riparian areas, was derived from general wildlife surveys (1992-2010) and observations by HNF fisheries biologists and by researchers from the Dept. of Natural Sciences at Carroll College.	General wildlife and fisheries surveys have made note of western toads and potential habitat for several years, but no specific methodologies to sample for amphibians have been employed. Biologists and students from Carroll College have sampled for amphibians at sites in the Travel Plan area over the last decade [G. Hokit, pers. comm.] and we have made use of this information.
Management Indicator Species		
Pileated Woodpecker (Old-Growth Indicator)	Pileated woodpecker habitat modeling is based on Region-1 protocols. A summary of how these protocols were applied to HNF habitats can be found in "*Criteria for Wildlife Models HNF*" (USFS 2009). See also "Snags and Woody Debris" above. Information as to distribution, relative population density and habitat use by pileated woodpeckers in the Divide landscape comes from an array of wildlfe field surveys and fortuitous observations since 1992 [HNF wildlife files]. Based on this information, I assume that, although the woodpeckers are MIS for old-growth forest, they most often occur in non-old-growth habitats in this landscape, focusing on large trees as key habitat components.	The key components needed to characterize pileated woodpecker habitat in the Divide landscape are large dead and dying trees (generally >24 inches dbh). The methodology for determining effects of travel management on snags is described above in the "Snags and Woody Debris" section. Given the high mortality of mature pine trees in the current bark beetle epidemic, *all* stands of large trees in general (esp. ponderosa pine) are of interest since (1) all large pine are now at risk of mortality in the short term and (2) pileated woodpeckers are capable of foraging and excavating cavities in live trees if needed. As a result, HNF habitat models of pileated woodpecker habitat, which focus on stands with large mature and old-growth trees, now probably reflect more accurately the suitability of these sites to support the woodpeckers than they have in the past. A tally of open road miles (and associated road corridor acreage) in pileated woodpecker habitat serves to indicate the relative impact of potential firewood cutting under different alternatives.
Northern Goshawk (Old-Growth Indicator)	Habitat modeled by HNF GIS specialists has been used for this analysis, the original modeling effort from 2002 having been updated (USFS 2009). Nest sites have been sought out and monitored since the early 1990s. Information regarding these sites is summarized in a number of reports in the HRD and HNF wildlife files [see Project File]. Based on the full spectrum of goshawk observations in the	Goshawks have been monitored throughout the Divide landscape since 1992. In recent years, protocols developed by Region 1 and adapted by the HNF have been applied. In 2005, large grids were sampled across the HNF as part of a Regional effort to assess goshawk distribution and population trends. In addition to these standard sampling programs, most reported goshawk sightings are followed up by less formal field exercises

WILDLIFE PARAMETER	ASSUMPTIONS AND INFORMATION USED	METHODOLOGIES AND SCIENTIFIC ACCURACY
	Divide landscape and data on goshawk habitat and home range size in Reynolds *et al.* (1992) [as well as in other research (see references)], we assume that goshawks will occupy, over the course of a decade, all habitats dominated by mature green forest in the landscape, spaced out so as to allow home range size of roughly 4,000-7,000 acres (based on local field observation). An additional assumption underlying this assessment is that the existing Forest road system has relatively little direct effect on goshawks and that changes proposed under action alternatives have little impact on the ability of goshawks to effectively occupy the landscape. I assume that high mortality in mature pine forests from ongoing bark beetle infestation will cause significant shifts in distribution of goshawk nesting sites in the near future.	designed to locate active nests. Nest sites are then mapped and monitored. Once clusters of nests indicating the centers of goshawk home ranges have been identified, it is possible to identify additional potential goshawk ranges throughout the landscape and survey in those areas. Field monitoring is continuing, in particular, to document changes in goshawk home range use patterns resulting from the mountain pine beetle epidemic. A tally of open road miles in goshawk nesting and foraging habitat (and associated road corridor acreage) provides as a mechanism for comparing potential indirect effects of snag removal by firewood cutters under different alternatives. Potential disturbance of existing nest stands from opening up of currently closed roads under some alternatives provides an additional means of comparison.
Hairy Woodpecker (Snag Indicator)	Hairy woodpecker habitat modeling is based on Region-1 protocols. A summary of how these protocols were applied to HNF habitats can be found "Criteria for Wildlife Models HNF" (USFS 2009). See also "Snags and Woody Debris", above. Information as to distribution, population density and habitat use by hairy woodpeckers in the Divide landscape comes from wildlfe field surveys and fortuitous observations since 1992 [HNF wildlife files]. Northern Region Landbird Surveys have also provided data. Based on this information, I assume that hairy woodpeckers are very versatile as to the kinds of habitats they use and that the Region-1 model, while delineating *optimal habitat*,substantially underestimates *total suitable habitat.* So, I have presented results both for (1) R-1 modeled habitat (which is based, at least in part, on Hutto 1995) and for (2) an expanded complex of mature forest habitat regardless of stand density and evidence of dead trees. I base this latter delineation on the assumption that all mature forest stands	Given the high mortality of mature pine trees in the current bark beetle epidemic, all mature stands with a ponderosa or lodgepole pine component now support significantly more snags than when HNF habitat models were last run. These developments, combined with a habitat model that presents a relatively narrow definition of hairy woodpecker habitat (which I refer to as "optimal" nesting habitat), result in an underestimate of habitat useful to these birds in the Travel Plan Area. The key components that characterize optimal nesting habitat are snag-rich mature forest stands (overstory trees >10 inches dbh) of sparse-to-intermediate density (<50% canopy closure). In the Divide landscape, this results in the delineation of considerably less habitat than hairy woodpeckers have been observed to use. So, I have also looked at mature forest habitat in general as a suitable environment for hairy woodpeckers (though not all of it may be nesting habitat). This includes all stands classified as mature forest (dbh >7 inches) regardless of density or evidence of dead trees. Acreage of hairy woodpecker habitat available to firewood

WILDLIFE PARAMETER	ASSUMPTIONS AND INFORMATION USED	METHODOLOGIES AND SCIENTIFIC ACCURACY
	contain a few cavity prone and insect laden trees sufficient to support at least some hairy woodpeckers. Road miles in modeled habitat and mature forest habitat come from GIS spreadsheets. I assume that the effects of travel management are indirect, resulting from road-facilitated snag removal by firewood cutters.	cutters and susceptible to snag removal by HNF roadside hazard tree projects (the 600 ft corridor along open roads) is used to compare relative effects of different alternatives. Field surveys, while useful in indicating the habitat versatility and relative abundance of hairy woodpeckers in the Divide landscape, have not provided systematic enough data to generate actual population estimates.
American Marten (Mature Forest Indicator)	Marten habitat modeling is based on Region-1 protocols. A summary of how these protocols were applied to HNF habitats can be found "Criteria for Wildlife Models HNF" (USFS 2009). See also "Snags and Woody Debris", above. Information on distribution and habitat use by marten in the Divide landscape comes from general wildlfe field surveys, reports from trappers and winter tracking surveys run for many years by MFWP and more recently by Wild Things Unlimited (Gehman *et al.* 2007-2012). Additional information concerning marten habitat and response to roads has come from a review of the literature [see References]. Based on these sources, I assume that the effects of travel management are indirect, resulting from (1) access provided trappers on snowmobiles and (2) removal of snags and logs from the road corridors by firewood cutters and HNF personnel (for safety purposes).	The key components needed to characterize marten habitat are relatively dense mature forest habitat with a suitable supply of medium to large dead trees and logs. In addition, marten are much more likely to be found in subalpine fir, lodgepole pine, Engelmann spruce and moist Douglas-fir forests than in dry Ponderosa pine/ Douglas-fir stands. The methodology for determining effects of travel management on snags is described above in the "Snags and Woody Debris" section. As with the woodpeckers, the ongoing bark beetle outbreak means that all mature stands with lodgepole pine component now support significantly more snags than when HNF habitat models were last run. In the short-term, these models of potential marten habitat may now more accurately reflect the suitability of these sites to support marten. Over the long long term, their suitability is likely to vary depending on the degree of remaining canopy closure and the vigor of forest regeneration. A tally of open road miles in potential marten habitat (and associated road corridor acreage) provides a mechanism for comparing potential indirect effects of snag removal by firewood cutters and routes available to trappers under different alternatives. Field surveys, while useful in indicating the presence and distribution of marten in the Divide landscape, have not provided enough systematic data to generate valid population estimates.

WILDLIFE PARAMETER	ASSUMPTIONS AND INFORMATION USED	METHODOLOGIES AND SCIENTIFIC ACCURACY
Site-Specific Assessments		
Local Effects in Key Areas	Local areas addressed in this section were chosen based on the extent to which they were treated differently under the 3 alternatives, their importance to the wildlife resource and in some cases, the level of controversy they generated. I assumed that by focusing on site-specific issues in these particular localities, the implications of implementing each alternative and the differences between alternatives, could be clarified. Data used to define the status of these areas with regard to open road miles, local road densities and snowmobile area closures were derived from the HNF Visitor Map, Divide Travel Plan alternative maps and HNF "B-maps" (USGS 1:24,000 scale maps with the HNF road and trail system superimposed). More qualitative information on local wildlife resources and their response to different road/trail scenarios was drawn primarily from HNF wildlife field surveys (1992-2012), with supplementary information coming from MFWP surveys and mapping efforts, USFWS fieldwork and the HNF Roads Analysis (2001-2004).	The boundaries of local areas (for purposes of calculating road densities) were defined by a combination of topographic features and the reach of the local road system at issue. In a number of cases, I drew boundaries along section lines. Road miles were measured with an engineers' compass and areas determinied via dot grid: No GIS technology was applied, but the precision and accuracy of the more primitive methodology employed here can be assumed to be in the same range as standard GIS estimates for areas of this magnitude. Aside from these measurements, the bulk of the assessment is based on more qualitative information dealing with local wildlife associations, habitat configurations and expected responses to the proposed scanarios presented by different alternatives.

Affected Environment

Introduction

The Divide Travel Plan Area covers all but the southeastern corner (the Clancy-Unionville unit) and the northern tip (Little Prickly Pear drainage) of the Divide landscape and encompasses a wide range of wildlife habitats and wildlife species associations. Not all of these habitats and species groups are affected by Forest travel management in ways that are measurable or meaningful (in terms of individual species behavior, survivorship, or productivity). As a result, not all of the wildlife parameters (species, habitats, habitat components) tallied in the following table are analyzed and discussed in the body of the report that follows, though they may receive some mention.

Parameters not carried forward in the report are those for which there are either no anticipated impacts associated with alternatives or for which the impacts are addressed via analysis of a surrogate species [the elk analysis, for example, provides a basis for inferring primary impacts on white-tailed deer and moose]. As summarized in the previous section, the information presented in this analysis comes from survey and observation in the field, accumulated professional experience, discussion with other professionals and field-going personnel, examination of scientific literature, GIS modeling analyses and conservation strategies and recovery plans.

Table 82 identifies relevant wildlife parameters, the degree to which they have been analyzed and the rationale for the level of analysis. Analysis categories include (1) detailed effects assessment, (2) coverage under analyses for other parameters, (3) assessment of existing condition only, or (4) summary in the Wildlife Analysis Approach Table (*appendix A of the wildlife specialist report*).

Table 82: Key to documentation of wildlife analyses

Wildlife Parameter	Analysis Level	Comment
General Habitat	Detailed Effects Assessment	The analysis indicates that effects on general habitat, including fragmentation, habitat loss and edge effects are minimal.
Old Growth	Examined as a sub-set of General Habitat	Effects on old growth are minimal and indirect, stemming mostly from firewood cutting along open roads .
Riparian Habitats	Detailed Effects Assessment	New effects on riparian habitats are minimal, but the existing road system creates problems in a number of areas.
Travel Corridors and Linkage Zones	Detailed Effects Assessment	Connectivity can be affected by roads and has been identified as an issue by various user groups. It is described in terms of open road density and large non-motorized habitat blocks. Differences between alternatives are measurable.

Wildlife Parameter	Analysis Level	Comment
Snags and Woody Debris	Detailed Effects Assessment	Snags and logs come into play in analyses of certain sensitive and management indicator species and as components of old-growth. Differences between alternatives are measurable. No snags will be removed to construct new roads, but road access allows their removal by firewood cutters and as hazard trees (an indirect effect).
Population Viability	Effects Assessment included in individual species sections	Since direct effects on general habitat are negligible, the contribution to population viability remains unchanged. Any differences between alternatives stem from indirect effects of future road use.
Big Game Species		
Elk	Detailed Effects Assessment	The Rocky Mountain elk is a management indicator species and a species of interest to several user groups. Differences in effects between alternatives are measurable.
Mule Deer	Current Status Assessment. Effects covered in sections on Elk	Current status of mule deer is discussed in the Specialist Report but effects are not reported. The elk analysis serves as a surrogate assessment of primary effects on mule deer. Potential differences between elk and mule deer are discussed.
Whitetail Deer	Wildlife Analysis Approach Table	The elk, mule deer and riparian analyses serve as a surrogate for effects on whitetail deer.
Moose	Current Status Assessment	Current status and needs of moose are discussed in the Specialist Report but effects are not reported. Anticipated effects on moose are addressed via the effects assessments for riparian habitat and for elk.
Big Horn Sheep	Wildlife Analysis Approach Table	Bighorn sheep are not resident in the Divide landscape and therefore not affected by proposed alternatives.
Threatened and Endangered Species		
Grizzly Bear	Detailed Effects Assessment.	Grizzly bears are present in the Plan Area in very low numbers. No new negative effects are expected from project alternatives.
Canada Lynx	Detailed Effects Assessment.	Effects on lynx include compaction associated with snowmobiling and cross-country skiing and potential effects associated with road use.
Wolf	Detailed Effects Assessment	Wolves are present in and around the Plan Area, but effects of travel management on wolves are expected to be minimal.
Sensitive Species		
Wolverine	Detailed Effects Assessment	In 2013, the USFWS proposed the wolverine for listing under the Endangered Species Act because of the loss of natal denning habitat as a result of climate change. By 2014, this risk was deemed to be not so immediate as to require listing and so the wolverine has reverted to “sensitive species” status. The focus of this analysis is on potential disturbance at denning sites and in unroaded refuges.

Wildlife Parameter	Analysis Level	Comment
Fisher	Detailed Effects Assessment	Fishers are present in very low numbers. Effects on any fishers in the Plan Area are expected to be minimal and indirect.
Townsend's Big-eared Bat	Wildlife Analysis Approach Table	Townsend's big-eared bats are not known in the Plan Area and no effects are anticipated.
Bog Lemming	Wildlife Analysis Approach Table	There are no anticipated effects on bog lemmings.
Bighorn Sheep	see above	
Bald Eagle	Wildlife Analysis Approach Table	There are no bald eagle nests in the Plan Area: no alternative is likely to affect them.
Black-backed Woodpecker	Detailed Effects Assessment	Effects on black-backed woodpeckers will be indirect and related to firewood cutting and roadside hazard tree removal.
Peregrine Falcon	Wildlife Analysis Approach Table	There are no anticipated effects on peregrine falcons. None are known to nest in the Plan Area.
Flammulated Owl	Detailed Effects Assessment	Effects on flammulated owls are indirect and related to removal of large snags by firewood cutters. Analyses of snags, woodpeckers, goshawks and marten serve as surrogates for flammulated owls. Their status is addressed in the Specialist Report, but effects are not discussed.
Harlequin Duck	Wildlife Analysis Approach Table	Harlequin ducks are not present and no effects on them or their habitat are anticipated.
Western Toad	Detailed Effects Assessment	Effects on western toads are expected to be minimal, some improvement due to fewer roads in riparian areas; ongoing hazards of road crossing.
Leopard Frog	Wildlife Analysis Approach Table	Leopard frogsare believed to have been extirpated from the Plan Area more than 20 years ago: no effects are anticipated.
Management Indicator Species		
Pileated Woodpecker	Detailed Effects Assessment	Effects on pileated woodpeckers are expected to be indirect and minimal, coming from removal of a few large snags (>30" dbh) by firewood cutters along open roads.
Northern Goshawk	Detailed Effects Assessment	Effects on northern goshawks will be relatively minor and indirect, stemming from removal of snags used by potential prey species from the open road corridors.
Hairy Woodpecker	Detailed Effects Assessment	Effects on hairy woodpeckers are expected to be indirect. While substantial numbers of suitable snags are likely to be taken from the road corridors for firewood, the percentage of hairy woodpecker habitat affected will be relatively small.
Marten	Detailed Effects Assessment	Effects on marten are expected to be relatively minor and indirect. Modest loss of habitat components would result from snag removal along open roads in lodgepole pine, subalpine fir and Engelmann spruce forest. Declining snowmobile access for trappers would also be a factor.
Elk	see above	see above

Wildlife Parameter	Analysis Level	Comment
Mule Deer	see above	see above
Bighorn Sheep	see above	see above
Other Road Analysis Issues		
Recreation	Effects Assessment included in individual species/parameter sections	Effects of recreation associated with the road/trail network vary in character and degree for different species and habitat components.
Disruption/ Displacement	Effects Assessment included in individual species sections	Effects of disruption/displacement associated with roads vary widely among species.
Direct Mortality	Effects Assessment included in individual species sections	Effects of direct mortality associated with roads and trails vary widely among species.

Wildlife Habitat in the Travel Plan Area

Habitats in the Divide landscape range from high alpine meadows and subalpine fir/whitebark pine forests to low- and mid-elevation Douglas-fir and ponderosa pine forests interspersed with dry grassland and shrubland. Cool moist forests comprise a majority of habitats, followed by warm dry forests, grasslands/shrublands, riparian habitats and aspen (Divide Landscape Analysis 1996b).

This analysis looks at 3 major habitat categories that may be affected measurably by travel management: (1) general wildlife habitat (primarily conifer forest and grassland/shrubland habitat), (2) riparian/wetland habitat and (3) snags and woody debris. We refer to analysis at this broad scale as “coarse filter” analysis. A coarse filter assessment focuses on maintaining a diversity of habitats and habitat functions for a full range of species (USFS 1996c). Landscape-wide habitat functions that are included in the coarse filter analysis are wildlife travel corridors, linkage zones and habitat fragmentation.

Species-specific analyses are characterized as “fine filter” analyses and they focus on maintaining habitat for particular species, in particular, threatened, endangered, sensitive and *Helena Forest Plan* indicator species. Table 82 above lists those species addressed in a fine filter format.

General Upland Wildlife Habitats

Forest Habitats

Forest habitat in the Travel Plan area can be divided into a variety of categories: (1) warm, dry Douglas-fir/ponderosa pine at lower elevation; (2) mixed lodgepole pine and Douglas-fir forest, mostly at mid elevation; (3) lodgepole pine forest at mid to high elevation; (4) moist subalpine fir-dominated forest at high elevation; (5) Engelmann spruce-dominated forests, mostly in drainage bottoms and across cool benches and basins; (6) forests with a notable whitebark pine component at high elevation; and (7) aspen forest, both riparian and upland, over a wide elevational range, usually in small fragmented stands. Mature closed-canopy stands in the 80-120 year age range currently dominate the landscape. But, over the past 6-7 years a mountain pine beetle infestation has been killing hundreds of thousands of mature lodgepole and ponderosa pine trees (and lesser amounts of whitebark pine and limber pine), a process that is transforming forest structure across the landscape.

Habitat for post-fire dependent wildlife remains limited in the Divide landscape. Until 2009, only two stand-replacing fires in excess of 100 acres had occurred in recent decades: (1) the Beartrap Gulch fire (1960s) in the upper Little Prickly Pear drainage and (2) the lower Sweeney Creek fire (1950s) on the northeast side of that drainage. The Beartrap burn is located in unroaded country below the Continental Divide and supports a rich array of early seral conifers (mostly lodgepole pine), shrubs and ground vegetation and as a result, is an attractant for wildlife species. In Sweeney Creek, the ponderosa pine seed source was eliminated and the area now supports a mosaic of grass-shrub and aspen communities with little conifer regeneration. Few snags remain in these burns. More recently, the MacDonald Pass fire burned a 170-acre swath through the Walker Creek drainage in the early fall of 2009. It is the only burn with an abundance of recent fire-killed snags in the Divide Travel Plan Area.

Other than these three areas, early-seral conifer habitats have been created mostly by timber harvest, which has not produced the dead tree habitat that attracts many post-fire wildlife species. Concentrations of winter-killed trees in the upper Snowshoe and Dog Creek drainages in the late 1980s and around Jericho Mountain in the early 1990s produced some local habitat opportunities for these species. But now, the mountain pine beetle outbreak has created landscape-wide dead tree habitats in a variety of configurations, ranging from snags dispersed through predominantly green canopy to broad swaths of almost entirely dead forest across whole drainages.

For purposes of this discussion, I have condensed the variety of forest types listed above into two primary categories: Cool moist forests and warm dry forests.

Cool Moist Forests

Cool, moist forests at middle and higher elevation are the predominant habitat formation across the Divide landscape. These forests are most often dominated by lodgepole pine [Figure 6; see also Figure 46, Figure 47, Figure 56, Figure 57]. Engelmann spruce occurs in riparian sites [Figure 8], across cool basins and benches and on certain north and east slopes. Subalpine fir is also present in these situations across much of the landscape at high elevation [see Figure 6, Figure 8, Figure 58, Figure 59]. Whitebark pine is confined to high elevation sites, often growing on dry, rocky substrates (making these stands a marginal fit as “moist” forests). Whitebark is most common at the north and south ends of the landscape, along the Continental Divide around Black Mountain in the north and Thunderbolt Mountain in the south. These pines have been heavily impacted by the mountain pine beetle outbreak.

At middle elevations, Douglas-fir is a dominant presence on many “moist” sites, often in combination with lodgepole pine. Douglas-fir stands are coming to represent the primary mature forest component over much of the Divide landscape as lodgepole pine succumbs to mountain pine beetle.

In some lodgepole pine stands, canopy trees are old and decadent and are being succeeded by climax subalpine fir at higher elevation [Figure 6] and by Douglas-fir at mid-lower elevation. But over much of the Travel Plan area, especially in the upper Little Blackfoot drainage south of Highway 12 and along the Continental Divide in the northern reaches of the planning landscape, lodgepole pine maintains relatively pure stands of 80 to 120 year old trees, a product of fires and widespread logging in the late 19th and early 20th centuries. The mountain pine beetle infestation has opened up the canopy in many of these stands as mature trees die [Figure 18, Figure 19, Figure 46, Figure 47]. This will eventually increase the vegetative and structural diversity of the understory, which for the most part has been lacking in complexity. On the

other hand, once the dead trees have fallen, fuel loading in the understories of the new stands will be substantially greater than that of preceeding stands. This will elevate the probability of these stands being completely transformed by wildfire.

Figure 6 - Photo 1. Cool Moist Forests
Lodgepole pine forest with young subalpine fir/ Engelmann spruce and dense ground cover dominated by grouse whortleberry in the understory. Lodgepole pine stands of this general age and density represent the most widespread cool, moist forest formation in the Divide landscape. This particular stand sits atop the Continental Divide southwest of Bison Mountain at about 7,500 ft elevation. Virtually all overstory trees larger than five inches diameter-at-breast-height are now dead as a result of mountain pine beetle infestation.

Warm Dry Forests

On the warmer, drier sites, mostly at middle and lower elevations, forests are dominated by a mixture of Douglas-fir and ponderosa pine. Absence of regular fire in these stands, abetted by historic logging, has transformed many of these once mostly open grown mature stands into dense, multi-storied forests no longer able to survive a fire of any intensity (Figure 7). In terms of habitat for native herbivores, this represents a shift from a forest environment with minimal horizontal cover and productive ground vegetation (forage) to one with decent hiding/screening cover but scant understory forage. Under current conditions, the contribution of early seral forest habitat to this part of the landscape is more meager than under historic conditions, most young forests having been generated by timber harvest on both public and private land rather than by fire. Seral species in these forests are Douglas-fir at middle and higher elevations and a mixture of Douglas-fir and ponderosa pine at lower elevations, with some limber pine and juniper.

Figure 7 - Photo 2: Warm Dry Forest
Relatively dense ponderosa pine forest with Douglas-fir regenerating in the understory, producing multi-storied stand structure. This density and layering would have been uncharacteristic of the more open-grown, fire-maintained stands that historically occupied dry sites such as this on the Mount Helena ridge in the southeast quadrant of the Divide landscape.

Old-Growth Forest

Old-growth forests are unique for their diversity and for the variety of niches that they offer. While no local wildlife species are absolutely dependent on old-growth for their survival, a number of them find optimal conditions in these old forest environments.

The Divide landscape supports two general types of structural old growth: (1) cool-moist types (classic Pacific Northwest old-growth) and (2) warm-dry open-grown forest types.

Cool, moist structural old growth stands occur primarily at upper elevations, on north slopes and in drainage bottoms. Most often, this type of old growth occurs in blocks or patches of limited size. These patches, however, are usually surrounded by younger closed-canopied conifer stands, which creates a wider interior forest condition. Cool, moist old growth habitats have multi-layered canopies, abundant woody debris and varying age classes of snags. They support varied understory vegetation and maintain light and climatic variables that offer a diversity of wildlife niches (Franklin et al. 1981). Large snags, along with dead and down material, supply food and nesting for cavity dependent birds as well as a variety of insects. The dark, mesic environment is a microsite that provides for a variety of fungi and insects, which in turn become food for small mammals and birds, adding to the species richness and diversity. Resident species include pileated woodpeckers, brown creepers, hermit thrushes, northern goshawks, western tanagers, hairy woodpeckers, white-breasted nuthatches, Stellar's jays, spruce grouse, red-backed voles, marten and northern flying squirrels, among others. Native ungulates use these areas in summer for thermal cover to reduce heat stress. In winter these areas are

important foraging and denning habitat for marten and also provide opportunities for wolverine, fisher and lynx.

Historically, warm, dry old-growth was characterized by large open-grown Douglas-fir or ponderosa pine stands with abundant grasses, forbs and small shrubs in the understory (Braun et al. 1966). Large snags were scattered throughout, but logs, as well as young conifers, were kept to a minimum by frequent ground fires (Knight 1989; Barret and Arno 1999). Species favored by these habitats include flammulated owls, pygmy nuthatches, violet-green swallows, mourning doves, western bluebirds, pine siskins, flickers, Cassins finches, Clarks nutcrackers, red squirrels, ground squirrels, chipmunks and pocket gophers among others. Foraging opportunities for deer and elk were excellent. A majority of these old-growth formations were logged during the late 19th and early 20th centuries and most of those that have survived are now changed due to fire suppression, full of dense multi-layered understory, no longer capable of surviving periodic fire and inhabited by a different array of wildlife.

Grassland and Shrubland

Natural grassland and shrubland occurs throughout the Divide landscape as diminutive openings amidst mature forest, as small upland parks, as dry-mesic regions around central riparian sites, as foothills extensions of open valley habitats and as expansive montane grassland covering hundreds, sometimes thousands, of acres [see Figure 10, Figure 14, Figure 39, Figure 42, Figure 43]. Altogether, they occupy about 10 percent of the landscape. Most are dominated by grasses and herbaceous forbs. Shrubs cover a much smaller proportion of unforested habitat, often in rough, rocky terrain or other sites with harsh substrate. Among larger upland shrubs, big sagebrush is the most widespread and the most likely to occur in extensive stands. Others, such as bitterbrush, chokecherry, mountain mahogany, juniper and rabbitbrush may be locally common [see Figure 41, Figure 56, Figure 57].

The Divide Landscape Analysis (USFS 1996b) estimates that grassland and shrubland habitat has been reduced by roughly 15 to 30 percent since the early 20th century. This is a function of fire suppression that has allowed conifer forests to methodically colonize open habitat, eliminating smaller openings, diminishing the size of larger parks and fragmenting many of them into an array of smaller grassland patches. Ecotone edge is often deep and varied. This has reduced habitat for grassland wildlife species and intensified competition between native herbivores and domestic livestock that graze the National Forest allotments from late spring through early fall.

Riparian Habitats

Characteristics of Wetlands and Riparian Zones

Riparian and wetland habitats, while widely distributed across the Divide landscape, are usually highly localized and occupy a relatively small share of the total landscape (less than three percent). The presence of surface or near-surface water produces local microclimates that differ from those of surrounding upland areas and allows for more productive and biologically diverse habitats. Wetland and riparian areas host unique vegetation assemblages and may be the only herbaceous communities in forested ecosystems or the only tree-dominated community in grasslands. As a consequence, they provide habitat for a disproportionate number of wildlife species (Thomas 1979).

A wetland is a land area that is saturated with water, either at the surface or in the root zone and as a result, supports hydric soil and vegetation adapted to flooding (Mitsch and Gosselink 2007, p. 27-31). Wetlands in the Divide landscape vary widely in size and in the degree to which

they support water through the season. They include marshes (with surface water), swamps (forested wetlands), bogs (with sphagnum moss mats), wet meadows (subirrigated grasslands), sedge meadows and seeps (wet areas around springs). These sites vary in size, but most are localized and frequently isolated from other such habitats. Wetlands often lie within riparian zones adjacent to open water, but some, such as wet meadows and springs, occur as independent entities in upland landscapes and are referred to as *isolated wetlands* (Mitsch and Gosselink 2007, p.26). As noted, wetlands are productive, ecologically diverse and support characteristic vegetation that contrasts with that of surrounding areas. As a result, many wildlife species are drawn to these sites.

A riparian zone is an area with distinctive soil and vegetation between a stream, pond, or other body of open water and the adjacent upland. Most riparian zones include a certain amount wetland habitat and in some cases, the entire zone is wetland. Many riparian zones, however, are a mix of wetland vegetation (dominated by aquatic plants adapted to saturated soil) and vegetation adapted to more mesic conditions (including trees and shrubs). Regardless of the relative proportion of hydric and mesic substrate, riparian zones are typically more productive and diverse than the adjacent upland habitat (Thomas 1979, p. 40-47). Wetland and riparian habitats are essentially ecotones that occur at the interface of aquatic and truly terrestrial ecosystems (Mitsch and Gosselink 2000).

In this report, the term “wetland” refers to the distinctive habitat associated with water-saturated soils; the term “riparian” refers to the ecotonal area adjacent to an open body of water, regardless of whether or not wetland habitat is present (though it often is).

Riparian and Wetland Associated Wildlife

Wetland habitats and riparian zones provide more breeding habitat for birds than any other kind of habitat association in North America (Kauffman et al. 2000). In the Rocky Mountain region, they contain more vulnerable bird species than any other community type. Numerous landbird species (ruffed grouse, willow flycatcher, yellow warbler, song sparrow) are tied to the shrubs or deciduous trees associated with riparian environments (Hutto and Young 1999). Studies of birds associated with riparian willow habitat conducted by the Northern Region landbird monitoring program in 2001 found 13 bird species that were “riparian-dependent” and 10 others that were “riparian-associated” (Young et al. 2003). Riparian dependent species were Wilson’s warbler, spotted sandpiper, fox sparrow, American redstart, willow flycatcher, common yellowthroat, veery, cedar waxwing, northern waterthrush, common snipe, song sparrow, yellow warbler and Lincoln’s sparrow. Riparian-associated species were MacGillivray’s warbler, spotted towhee, gray catbird, red-winged blackbird, white-crowned sparrow, dusky flycatcher, lazuli bunting, warbling vireo, red-naped sapsucker and black-headed grosbeak. The study included four sites in the Divide Travel Plan Area and results for these areas reflected those of the region as a whole.

Amphibians require riparian/wetland areas for part, if not all, of their life cycle. Because of limited mobility, their survival is favored by areas with abundant wetland habitat, either in extensive contiguous formations or as an array of smaller sites in close poximity, so as to allow effective dispersal and migration to other unoccupied habitat. Amphibians resident in the Divide landscape are spotted frogs, western toads and long-toed salamanders. Leopard frogs, once common, are now probably extinct in this landscape.

Mammals are also drawn to wetland and riparian areas because of their productivity, vegetative diversity, proximity to water and favorable microclimates, which combine to provide a varied

and abundant forage supply. Some species, such as mink, beaver, muskrats and water voles, are tightly tied to aquatic and wetland environments. Most wide-ranging mammals, such as deer, elk, moose, foxes, bears and mountain lions, though they spend the bulk of their time in upland habitats, are sooner or later drawn to wetland and riparian areas, for water, forage, prey, cover, or thermal relief. These localized sites are thus focal habitats that concentrate mammalian activity.

Recent wildlife field surveys indicate that with the demise of thousands of acres of mature pine forest in the wake of the mountain pine beetle outbreak, a number of species that were formerly widely distributed through those habitats are now concentrating to a greater degree in forested wetland and riparian areas. Most of these sites support patches or strips of green Engelmann spruce, subalpine fir, Douglas-fir and aspen and in many cases, provide the only viable mature forest environments in the area (Figure 8). Species that have been noted concentrating in wetland/riparian forest to a greater degree than in the past include red squirrels, red-breasted nuthatches, white-breasted nuthatches, mountain chickadees, Townsend's solitaires and ruby-crowned kinglets. Traditional wetland and riparian associated species continue to occupy these habitats as well, although whether or not the new press of upland species is affecting their abundances and behavior patterns is unknown.

Figure 8 - Photo 3: Riparian and Wetlands

A wet meadow near the Contiental Divide in the Tenmile Creek drainage. This is typical of wetland formations near the headwaters of numerous drainages across the Divide landscape. In late summer, the meadow continues to maintain water at and just below the surface, making for a very wet and productive environment. Most of the mature lodgepole pine forest in and around these sites is now dead from mountain pine beetle infestation, but the associated stands of Engelmann spruce and subalpine fir, as seen here, are now supporting concentrated wildlife activity that was formerly spread throughout the upland lodgepole forest.

Human Influences

Riparian areas tend to attract a disproportionate amount of human activity, recreation, home building, livestock grazing and roads. Partly as an aid to quantifying human impact on riparian zones, streamside riparian habitats have been designated as riparian habitat conservation areas, corridors that vary from 150 to 300 feet on either side of the stream channel.

Currently, 83 miles of open road and motor trails pass through riparian habitat conservation areas in the Divide Travel Plan area, in addition to numerous routes (motorized and non-motorized) crossing wet soil types not directly associated with streams. Helena National Forest fisheries biologists and hydrologists have classified roads and motor trails within riparian habitat conservation areas as "high risk roads". This includes the 83 miles open to motorized use and another 10 miles of closed roadway that continue to deposit sediment in the streams. They consider the zone of influence of these routes to extend out 300 feet on either side along fish-bearing streams and 200 feet along non-fish-bearing streams [see the fisheries and hydrology specialist reports].

Since the 19th century, human enterprises, including roads, have substantially reduced the effective size of riparian habitats. Elimination of much of the beaver population, initially a consequence of the 19th century fur trade and since then, a means of providing dry ground for livestock grazing, agriculture, settlement and roadways, has been a major contributing factor. Channelization of streams, diversion of water for irrigation and draining of wetlands are other means by which riparian habitats have been modified to serve these ends. Roads in riparian zones influence the quality of wildlife habitat by slowly pushing sediment into local water bodies. While some roads actually cross stream channels (Figure 9), most generate sedimentation merely by running nearby in the riparian habitat conservation areas. Vehicle traffic and other human activity associated with roads also serves to interfere with normal wildlife activity in these key habitats.

Figure 9 - Photo 4: Human Influences
Primitive Forest Road #527-B1 as it crosses the Sally Ann Creek Riparian Habitat Conservation Areas in the Telegraph Creek drainage in the southern half of the Travel Plan Area. The road not only increases the sediment load in the stream, but also leads to periodic disturbance of wildlife species that are resident in or are drawn to this productive and complex habitat zone.

Connectivity and Fragmentation

Connectivity Basics

Connectivity, as coined in 1984 by G. Merriam (cited in USFS 1997), refers both to the abundance and spatial patterning of habitat and to the ability of animals to move from patch to patch of similar habitat. Corridors are a means by which connectivity is provided and are defined as strips or stepping stones of "*hospitable territory traversing inhospitable territory providing access from one area to another*" (Dendy 1987 as cited in USFS 1997). Broad corridors with potential to provide for species welfare over longer periods of time are sometimes referred to as linkage zones [see the following section].

Some corridors, particularly local connections between forest or riparian patches, can be readily recognized by their vegetation structure and composition, which contrasts with the dominant surrounding environment (Harris 1984, pp. 141-144). Most corridors, however, are not obvious, well-defined features of the landscape that can be precisely defined by topography or vegetation. Rather, they can only be defined by following the movements of animals that make use of them over time and their effectiveness varies for different species (Servheen 2006). The combination of habitat parameters that makes a corridor suitable for an elk will be different for a lynx and different still for a mink. Most animals need a certain degree of habitat connectivity, at one scale or another, to forage within a home range, for dispersal to new home ranges and for migration between locations.

Fragmentation is the converse of connectivity. Fragmentation occurs when a habitat, be it riparian, forest, or grassland, becomes partitioned into smaller patches either by natural means (such as conifer colonization in grasslands or fire in forests) or by human enterprises (such as logging, settlement or road building). Corridors are particularly susceptible to fragmentation because of their relatively narrow, linear configurations.

The Northern Region Connectivity Protocol (USFS 1997) provides a framework for describing corridors and the effects of Forest projects and other human activities. Of the five types of corridors outlined in the Protocol, four apply to the Divide Travel Plan Area: season migration corridors, dispersal/emigration corridors, travel corridors and invasive corridors.

Season migration or *cyclic corridors* may be transcontinental in scope or they may lie entirely within local home ranges. Transcontinental/continental migrations are relevant to the Divide landscape in that well-defined seasonal flyways used by waterfowl and raptors pass over the area. Locally, the most obvious examples of seasonal migrations are spring and fall movements by native ungulates between winter and summer ranges, inevitably along relatively well-defined routes. Historically, these routes were dictated by topography, snow conditions and the availability of resources (particularly, forage, water and cover). Over the past 150 years, these routes have shifted in response to human development: In part, they follow the old resource/topography-driven routes but divert as necessary to avoid roads and other centers of human activity and to take advantage of cover.

Travel corridors are local routes along which individual animals or groups of animals move within home ranges between foraging habitat, cover, breeding sites and so on. As with seasonal migration, these routes may shift in response to human enterprises and for any particular species, they may be difficult to define in terms of features on the landscape, their delineation requiring long-term field observation.

Dispersal and *emigration corridors* promote movement into unoccupied habitats. Dispersal behavior is most common when population density becomes too high for habitat within a given area to continue to support the population, resulting in natural colonization of suitable but unoccupied or lightly occupied habitat elsewhere. This has been occurring locally with the gradual influx of wolves and grizzly bears into and through the Divide landscape from growing populations to the north.

As with seasonal migration corridors, *invasive corridors* may be continental (Eastern blue jays moving across the Great Plains via wooded river corridors) or local (cowbirds following cattle trailing up onto the National Forest). These corridors may serve to sabotage biodiversity in local ecosystems with inadequate resistance to invaders. This is particularly true in the case of exotic weeds such as knapweed, leafy spurge and Dalmatian toadflax.

Regional Connectivity through the Divide Landscape

The Divide Travel Plan Area is part of what has been characterized as the Continental Divide linkage zone. A *linkage zone* is a region of habitat in which dispersing animals (grizzly bears, wolves, wolverines, moose, elk) can live as they slowly make their way between larger blocks of more suitable habitat [see USFS 1997 (Region 1 *Connectivity Protocol*); also, Servheen *et al.* 2003].

The area along the Divide has also been called a “dispersal corridor” or a “travel corridor”. But, as Servheen and others (2003) point out, the term “corridor” implies a linear strip of habitat defined by physical features or use patternsthat is used just for travel. In the Divide landscape,

the movement zone encompasses the entire breadth of National Forest lands centered on the Continental Divide (and for some animals, includes blocks of adjacent non-Forest land). While the linkage zone is up to 25 miles wide across the Helena Ranger District, most dispersing species tend to concentrate in areas of productive habitat such as the array of drainage-head basins near the Divide or some of the primary drainage bottoms.

Prior to development by settlers from the East, areas surrounding the Divide landscape provided more of a linkage zone for many animals than the mountains themselves. As indicated in the Journals of Lewis and Clark and documented archeologically (Knight 1989), numerous bison, elk, deer and pronghorns, accompanied by the large carnivores that preyed upon them, regularly moved through the valleys of the Missouri and Clark Fork Rivers and their tributaries. Today, options for movement in the valleys have been significantly reduced and often eliminated, by human development. This has placed an emphasis on National Forest lands along the Divide mountain ranges to provide connectivity. Although some animals need specific habitat formations while dispersing (fishers require mature forest, for example), most species of concern are attracted to the Helena NF region of the Continental Divide simply because it contains less human development than the foothills and valley environments on either side.

The Divide has some limitations in its ability to provide connectivity. The landscape, while dominated by mature forest, is interrupted by large openings, natural and human-created [Figure 10 and Figure 11]. This pattern is favorable for some species, unfavorable for others. In addition, riparian areas that historically served as primary movement corridors have been disrupted since the 19th century by mining, settlement, water diversion, logging, grazing and roading. Roads continue to be a potentially disruptive (if not a truly "fragmenting") influence: Aside from Highway 12 [Figure 16] and some sections of County roads [Figure 17], which may serve as real barriers to some species because of their width and traffic volume, roads in the Travel Plan Area are troublesome primarily because of the way they funnel human activity into the heart of the Divide linkage zone. But, they seldom block movement [seeFigure 11, Figure 13, Figure 14, Figure 15, Figure 39, Figure 41, Figure 42 ,Figure 43, Figure 44, Figure 47, Figure 48, Figure 57, Figure 59, Figure 60].

Figure 10 - Photo 5: Regional Connectivity through the Divide Landscape
Greenhorn Mountain (center of photo) astride the Continental Divide in the northern half of the Plan Area. The mosaic of forest and grassland seen here is characteristic of many parts of the Divide linkage zone, especially the area north of U.S. Highway 12. Greenhorn Mountain itself is unroaded, but the surrounding area has a weighted open road density of around 1.8 mi/mi².

Be that as it may, Walker and Craighead (1997) concluded that the Big Belt Mountain Range to the northeast, in spite of a number of geographic and human-generated problems, was the more viable dispersal route for large wildland animals (elk, mountain lions, grizzly bears) moving southward through this part of Montana, primarily because of high road density in the Divide landscape (both on the Helena NF and adjacent non-Forest lands). Total road density in the Divide landscape averages 2.07 mi/mi²; *open* road density is 1.69 mi/mi²; *weighted open* road density (calculating arterial and collector routes at 100 percent of length; local roads at 25 percent of length) is 0.90 mi/mi². Compare this with weighted open road densities in the Big Belt Range which are generally on the order of 0.2 to 0.5 mi/mi².

Characteristics favorable for corridor/linkage zone function for most species (especially the large carnivores and ungulates) include low open road density, low concentrations of human occupancy (as represented by occupied buildings, developed recreation facilities, mining operations), an abundance of productive foraging habitat, a robust mix of forested and non-forested habitats (abundant edge) and gentle-moderate terrain (Craighead *et al.* 2001; Walker and Craighead 1997; Servheen *et al.* 2003; Olimb and Williamson 2006). These features are distributed unevenly across this part of the National Forest, allowing for regional linkage that, while not ideal, is functional.

Figure 11 - Photo 6: Human Influences in the Linkage Zone
Roads and clearcuts atop the Continental Divide west of Roundtop Mountain toward the north end of the Travel Plan Area. Low-grade roads and large regenerating clearcuts, such as those seen here, are common features of this part of the Continental Divide linkage zone. Nonetheless, a number of uncommon, wide-ranging species (grizzly bears, wolves, wolverines) move through the area each year. The roads, while not serving as barriers to movement, elevate the potential for negative encounters with humans in the linkage zone.

So far, our understanding of how the Divide landscape functions as a linkage zone (connecting the Northern Continental Divide and Greater Yellowstone ecosystems) is based mostly on circumstantial and anecdotal evidence: (1) the area is strategically located between these two large wildland ecosystems, (2) it contains suitable habitat and (3) a number of species characteristic of the two wildland areas (wolves, grizzly bears, lynx, wolverines) have been observed in the Divide landscape in between. This has been supplemented for some species (primarily lynx and wolverines) by winter tracking surveys combined with DNA analysis of scat and hair samples. More rigorous research, however, including long-term tracking of marked animals, is needed to reveal more precisely how different species are moving through tea area and how the landscape may be functioning as a linkage zone.

Table 83, below, tallies acres of non-motorized habitat patches larger than 1,500 acres in the Divide Travel Plan Area. Most of these habitat blocks encompass some Forest roads, but all are closed to wheeled vehicles yearlong, most being physically blocked by gates, earthen berms, or other barriers. I have mapped non-motorized patches to within 300 feet of the roads and to within 150 feet of motor trails shown on Divide Travel Plan Alternative maps and then rounded acreages to the nearest 5 acres. Only areas within National Forest boundaries are included in this summary. Private and State inholdings are incorporated whenever they are devoid of open roads, dwellings, or other human developments.

Table 83 - Non-motorized habitat patches larger than 1,500 acres

Area Identification / Location	Acres with No Motorized Use Spring-Summer-Fall	Acres with no Motorized Use in Winter
Area North of U.S. Highway 12		
Black Mountain East	2,955	1,710
Black Mountain West	4,645	4,365
Upper Deadman Creek	4,985	4,985
Right Hand Jerusha Gulch	1,575	1,575
Upper Snowshoe Creek–Ophir Creek	3,725	1,765
Greenhorn Mountain	2,690	2,510
Sweeney—Austin Creek	4,590	4,590
Priest Pass—Austin Creek	1,585	1,585
Little Porcupine Creek	3,120	2,335
Area South of U.S. Highway 12		
Lazyman Gulch Roadless	14,405	14,405
Jericho Creek	3,265	3,265
Jericho Mountain Roadless	8,935	7,920
Lee Mountain	2,905	2,905
Red Mountain	3,540	3,540
Spotted Dog Creek–Trout Creek	3,485	3,485
Upper Elliston Creek—Slate Lake	5,860	3,395
Hat Creek	4,315	4,160
Spotted Dog Creek North	2,985	2,830
Negro Mountain North	2,010	850
Electric Peak Roadless–Treasure Mountain	29,730	26,855
Total Patch Acres North of Highway 12	29,870	25,420
Total Patch Acres South of Highway 12	81,435	73,610
Total Acres in Non-Motorized Patches	111,305	99,030

In this assessment, the minimum non-motorized patch size of 1,500 acres (nearly 2½ mi²) puts the focus on the availability of habitat blocks large enough to allow wildland species moving through a linkage zone to carry on with normal activities relatively free from human interference epitomized by motorized activity. Table 84 (following) summarizes the overall status of these large habitat patches in summer and winter based on the acreages of individual areas listed in Table 83.

On average, non-motorized habitat blocks are larger in the southern half of the Planning Area. This is primarily a function of the 3 inventoried Roadless Areas south of Highway 12 (Lazyman Gulch, Jericho Mountain and Electric Peak), which support regions of non-motorized habitat ranging from 8,935 to 29,730 acres. Non-motorized patches are often smaller in winter, due to the presence of some roads within the patches that, while closed yearlong to wheeled vehicles, are open to snowmobile use during the winter.

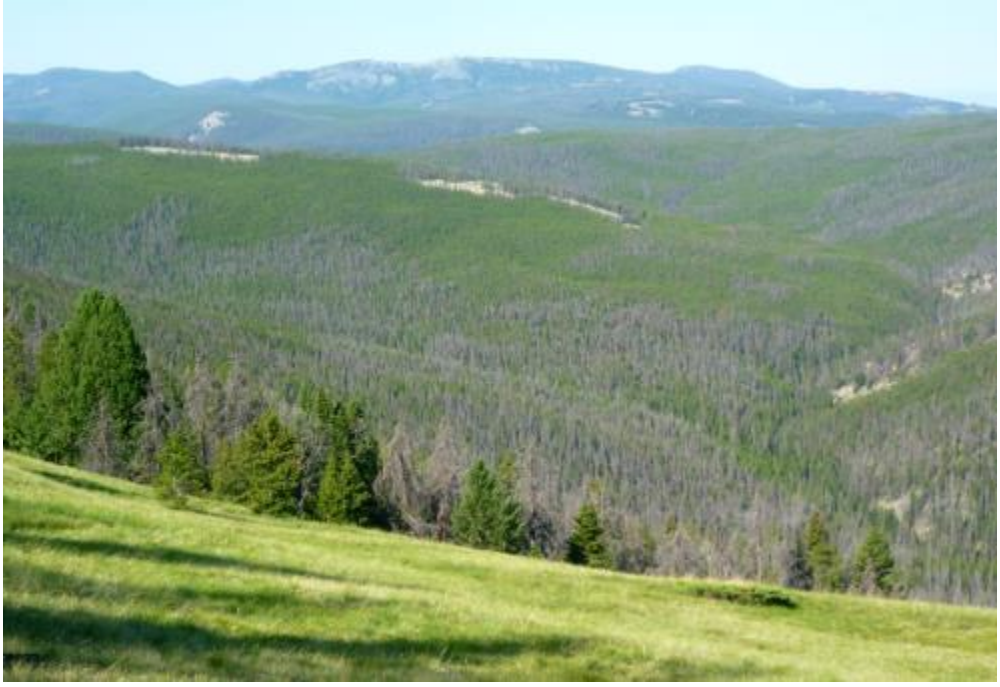

Figure 12 - Photo 7: Non-Motorized Habitat
The Electric Peak Roadless Area at the headwaters of the Little Blackfoot River. It is the largest block of non-motorized habitat in the Plan Area and contributes to the effectiveness of the Divide linkage zone south of Highway 12. It is dominated by mature conifer forest, the pattern of which, as seen here, is now being altered by the mountain pine beetle outbreak.

Table 84 : Large Habitat Patches Free from Motorized Use

Area Identification / Location	Patches with no Wheeled Vehicles	Patches with no Snowmobiles
Area North of U.S. Hwy 12		
Number of Patches	9	9
Average Patch Size (acres)	3,319	2,819
Percent of North Plan Area in Large Non-Motorized Patches	46%	39%
Area South of U.S. Hwy 12		
Number of Patches	11	11
Average Patch Size (acres)	7,403	6,692
Percent of South Plan Area in Large Non-Motorized Patches	73%	66%
Total Plan Area		
Number of Patches	20	20
Average Patch Size (acres)	5,565	4,949
Total Acreage in Plan Area in Large Non-Motorized Patches	111,305	98,980
Percent of Total Plan Area in Large Non-Motorized Patches	63%	56%

The fact that a relatively large proportion of the Plan Area (63 percent in spring, summer and fall; 56 percent in winter) is occupied by blocks of habitat ranging from 1,575 to 29,730 acres in which wheeled motor vehicles and human presence in general, are usually not disruptive factors, suggests that the Divide landscape may be more robust as a linkage zone than straight road density figures might indicate: current *weighted* open road density for public and private

lands is 0.84 mi/mi² [Table 85, Table 101]; *unweighted* road density is more than 2 mi/mi², which is quite high [Table 85]. Although previous modeling efforts have pointed to the Divide landscape as a problem area (potentially a "bottleneck") in north-south movement for large wildland species (Walker and Craighead 1997), the fact remains that these species (wolves, wolverines, grizzly bears, black bears, lynx, bobcats, mountain lions, elk, moose) continue to move through and occupy this part of the landscape (albeit, sometimes in low numbers).

The problem with most Forest roads is not so much that they physically "fragment" wildlife habitat in a way that blocks movement between habitat patches, but rather that they facilitate human access throughout the landscape. Most roads are local dirt and gravel routes that carry little vehicle traffic most of the year [Figure 13, Figure 14 and Figure 15]. Exceptions are U.S. Highway 12 through MacDonald Pass, the Rimini road (Powell County Road #495) along Tenmile Creek, the Little Blackfoot River road (Forest Road #227), the Mullan Pass–Austin Creek road (Forest Road #1805), the Sweeney Creek–Priest Pass road (Forest Road #335), the Orofino Gulch road (Lewis & Clark County Road #454) and the Grizzly Gulch road (County Road #753) [see Figure 17].

Figure 13 - Photo 8: Low-use Roads
Forest Road #1852 along Hope Creek in the north half of the Plan Area, a typical low-use road that funnels human activity into wildlife habitat but does little to physically "fragment" habitat.

Figure 14 - Photo 9. Unimposing Roads
Forest Road #571 along Dog Creek in the north half of the Plan Area, a road that allows human intrusion into wildlife habitat but is physically unimposing to wildlife on the move.

Figure 15 - Photo 10: Engineered Roads
Forest Road #1859 in upper Telegraph Creek, an engineered road built for timber harvest in the 1980s. Such roads usually carry more vehicle traffic than the more primitive routes shown in the previous photos and may prove more of a deterrent to some wildlife moving through the area. But, because human activity is sporadic and infrequent, some species use the route as a travelway and cross it frequently.

Of the higher traffic roads passing through the Forest (most of them State and County routes), U.S. Highway 12, which bisects the Plan Area through MacDonald Pass, is currently the only wide, paved thoroughfare. With four lanes and often high volume of fast-moving traffic, it has proven to be a real barrier to many animals in terms of their ability to get across alive. Bobcats, lynx, wolves, badgers, foxes, coyotes, deer, elk, owls, hawks, grouse, rabbits, squirrels and others have been struck and killed on the relatively narrow Helena NF portion of the highway in the last decade.

Figure 16 - Photo 11: High Risk Wildlife Zone
U.S. Highway 12 just east of MacDonald Pass. Although the highway crosses National Forest land for only about 4 miles (in the MacDonald Pass area), it serves as a high-risk zone for many wildlife species moving between the northern and southern segments of the Divide landscape across private and State land for about 20 miles. Numerous wildlife species, including lynx, wolves, bobcats, deer, elk, goshawks and great horned owls, have been killed attempting to cross the highway in this area.

The Orofino Gulch road (County Road #454) immediately south of Helena and just east of the Travel Plan Area is also paved and while much narrower than Highway 12, does allow higher speed and greater traffic volume than other Forest roads. In addition, an eight -mile segment of the Rimini Road (County Road #695) along upper Tenmile Creek is slated for paving in the next year or two. The new surface plus the designation of the road as a “Forest Byway” will undoubtedly increase traffic speed and volume, making it a more precarious crossing for wildlife of all sizes.

Currently, the Rimini road is one of five primary unpaved Forest roads in or adjacent to the Plan Area. These routes (listed previously) are graded gravel roadways that allow speeds of 30 to 50 mph in many areas and support fairly regular traffic flow (though much less than Highway 12). As such, they displace animals from the vicinity and interfere with movement, though they seldom block it entirely.

Figure 17 - Photo 12: High Traffic Roads
County Road #723 (the Grizzly Gulch Road) at the Forest boundary south of Helena, an example of a graded, high-traffic road on the National Forest. While some sections of the road higher on the Forest are relatively narrow and winding, much of the route, as seen here, is broad, hard-packed, well-drained and supports a regular flow of traffic that sometimes moves at a brisk clip. A thoroughfare such as this is problematic for many wildlife species, both because of its physical structure and the level of human presence.

Table 85 - **M**easures of Current Road and Motorized Trail Density

Routes	Weighting	Ownership	Density (mi/mi²)
All Roads and Trails (open and closed)	unweighted	HNF, County, Private	2.1 mi/mi²
Open Roads and Motor Trails	unweighted	HNF, County, Private	1.7 mi/mi²
Open Roads and Motor Trails	unweighted	HNF, County	1.3 mi/mi²
Open Roads and Motor Trails	weighted	HNF, County, Private	0.8 mi/mi²

Table 85 shows current open road density in the Plan Area measured in four ways. *Unweighted* open road density across all ownerships, public and private, is high and suggests that the Divide landscape is an inhospitable environment for wildland species attempting to move through the linkage zone. Density is substantially higher if closed roads are included (as has been done in some past modeling efforts). Road densities on this order are a good part of the reason that Walker and Craighead (1997) concluded that the Divide landscape on the Helena NF was a risky connection between wildland ecosystems to the north and south. On the other hand, *weighted* open road densities[1], which factor in the level of vehicle use that various parts of the road

[1] In this analysis, roads are weighted differently than in the *HFP* elk analysis that follows later in this report. In this case, primary and collector roads are calculated at 100 percent of length; local roads that receive little Traffic is calculated at 25 percent of length; and closed roads and private roads not open to the public are not included.

system typically receive, suggest a more benign scenario. [See also Table 101, Table 107, Table 108 and Table 114 for additional summaries of road densities in the Plan Area].

Overall, road density and dispersion in the Travel Plan Area do not preclude any wildland species from occupying the landscape at current levels of motorized use. The presence of grizzly bears, wolverines, lynx and robust elk populations attest to this conclusion. The road system, however, is a complication that these species would not have to deal with in a wildland environment: It raises the level of risk from human encounters and it substantially reduces habitat options compared with those that were available prior to development of the transportation system. Problems with roads in the Divide landscape are due as much to the location of certain roads in sensitive wildlife habitat sites [see Figure 9, Figure 43, Figure 49, Figure 56] as it is to overall weighted road density [see the discussion in *Riparian Habitats* above and in *Local Effects in Key Areas* toward the end of this report].

Snags and Woody Debris

Dead Tree Environments

Tree decay is an ecological function that creates key habitat elements, snags and logs, for wildlife (Rose *et al*. 2001). Living trees with decay, hollow trees and dead trees are expressions of mortality agents (e.g. fire, disease and insects) that create a range of snag species and sizes (Bull *et al.* 1997) utilized in different ways by different wildlife species. While snags and logs have long been seen as essential wildlife habitat components, research increasingly underscores the need to understand them as part of a larger interacting ecosystem (Bull *et al.* 1997, Duncan 1999, Duncan 2002, Rose *et al.* 2001).

Snags provide the primary substrate for the cavities that many birds and arboreal mammals require for an array of basic life functions (Thomas 1979). Woodpeckers are the most prominent excavators of cavities in the Divide landscape. Some species, such as pileated and black-backed woodpeckers are able to excavate trees with hard exterior sapwood shells and decaying heartwood. Weaker excavators, such as hairy and downy woodpeckers, as well as diminutive non-woodpecker species such as chickadees and red-breasted nuthatches, select trees with softer exterior wood created by armillaria root rot and other saprophytic fungi (Rose *et al*. 2001).

Most woodpeckers excavate a new cavity each year (Bull *et al.* 1997), thereby generating a continuous resource for secondary cavity users, species unable to produce their own cavities. These include several species of owls, myotis bats, kestrels, wrens, tree swallows, bluebirds, marten, red squirrels and flying squirrels, among others. The variability among secondary cavity users in their use of snags is broad. Saw whet owls, for example, use cavities with a minimum tree diameter (at breast height) (dbh) of 12 inches (Thomas 1979; Bull *et al.* 1997). Larger owls such as great gray, great horned and barred owls use platforms created when snags break (Bull and Duncan 1993; Bull *et al.* 1997). Brown creepers nest between partially detached pieces of bark and the trunks of dead trees (McClelland 1977. Bats roost under the loose bark of snags but also in cavities (Bull *et al.* 1997). Marten use hollow trees for denning and shelter. Black bears will den in and under larger hollow trees (averaging 43 inches dbh) (Thomas 1979; Bull *et al.* 1997).

In addition to their role as nesting and foraging habitat, snags also support other activities, including singing, viewing, perching, estivating, communicating, escaping, hibernating, resting and observing (Davis 1983).

Snags continue to be important to wildlife once they fall and become logs. Logs provide foraging sites, hiding and thermal cover, denning sites, nesting sites and travel conduits for small animals, such as chipmunks, pack rats, deer mice, weasels, marten, grouse, toads and salamanders (Rose *et al*. 2001). Larger animals, such as bears, forage for invertebrates in logs. Fishers use large logs as den sites; lynx typically select dense patches of downed trees for denning. As logs continue to decay and lose structure, they play an important role in nutrient cycling, soil fertility and erosion control, among other functions (Maser *et al.* 1988).

Snag and log occurrence is variable and hard to predict under natural disturbance regimes. Most dead tree concentrations are produced by fire and while it is possible to estimate the relative probability of fire occurrence and expected fire behavior in a particular vegetation/fuel environment, actual predictions as to when and how such events might play out not have proven useful for planning and management purposes. In dry ponderosa pine/ Douglas-fir forests, frequent non-lethal fires result in low snag variation over time (Ritter *et al.* 2000). Mixed coniferous forests (most commonly Douglas-fir/ lodgepole pine in the Divide landscape) often experience a mixed severity fire regime, which results in considerable variability in snag density. Cool lodgepole pine and spruce/fir forests generally experience infrequent stand-replacing fires, which generate periodic snag pulses (Lyon 1977).

Snag Status in the Divide Landscape

Currently on much of the Helena NF, pine forests at all elevations and over all moisture regimes are under attack from mountain pine beetles, resulting in landscape-wide snag densities on a scale usually produced only by large fires. The Divide landscape has been devoid of large-scale fire since the early 20th century and the rapidly spreading snag-rich environment represents a transformative phenomenon for wildlife habitat and associated wildlife species in this area.

Snag abundance at current levels will be short-lived. Most ponderosa and lodgepole pine trees will have fallen within 5 to 10 years of their demise. The resulting accumulation of large woody debris will provide an environment for a different assemblage of wildlife species. Because ponderosa pine decays relatively quickly, these sites will be characterized by low-lying debris, punky broken logs, soft stumps and a few standing trunks broken off partway up. Lodgepole pine snags are generally more solid and they often stack up as they come down. Mixed with regenerating saplings, these debris mazes provide hiding and resting enclaves for elk, deer, bears, lynx, hares, grouse and numerous other animals [Figure 19].

Travel management on the Forest affects dead tree habitat in that most large snags within sight of Forest roads are taken by firewood cutters. Each year, the Helena NF issues hundreds of firewood permits that allow removal of several cords of wood in the form of dead or dying trees. Almost all firewood cutting occurs within 300 ft of open roadways, which makes any decision to close or open a road a key to the fate of local snags. Retaining snags as wildlife trees is rarely a primary objective for closing a road, but it may figure in as a secondary issue in some cases.

Even with the rapidly developing abundance of snags in road corridors [Figure 18, Figure 31, Figure 32], it is likely that most of them will be taken for firewood in the next few years. Others will be taken by Forest Service crews to keep roads and trails open and provide for public safety. Standing snags and woody debris in the road corridors will disappear much more quickly than will be the case in other areas where only natural forces are at work.

Figure 18 - Photo 13: Beetle Kill
Beetle-killed lodgepole pine proliferating along Forest Road #4014 in Ontario Creek in the south half of the Plan Area. These roadside snags are available to firewood cutters, but those further back from the road will remain intact until they fall naturally over the next 10 years.

Figure 19 - Photo 14: Coarse Woody Debris due to Beetle Kill
Beetle-killed lodgepole pine transformed to coarse woody debris by local winds (2014). In the next five to ten years, formations such as this will be the norm in lodgepole habitats. Small diameter trees, not attacked by the beetles and remain key components of the future forest.

Migratory Landbirds and Shorebirds

Management Direction

In 1988, an amendment to the Fish and Wildlife Conservation Act mandated that the U.S. Fish and Wildlife Service (USFWS) "identify species, subspecies and populations of all migratory non-game birds that, without additional conservation actions, are likely to become candidates for listing under the ESA of 1973". A subsequent report, *Birds of Conservation Concern 2002*, identified migratory and non-migratory bird species (in addition to those already designated as federally threatened or endangered) that represented the highest conservation priority. In that report (and in a 2008 update), North America is broken down into 66 Bird Conservation Regions (BCRs), with "bird species of concern" identified for each region. The Helena NF is situated at the boundary of BCR 10 (northern Rockies) and BCR 17 (badlands and prairies) but supports bird populations more characteristic of BCR 10. The migratory bird list for that BCR and the accounting in MFWP's *Montana Field Guide* (http://fieldguide.mt.gov/) have been used to determine which birds may be of particular management concern in the Divide landscape. This grouping takes in all migratory and yearlong resident landbirds and shorebirds identified as "species of concern". It does not include waterfowl or upland gamebirds.

More specific management direction for dealing with landbirds and shorebirds in project planning (including NEPA documents) comes from the Forest Service's Landbird Conservation Strategic Plan (2000) and Executive Order 13186 (2001) [Fed Reg. Vol 66, No. 11, p. 3853-3856]. More recently (2008), the Forest Service and the U.S. Fish and Wildlife Service (USFWS) signed a memmorandum of understanding (MOU) that directs the Forest Service to approach management of migratory birds in the following way: (1) focus on bird *populations*; (2) focus on habitat restoration and enhancement where actions can benefit specific ecosystems and migratory birds dependent on them; (3) recognize that actions taken to benefit some migratory bird populations may adversely affect other migratory bird populations; and (4) recognize that actions that may provide long-term benefits to migratory birds may have short-term impacts on individual birds. The parties agreed that through the NEPA process, the Forest Service would evaluate the effects of agency actions on migratory birds, focusing first on species of management concern along with their priority habitats and key risk factors. The MOU expired in December 2013, but discussions are underway to issue a new Memorandum in the near future. This this report deals with priority bird species as if the Memorandum were in effect.

Population Status and Habitat in the Project Area

Over a period of 14 years (1994 to 2008), the Helena NF participated in the USFS Northern Region Landbird Monitoring Program (LBMP) in partnership with the Avian Science Center (ASC) at the University of Montana (Hutto and Young 2002). Each year, from late spring through mid-summer, the ASC conducted standardized surveys along a series of pre-determined transects across the Forest (with two years, 2001 to 2002, focused on bird populations in riparian willow communities). The program has provided data on population trends, habitat relationships and effects from past management activities for birds breeding throughout western Montana and northern Idaho. According to Hutto, "There are not nearly enough years of data to make meaningful use of our population trend data yet, but the preliminary data suggest that most populations have remained fairly stable during the 12-year period from 1994 to 2006" (http://avianscience.dbs.umt.edu/projects.php).

The Divide landscape includes 19 point-count transects (15 of them in the Travel Plan Area) that were monitored in different combinations from 1994 to 2006. In monitoring a transect,

surveyors identified and counted birds for 10 minutes at each of 10 points, with tansects being worked once a year in late sprng or early summer. Surveyors identified birds primarily by songs and calls and to a lesser extent, by sight. So, they did not always pick up birds that were particularly secretive (American bitterns), uncommon (Brewer's sparrows), or attached to habitat that lacked transects (bobolinks) during their relatively short sessions at each transect point. Some of these species, however, have been identified fortuitously over the past two decades during general wildlife fieldwork or by special survey efforts that targeted particular species (goshawks, flammulated owls, boreals owls and black-backed woodpeckers, for example).

Over the 12 year period, 60 bird species were identified along the LBMP survey transects and an additional 36 species were picked up during general and targeted wildlife survey work. These tallies do not include waterfowl, upland gamebirds, or obvious transients (Baird's sparrows, peregrine falcons, ferruginous hawks, among others). Of the 96 species, nineteen are classified as "species of concern" and/or "birds of conservation concern" in the Montana portion of BCR 10 and are displayed in Table 86 as species whose populations could be compromised by certain land management activities.

The Divide Travel Plan Area provides habitat opportunity for all of these species, some more than others. Some species are affected negatively by certain land management practices, others positively and some little at all. Hejl and others (1995) recommend a bird conservation strategy composed of three parts: (1) maintain, mimic and restore natural vegetation patterns and processes; (2) ensure that the specific habitat components required by focus species are created and/or maintained; and (3) monitor the habitats and individual species.

Table 86 - Resident Bird Species in the Divide Landscape

Species of Concern	Listiing	Relative Abundance in Divide Landscape	Habitat Preferences and Limiting Factors
Swainson's Hawk	USFWS	uncommon	Swainson's hawks are similar in behavior and habitat use to red-tailed hawks, but their populations are less robust, primarily because of problems on winter range in South America. They occur mostly on the fringes of the Plan area in grassland and agricultural fields, nesting in isolated trees and hunting for small mammals, reptiles and large insects.
Golden Eagle	MNHP	rare	Golden eagles nest on cliffs and in large trees. They forage most often over grassland and open woodland, where prey is visible. Numbers are limited by territorial competition with other eagles (and other raptors) and by mortality from shooting, poisoning and electrocution on powerlines.
Prairie Falcon	MNHP	rare	Prairie falcons establish eyries on high cliffs, preying on birds that can be knocked out of the air. They are less dependent on aquatic habitat than peregrine falcons and appear more versatile in their choice of nest sites. Nonetheless, numbers are limited by the availability of nesting cliffs, as well as by the logistics of ongoing recovery from decimated populations in the 20th century.

Species of Concern	Listiing	Relative Abundance in Divide Landscape	Habitat Preferences and Limiting Factors
Northern Goshawk	MNHP	uncommon but regularly distributed	Goshawks nest and fledge young in mature closed-canopied forest stands but hunt in a variety of forest formations, as well as in open habitats near forest edges. Availability of nesting/ post-fledging habitat and the density of prey are primary limiting factors. Low population density is driven by the need for large home ranges.
Great Gray Owl	MNHP	uncommon but often observed	Great gray owls nest in the upper reaches of large broken-topped trees in mature/ old-growth forest (usually fairly dense). They forage in a variety of habitats, including wet meadows, fields and bogs, as well as coniferous forest. In some areas, great gray owl populations are limited by periodic shortages of prey; in others, sparsity of suitable nest trees is the primary factor.
Boreal Owl	MNHP	relatively uncommon overall, but usually well distributed in suitable habitat	Boreal owls nest in tree cavities and hunt at night in higher elevation conifer forests, usually Engelmann spruce, subalpine fir and lodgepole pine. These diminutive owls are more common than once thought, but they are secretive and difficult to census. Numbers are limited by territoriality and the availability of suitable habitat.
Flammulated Owl	USFWS MNHP	rare with fragmented distribution	The flammulated owl is a small cavity nesting raptor, preferring open-grown mature or old-growth ponderosa pine forest for nesting and foraging. Inclusions of denser conifers provide roosting enclaves. They are sometimes found in Douglas-fir or aspen when suitable ponderosa pine stands are unavailable. The scarcity of open-grown stands of large ponderosa pine is the main limiting factor.
Great Blue Heron	MNHP	relatively uncommon but widespread	Great blue herons usually feed in shallow wetlands wherever they occur, including many near human development. Less often they forage for amphibians and small mammals in wet meadows or fields. They establish nesting colonies in the canopies of deciduous trees (typically cottonwoods) not far from wetland feeding areas. Populations are limited by the fragmented distribution of suitable nesting and foraging sites.
Lewis's Woodpecker	USFWS MNHP	currently rare, but becoming less so with increasing habitat opportunity	Lewis's woodpeckers are cavity nesters most strongly associated with burned or open gown ponderosa pine forest with a sufficient supply of snags. They usually move into burned forests several years after fire has occurred. Pine forests decimated by insect and disease may also provide suitable habitat. Lewis's woodpecker populations are limited primarily by a shortage of older, dead trees in a given area.

Species of Concern	Listiing	Relative Abundance in Divide Landscape	Habitat Preferences and Limiting Factors
Black-backed Woodpecker	MNHP	currently rare because of the absence of wildfire	Black-backed woodpeckers are tightly tied to large concentrations of dead trees created by stand replacing fires. Post-fire insect populations can sustain woodpecker populations for only 3-5 years. The proliferation of dead trees created by mountain pine beetle infestation in the Divide landscape does not appear to be drawing in black-backed woodpeckers. The primary limiting factor is the erratic availability of suitable post-fire environments for these highly specialized birds.
Willow Flycatcher	USFWS	rare	Willow flycatchers are highly restricted to riparian shrub communities. Landscape-wide populations are suppressed by the fragmented and limited distribution of the key habitat association and by processes that reduce the quality of that habitat, stream channelization, livestock grazing, etc.
Olive-sided Flycatcher	USFWS	relatively uncommon	These birds generally nest and perch in dead trees in open habitats, historically, those created by fire, but also in post-insect infestation areas, logged sites with residual snags, or other open areas with tall dead trees. They are most common in spruce, lodgepole pine and aspen habitat types. Populations are limited by the availability of snags in suitable configurations.
Clark's Nutcracker	MNHP	relatively common in suitable habitat	Clark's nutcrackers are conspicuous residents of higher elevation whitebark pine-dominated forests in summer and lower elevation ponderosa pine and limber pine forests in winter. They are highly dependent on the large seeds of these trees. Populations are limited primarily by the abundance and distribution of whitebark pine, which has decreased substantially with ongoing insect and disease infestation.
Rufous Hummingbird	MNHP	uncommon	Rufous hummingbirds are most common west of the Continental Divide in open habitats with abundant shrubs: burns, riparian shrub arrays, open-grown forest and timber harvest units. Proliferation of cutting units that provide shrubs but lack other key resources may be depressing populations. East of the Divide, populations are limited by fragmentation and overall scarcity of suitable habitat.
Brown Creeper	MNHP	uncommon overall, but usually well represented in suitable habitat	Brown creepers are small insectivorous birds than nest under the loose bark of large dead or dying trees. They are most common in mature and old-growth conifer stands with relatively dense canopy closure and a good supply of large trees and snags. The primary limiting factor for brown creepers is the decline in abundance of these dense older forest habitats.
Veery	MNHP	rare	Veerys are small birds strongly associated with riparian willow communities, particularly those with open forest overstory and with cottonwoods. Their population distribution is limited by the fragmented dispersion of the riparian communities on which they depend.

Species of Concern	Listiing	Relative Abundance in Divide Landscape	Habitat Preferences and Limiting Factors
Green-tailed Towhee	MNHP	uncommon	Towhees are most often observed on or near the ground in drier shrub communities, especially those with a diversity of shrubs. They are most common in sagebrush but they also do well in some riparian shrub habitats. Primary limiting factors are those that threaten the health of shrub-dominated habitats, often livestock grazing in this case.
Evening Grosbeak	MNHP	relatively common in suitable habitat	Evening grosbeaks are often observed in small flocks in mixed conifer and spruce/fir forests; but they also make use of aspen, cottonwoods and ponderosa pine. Their populations generally increase in years of insect irruptions, particularly, spruce budworm. Limiting factors include the unpredictable presence of preferred insect prey and the distribution of mature forest.
Cassin's Finch	USFWS MNHP	relatively common	Cassin's finches are most often found in open-grown coniferous forest, typically, ponderosa pine; but they occur across a broad array of forest types, including post-fire stands and riparian habitats. Variable conifer seed production (particularly in ponderosa pine) may be a destabilizing factor for populations.

Big Game Species

A variety of big game species inhabit the project area: elk, mule deer, white-tailed deer, moose, black bears, mountain lions and in very low numbers, grizzly bears and wolves. This analysis focuses on elk and their role as management indicators that indirectly show the effects of land management on other species. We assume that the effects of human actions on elk more or less pertain to other big game species as well, although there will be species-specific differences that are not reflected in the elk analyses that follow. Some of these differences are described in sections on individual species below (*Mule Deer, Moose*) and the rest in the Wildlife Analysis Approach Table (*appendix A of the wildlife specialist report*).

North American Elk

Management and Analysis Strategies

The American elk (*Cervus elaphus*) serves as a management indicator for hunted species on the Helena NF (as it does on most National Forests in Region 1). Montana Fish, Wildlife and Parks, the Forest Service and other agencies manage elk to provide a surplus for hunters while holding populations well above levels required for viability. Population viability of elk in the northern Rockies has not been at risk since the early 20th century. Elk are one of the more manageable wildlife species: their habitat requirements are well studied and they respond readily to habitat change and population manipulation (Cooperrider 2002). Elk are adaptable and occur in a variety of habitats including high mountain forests and meadows, grasslands, shrublands, cold deserts and highly managed forests (Skovlin *et al.* 2002). Prior to European settlement, elk in Montana were commonly observed in the grasslands and river bottoms of the Great Plains year-round. However, due to habitat alteration in the valleys and on the prairies (most often from livestock and crop raising) and the extirpation of elk from areas of human settlement, most elk now find summer range in mountain grasslands, meadows and coniferous forests, descending to ranges in the foothills and adjacent valleys only in winter (Skovlin *et al.* 2002).

Managing for elk has become increasingly complex as human activities have affected habitat quality and access. Management requires meeting basic habitat needs and understanding the socioeconomic value of elk. Primary considerations in elk management (Lonner 1991) include:

- Maintaining habitat security to protect elk during the hunting season;
- Preserving/recovering desired elk population characteristics as determined by elk managers and distributions relative to land management;
- Satisfying the growing demand for quality hunting and non-hunting experiences.

Methodologies have evolved over the years to measure the status of elk populations and their vulnerability to land management practices, hunting, wildlife viewing and the ever-increasing presence of people throughout elk habitat. These approaches are generally organized around seasonal habitat needs: Summer range, winter range and hunting season security habitat.

Summer Range

Basic Elk Summer Range

From late spring through late summer, elk need secluded calving areas and summer habitat rich in nutritional forage. Elk move upslope following spring green-up and calving occurs along a rough elevational gradient. While bulls often seek out the patchy interface between emerging green-up and the snowline, cows remain lower where forage is more robust. Productivity of elk is therefore based partly on the quality of transitional range as well as that of summer range.

Research suggests that the quality of summer range, via its ability to contribute to late summer nutrition, may be the most important variable in determining annual variation of herd growth (Stewart *et al.* 2005; Cook 2002, p. 305; Cook *et al.* 1996). *Habitat Effectiveness* (Christensen *et al*. 1993) is one widely used means of summarizing how well summer and transitional ranges meet the needs of elk for growth and welfare in non-hunting seasons. Habitat effectiveness derives from the abundance and distribution of cover, forage, water and special habitat features. Since the availability of these components tends to be satisfactory on most summer ranges, variations in habitat effectiveness are related most often to an additional factor: the opportunity to avoid human activity. Opportunity for seclusion, or the lack thereof, on the National Forest is primarily a function of open roads, which, if abundant enough, can shunt elk away from habitat sites that they would prefer to use. Open road density is translated to habitat effectiveness via a curve derived from the *Montana Elk-Logging Study* (Lyon 1979), which recommends minimum habitat effectiveness of 50 percent on elk summer range (or an open road density less than about 1.85 mi/mi^2).

A problem with “habitat effectiveness” as an index of habitat functionality is that it measures open road density over broad areas (typically, elk herd units) without considering how roads are distributed. Roads that pass through key habitats (wet meadows, riparian areas, nursery areas, aspen stands) degrade the capability of elk summer range to a greater extent than those that traverse areas of less importance.

Figure 20 - Photo 15: Elk Summer Range
"Important elk summer range" along the Continental Divide in the south half of the Travel Plan Area. This area supports stands of mature timber interspersed with wet meadows, providing elk with high quality forage and summer thermal cover. When roads are pushed into areas such as this, elk use and habitat effectiveness can decline appreciably. This particular area at Sure thing Swamps is currently unroaded.

This impact on localized and sometimes poorly mapped habitat features is difficult to quantify over an area as large as the Divide landscape. So, I have focused on impacts in local areas that are particularly important to elk and for which we have reliable field information [see "*Local Effects in Key Areas"*].

Helena Forest Plan standards for summer range are concerned with maintaining adequate hiding cover (big game Standards 3 and 5), protecting active elk calving and nursery sites from motorized uses (Standard 4b) and inventorying and mapping important summer range areas (Standard 7). Also incorporated into the *Forest Plan* are recommendations of the *Montana Cooperative Elk-Logging Study* (Lyon *et al.* 1985) (Standard 6), some of which apply to summer range: Applicable recommendations are to protect the integrity of wet sites, preserve key blocks of cover, minimize open road density, eliminate open roads passing through key summer habitat and discourage project designs that introduce cattle into new areas of elk summer range. Of primary interest to the Divide Travel Plan are those standards that address the influence of roads on elk summer habitat. While the relationship between roads and forest cover on summer range is of interest, the Travel Plan would have no effect on cover.

Helena NF and MFWP Interpretations of Summer Range

The *Forest Plan* Glossary defines big game summer range simply as "a range, usually at higher elevation, used by deer and elk during the summer…" (*HFP,* p. VI/16). Working maps of big game range in the Divide landscape prepared for the *Forest Plan* (1981) show local pockets of

"key summer range" [Figure 20] in detail, but they do not delineate summer range as a whole. Given this deficiency, most *Forest Plan* big game analyses since the early 1980s have interpreted summer range as (1) all land inside Helena NF boundaries, regardless of elevation, or (2) all Helena NF lands *not* shown as winter range on the 1981 maps. Summer range under either of these interpretations is extensive, covering true higher elevation "summer ranges" as well as lower elevation "transitional ranges" used mostly in spring and fall.

So, I have proceeded as follows:

- In discussing the ecology of elk summer range in the Travel Plan Area, I have adhered to the more traditional view of summer range as higher elevation habitat where most of the elk are found during the "summer", between the time calves are born (late May to early June) and the first big frosts begin to push elk out of many key summer habitats (generally in mid-late September). It should be noted that this is a considerably larger area than the sum of local sites that are mapped as "key summer range" or "important summer range".
- In determining compliance with *Forest Plan* big game standard 3, which requires maintaining 35 percent of summer range as hiding cover *(HFP*, p. II/17), I have used the more expansive delineation of "summer range", that is, *all* lands within Helena NF administrative boundaries. This interpretation loops in a lot of ground that serves primarily as transitional and winter range and that is used only incidentally or occasionally in summer. But it is consistent with much of what has been done in other *HFP* analyses since 1981 and so, I have applied it here as well.

Winter Range

Traditionally, the availability of suitable winter range has been seen as the key limiting factor for most elk populations (see Polfus 2011, p. 20-23; Lyon and Christensen 2002, p. 559). Winter ranges are usually smaller than summer ranges, supply less forage and provide less forest cover. They often lie closer to sources of human disturbance than summer ranges, typically on or near private ranchland and they are often grazed over by domestic livestock. In addition, winter ranges are occupied by elk when temperatures are low and snow may limit access to forage. Under these conditions, elk catabolize fat and muscle, so that they may lose 10 percent of their body weight in moderate to normal winters and 25 percent or more in severe winters (Cook 2002, pp. 305-310). Managing for wintering areas with minimal human activity and adequate forage can help reduce energy costs associated with over-winter survival (Skovlin *et al.* 2002). On the other hand, recent studies, suggest that while natural mortality is generally higher on winter ranges, the probability of elk surviving a given winter is directly linked to the quality of nutrition on spring, summer and fall ranges (Cook 2002, p. 305). Elk that enter the wintering period with high fat reserves are better able deal with the often harsh conditions associated with winter range.

In the Divide landscape, as well as across much of the Helena NF, a large proportion of elk winter range lies on private land, or other non-Forest lands, in lower elevation foothills and valleys [Figure 21]. Big game habitat on these lands is outside the jurisdiction and control of the National Forest. It has been delineated on broadscale maps by MFWP (and the Rocky Mountain Elk Foundation) [MFWP 2011a]; but for purposes of assessing the impacts of Helena NF travel management, I have turned to winter range maps developed for the Helena NF Oil and Gas Leasing EIS in 1995 (USFS, USDI 1995). The rationale for using this version of winter range

as opposed to that delineated by the MFWP maps is discussed in some detail in the *"Environmental Consequences"* sections that deal with elk winter range.

Figure 21 - Photo 16: Elk Winter Range
Primary elk winter range on private land north of Elliston in the foothills above the Little Blackfoot River Valley (late February). Elk remain on these lower elevation grasslands for the duration of the winter and do not move back up onto the National Forest until after mid-April.

In this analysis, I discuss the status of winter range as a whole, including the large private land component. However, because the Helena NF is unable to manage much of this resource directly, I use only winter range within Elk Herd Unit boundaries (an area reaching 1.5 mile beyond the Forest boundary) to calculate Forest Plan standards. This accounts for most elk that remain linked to National Forest lands in winter (potentially moving back and forth between public and private land) and that might be influenced by Helena NF land management during this period [see *appendix D of the wildlife specialist report*].

Helena Forest Plan standards for elk winter range focus on two things: (1) providing adequate thermal cover (stands of trees greater than or equal to 40 feet high with at least 70 percent canopy closure) and (2) restricting disturbance from motor vehicles. Thermal cover in stands larger than 15 acres needs to account for at least 25 percent of winter range in each elk herd unit and vehicle traffic through elk wintering areas is to be restricted to those few primary roads and snowmobile trails needed to access other parts of the Forest. Interestingly, the Plan does not address forage on winter range.

For several decades, *thermal cover* has been one of two pivotal habitat elements at issue on big game winter ranges (forage being the other). In winter, thermal cover stands curtail snow accumulation, block wind and under the right conditions, moderate temperature under the canopy. However, the value of thermal cover, widely accepted as a key component of elk winter range in the 1970s and 1980s (Thomas 1979; Beall 1976), has been called into question by more recent research (Skovlin *et al*. 2002). Cook *et al.* (1998) found no positive effect of thermal

cover on the condition of elk in a series of experiments in northeast Oregon and concluded that providing thermal cover was not a suitable solution for inadequate forage on winter range. A review of experimental tests aimed at probing the value of thermal cover to big game animals (Cook *et al.* 2005) concluded that the thermal cover benefit attributed to dense forest structure was probably not operative across a considerable range of climate, including most elk winter ranges in Montana.

Recently, however, Thompson and others (2005) have made a case for the importance of forest cover on Montana elk winter ranges. They argue that elk benefit from solar radiation in open habitats only as long as forage is adequate and accessible, as is the norm in most winters. But when forage is scant or access to it is impeded by deep or crusty snow, elk use up stored energy reserves at a higher rate and the metabolic cost of remaining in open grassland or shrubland becomes too high. In those cases, elk switch to an energy conservation strategy, moving to forest cover, becoming less active and subsisting on low quality forest forage.

The forest formation advocated by Thompson *et al.* is not the classic continuum of greater than or equal to 70 percent canopy closure, but rather, a cover/forage mosaic where patches of dense cover are intertwined with more open-canopied forest and small openings. This provides an environment where manageable snow conditions and useful forage [deciduous shrubs, elk sedge, young conifers (esp. Douglas-fir) and arboreal lichens, species that thrive in more open forest conditions] are in close proximity. Thompson *et al.* (2005) provide no shorthand descriptive term for this habitat formation; but it is not “thermal cover”.

Field monitoring by MFWP biologists has shown that even when elk spend daylight hours foraging in open grasslands, they most often retreat to these kinds of mature forest stands to bed down at night. Bulls in particular spend a considerable amount of time in forested habitats adjacent to open foraging areas. The stands need not be large, often riparian stringers and small isolated forest patches serve the purpose. But, the dominant trees are almost always mature (T. Carlsen, A. Grove: personal communication 2012). Again, these stands need not meet the definition of “thermal cover” and many of them are relatively open. Some of the Douglas-fir stands visible in Figure 21 are representative of the kinds of forest cover that elk make use of on winter range.

More to the point for travel planning, the need to limit human disturbance on elk winter range has been validated by research (see Polfus 2011; Canfield *et al.,* p. 6.3-6.9; Lyon 1979). While elk can tolerate a certain amount of vehicle traffic along predictable, well-defined routes, by habituation or avoidance of the road/trail corridor, random off-route travel will haze elk from normal wintering sites, leading them to draw down limited energy reserves. In this regard, Forest Plan standards remain valid.

Fall Elk Security

Introduction

Elk management during the hunting season focuses on maintaining population numbers well above viability thresholds, protecting certain sex and age classes from over-harvest, providing public hunting opportunity and attempting to balance elk distribution across public and private lands. While these functions are a responsibility of Montana Fish, Wildlife and Parks (MFWP), the Helena NF strives to compliment their efforts by managing elk habitat on the National Forest. The goal has been to provide security habitat that allows a reasonable number of elk to escape hunters so that MFWP does not have to reduce the allowable harvest or shorten the

hunting season (USFS 1986). The current five -week rifle season (mid October to late November) is much longer than in most states and provinces. When the six -week archery season (early September to mid October) is added, the total hunting period for elk encompasses most of the fall. This "permits a diversity of choice [for hunters] with regard to time, weather conditions, hunter density and area" (Lonner and Cada 1982 cited in Hillis *et al.* 1991).

Helena Forest Plan Approach (1986)

The current *Helena Forest Plan* standard for measuring elk security/vulnerability in the hunting season [Big Game Standard 4a (*HFP,* p. II/17 – II/18)] uses an index that combines open road density and hiding cover [see Table 87 and Figure 22 below].

In computing the standard, road miles are "weighted": Open roads on public lands are calculated at 100 percent of length, regardless of condition or use level and private roads not open to the general public are calculated at 25 percent of length. Forest roads closed to vehicles during the hunting season are not counted (USFS 2007e). The *Forest Plan* requires that in order to be tallied for standard 4a, hiding cover must occur in blocks of 40 acres or more ("*Forest Plan* hiding cover") (see standard 5, *HFP* p. II/19). Hiding cover is defined as vegetation capable of concealing 90 percent of a standing elk at 200 feet (the "Forest Service definition"). Obtaining this measurement over large areas (such as elk herd units) is an arduous and time-consuming process. So, for the sake of practicality, we use *canopy closure* (*"crown closure")* as derived from satellite imagery as a surrogate for hiding cover, based on the assumption that stands with canopy closure of 40 percent or more will also provide hiding cover. Standard 4a allows for the application of this alternate methodology, which comes from MFWP [also referred to as "MDFWP"] and sets open road density limits for given hiding cover percentages as shown in Table 87 (*HFP*, p. II/18).

Table 87 - Maximum Open Road Density Per Standard 4a (*HFP,* p. II/18).

% Hiding Cover required when using USFS definition	% Hiding Cover required when using MDFWP definition	Maximum Open Road Density for the given level of hiding cover
56 %	80 %	2.4 mi/mi^2
49 %	70 %	1.9 mi/mi^2
42 %	60 %	1.2 mi/mi^2
35 %	50 %	0.1 mi/mi^2

Figure 22 (following) graphs the relationship between maximum open road density and MDFWP (MFWP) percent hiding cover shown in Table 87. In determining compliance with standard 4a, hiding cover and open road density are plotted for individual elk herd units (EHUs) [discussed in a following section]: points below the curve comply with standard 4a; points above the curve do not.

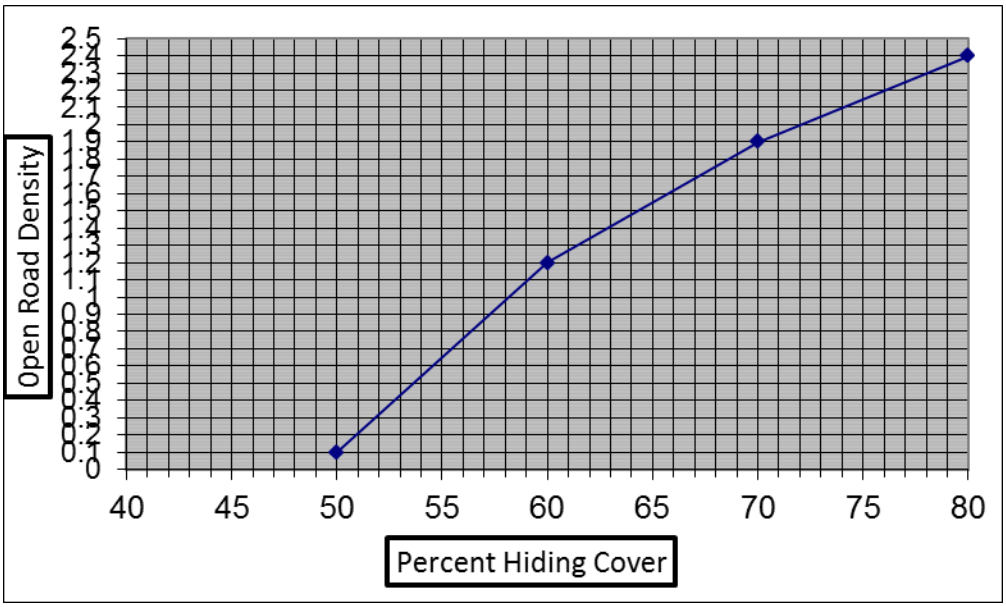

Figure 22 - Graph derived from MDFWP hiding cover
Graph derived from MDFWP hiding cover (crown closure) and open road density points used to measure compliance with Forest Plan Big Game Standard 4a. Points below the curve are in compliance with the standard; points above the curve are out of compliance.

Table 88 shows current percent hiding cover, weighted open road density and compliance status with big game standard 4a for the six elk herd units (EHUs) in the Divide landscape. Elk herd units serve as the basic analysis areas for computing standard 4a, as per big game standard 2 [*HFP,* p. II/17].

Table 88 - Current Hunting Season Open Road Density and Hiding Cover

Elk Herd Units (EHUs)	EHU total acres	HFP hiding cover acres	Percent HFP hiding cover	Weighted open road miles in fall	Open road density (mi/mi²)	Meets HFP Std 4a?
Little Prickly Pear—Ophir Crk	87,022	52,754	60%	203	1.5	no
Greenhorn Mtn	56,314	23,059	41%	121	1.4	no
Spotted Dog—Little Blackfoot	82,314	53,149	65%	138	1.1	yes
Jericho Mtn	35,345	25,810	73%	70	1.3	yes
Black Mtn—Brooklyn Bridge	53,840	30,608	57%	69	0.8	yes
Quartz Crk	36,733	20,849	57%	63	1.1	no

Only three of the six herd units currently comply with the standard for big game security (having plotted out below the curve shown in Figure 22). Two of these (Jericho and Spotted Dog-Little Blackfoot) support notably more hiding cover than the other 4 units. The third herd unit in compliance (Black Mountain-Brooklyn Bridge) has moderate hiding cover, but it has the lowest open road density of any herd unit in the landscape (with the Lazyman Inventoried Roadless Area occupying more than half the unit). Failure of a herd unit to comply with the standard is associated with vaious combinations of insufficient hiding cover (Quartz), high open road density (Little Prickly Pear-Ophir), or both (Greenhorn). While open road density can be quickly reduced by closing roads, an increase in hiding cover is the product of long, slow natural processes that cannot be manipulated in the short term. In the meantime, hiding cover across

the landscape is decreasing further as trees killed in the mountain pine beetle outbreak continue to fall across much of the Travel Plan Area.

While the relationship between open road density and hiding cover can be informative, it does not account for the spatial arrangement and size of unroaded patches, topography as a mediator of hunter access, the distribution of forage and other factors that influence the ability of elk to survive the hunting season. Forest stands that do not meet the definition of hiding cover may prove to be secure areas for elk where local conditions of topography, remoteness and environmental barriers impede hunter access. Conversely, blocks of hiding cover situated in roaded country may be highly insecure. Hiding cover has a role to play but it is not synonymous with security (Lyon and Canfield 1991; Unsworth and Kuck 1991; Lyon and Christensen 1992; Christensen *et al.* 1993).

When the *Helena Forest Plan* was fashioned in the early 1980's, the total elk population on the Forest was estimated to be around 5,000 (4,900 elk in 1981) (*HFP,* p. V/5). Goals, objectives and standards for big game in the *Plan* were designed, among other things, to provide enough habitat on the National Forest to support 6,400 elk by 2000, in support of MFWP goals for harvestable elk (*HFP,* p. V/5). Recent MFWP aerial survey data (2014) indicate that at least 11,350 elk inhabit the nine hunting districts that have major overlap with the Helena NF. This total does not include elk on seven other hunting districts with relatively small overlap of Helena NF lands. While some of the elk in the overlapping hunting districts spend all or part of their time on non Forest land or on the Beaverhead-Deerlodge and Lewis and Clark NFs, a significant number of them, well in excess of 6,400, are part of the Helena NF population.

Although elk populations in the Divide landscape have increased substantially since the 1980's and have been at or above MFWP population goals for several years, as well as exceeding Helena NF population goals, big game standard 4a continues to indicate that elk security is sub-standard in half of the local herd units and barely above standard in the others. As such, the index has been an imprecise and often uninformative guide to the state of elk security over the past 25 plus years [see discussion in *"Forest Plan Programmatic Amendment for Big Game Security for the Divide Travel Plan"*].

The Concept of Elk Security Areas

Since the release of the *Helena Forest Plan* in 1986, field research in the northern Rockies and Pacific Northwest has led to the concept of "*elk security areas"* as a basis for assessing elk vulnerability to hunting. The degree to which elk are able to survive the fall hunt is seen, in large part, as a function of the size and pattern of habitat blocks, amply forested in most cases, to which hunter access is limited and in which elk have consistent, unencumbered access to basic resources. Hillis and others (1991) developed an analysis procedure (generally referred to as the "Hillis method") based on the availability of large non-linear blocks of habitat (greater than or equal to 250 acres) ½ mile from open roads. The intent was that at least 30 percent of the "hunting season home range" within a "standardized habitat analysis unit" be held in security areas (Hillis *et al.,* p. 39). This particular set of parameters was designed for densely-forested western Montana elk habitat and the Hillis team recommended that, particularly for areas further east where forest cover was more limited, security requirements be evaluated on a site-specific basis and the guidelines adjusted so that results made biological sense in a local setting (Hillis *et al.* 1991, p. 40; Christensen *et al.* 1993, p. 5).

Forest Plan Amendment for Big Game Security

Under a *Forest Plan* amendment proposed for the Divide Travel Plan and applicable to future projects in the Divide landscape, a "security area" approach would replace the current "hiding cover/open road density index" as the *Forest Plan* standard for gauging the vulnerability of elk to hunting [see *"Forest Plan Programmatic Amendment for Big Game Security for the Divide Travel Plan"]*. The amendment derives from the Hillis methodology (1991), but it includes modifications designed for "eastside" Forest environments in general and the Divide landscape in particular. The specifics of the amendment come in part from guidelines worked out by biologists from the Forest Service and Montana Fish, Wildlife and Parks (MFWP) and summarized in *"U.S. Forest Service and Montana Department of Fish, Wildlife and Parks Collaborative Overview and Recommendations for Elk Habitat Management on the Custer, Gallatin, Helena and Lewis and Clark National Forests"* (USFS and MFWP 2013). Other details emerged from a series of meetings focused on big game management for the Divide Travel Plan: Participants included Helena NF and MFWP biologists, as well as local interest groups (2013 to 2014).

The new standard [*Forest Plan Programmatic Amendment*] is based on three basic statements, clarified by a series of definitionss, guidelines, goal statements and site-specific data for Divide elk herd units. The standard reads as follows:

- Road management will be implemented to maintain or improve big game security and hunting opportunity.
- Road management will also be implemented to maintain or improve big game intermittent refuge areas [discussed below].
- The standard applies only to the National Forest System lands within those portions of an elk herd unit that are within the Helena Ranger District, Helena National Forest administrative boundary.

Public motorized use will be managed during the hunting season (September 1 to December 1) to maintain elk security at levels specified for each of the six Divide elk herd units under each alternative proposed for the Divide Travel Plan. These baseline security levels are shown in Table 109 and Table 110 in the *"Environmental Consequences"* section of this report. Security is defined in terms of the percentage of an elk herd unit occupied by non-motorized security areas [Table 109].

The goal of the standard is to *maintain* or *improve* elk security in herd units where security/refuge areas occupy less than 50 percent of the unit and to keep it above 50 percent in herd units that have achieved that level. Any *decrease* in percent security in herd units that are under 50 percent, would represent non-compliance with the standard. Herd units would remain in compliance as long as their security percentages hold steady or increase. The 50 percent security area level (considerably higher than the 30 percent recommended by the Hillis group) is based on what has been deemed desireable and achievable in the Blackfoot landscape just to the north [*Blackfoot Non-Winter Travel Plan FEIS,* 2014]. For the sake of consistency, the 50 percent goal has been applied to the Divide landscape as well, although we recognize that, given the entrenched nature of the State, County and Forest road system in the landscape west of Helena, this percentage is unachievable on all but perhaps two of the six Divide herd units. The fact that herd units are below 50 percent security does not mean that they are out of compliance with the standard.

The figures in Table 109 represent the baseline security levels that need to be maintained or improved in order for herd units to continue complying with the standard under any given alternative. Currently, percentages in a majority of herd units are low [Table 89; Table 109, Alternative 1]: But they represent security levels that have been allowing MFWP to meet its elk population objectives in local hunting districts, or in those portions of the districts associated with Divide landscape herd units [Table 92 and Table 93]. The inference is that, although percentages are well below 50 percent, the current arrangement of security and refuge areas is, for the time being, operating effectively.

Delineating Elk Security in the Divide Landscape

In delineating elk security areas, we have relied on guidelines recently developed by MFWP and Helena NF biologists (USFS and MFWP 2013) with additional input from interested local groups and individuals. These criteria and the elk security areas that arise from them in the Divide landscape are summarized in the proposed *Forest Plan Programmatic Amendment for Big Game Security* [*following report*].

While distance from open motor routes is the essential parameter used to define the boundaries of elk security areas, a number of other components come into play in determining what that distance should be and how large the area needs to be in order to provide effective security. Hillis *et al.* (1991) identified deficient forest cover as a potential problem for "eastside" Forests in Montana. Other factors that can diminish the integrity of a security area include:

- small size (in the 250 acre range),
- narrow or irregular shape (excessive edge and access opportunity),
- gentle terrain (which encourages hunters to probe further into the area),
- scarcity of physical barriers (such as cliffs, talus, broad streams, bogs, deadfall)
- limited elevational range (which limits elk use to only part of the hunting season),
- forest structure that is open or highly fragmented,
- few interior foraging areas (which forces elk to leave the security area to find food),
- isolation from other security areas (no credible travel corridors between areas),
- an interior network of closed roads and trails (providing walking lanes for hunters),
- proximity to local population centers (which generally leads to high hunting pressure),
- multiple entry points (trailheads, roadside pullouts, parking areas).

Factors that increase the effectiveness of security areas are the converse of those listed above: large size, plentiful forest cover, minimal trails and old roadways, rugged terrain, heavy deadfall and so on.

In developing the guidelines, we recognized that all of these factors may influence the ability of an area to hold elk through the hunting season; but we felt that the key component was *size*. Accordingly, rather than adjust individual security area boundaries to account for a multiplicity of factors, we simply set the minimum size of a bona fide "*elk security area"* at 1,000 acres, considerably larger than the 250 acre minimum recommended by Hillis *et al.* for "westside" Forests. This is an adjustment for "eastside" cover conditions and it also conforms to the 1,000-acre security area minimum recently established for the *Blackfoot Non-Winter Travel Plan* Area on the Lincoln Ranger District just to the north (USFS 2014).

A number of smaller habitat blocks (between 250 and 1,000 acres) that have been classified as security areas in past analyses are now designated as "*intermittent refuge areas".* While most

of these areas are probably too small to hold elk securely throughout the hunting season, they serve as temporary refuges for hunted animals and in parts of the Divide landscape, they represent the only escape areas available [see Figure 23]. While their acreages are not added into the security area total for a given elk herd unit, they have been mapped and noted as areas that need to be managed for elk security.

We calculate elk security on a herd unit basis [see *"Elk Herd Units"* in the following section]. Herd units along the Helena NF boundary have been drawn to extend 1.5 mile out onto non-Forest land. But, in delineating security areas, we do so only for the area within Helena NF administrative boundaries (see USFS and MFWP 2013). This is where MFWP and the Helena NF would like to retain elk in the hunting season: public land open to all hunters (where the Forest Service has management control and the ability to close roads). By excluding from the security calculation those portions of the herd units that lie outside the Forest boundary, we have omitted security provided by private lands on which public hunting is barred and on which elk have been learning to seek refuge with increasing frequency. MFWP and the Helena NF feel that relying on these sanctuaries for security is undesirable since it decreases public hunting opportunity. In addition, the status of private lands can be in flux over the long-term, depending on landowner decisions that may have little consideration for the welfare of elk. So, while I have accounted for the role that these lands play in influencing elk security on the National Forest as a cumulative effect, I have not analyzed it as a direct effect on Helena NF land.

Elk security areas are now delineated as habitat blocks of at least 1,000 acres [250 acres for intermittent refuge areas] with borders ½ mile from roads and motor trails open during the big game hunting season. Security area boundaries have also been pulled back ½ mile from private land holdings that support active roads somewhere on the property. This has eliminated some areas that had previously been delineated as security areas and it has reduced the size of others. At the recommendation of MFWP, the hunting season was defined to include both the general rifle and archery seasons, thus occupying most of the period between September 1 and December 1 [USFS and MFWP 2013, p. 13]. Open routes in this period were determined via the road and trail attribute layers in the Helena NF GIS data base and security area boundaries drawn accordingly. Resulting areas are shown in Figure 23.

The Role of Forest Cover

While the new *Forest Plan Programmatic Amendment* does not require that elk security areas provide a particular level of hiding cover, it does recognize forest cover as an important component of security and includes a set of guidelines for managing cover on fall elk ranges [*following report*]. The guidelines focus on maintaining cover where it exists within security areas and in travel lanes between them. Where cover is not available, the guidelines emphasize managing for its recruitment. Abundant cover is most valuable in areas known to be frequented by elk: saddles, low divides, drainage-heads, riparian/ wetland sites and the upper third of slopes in large drainages. These objectives do not apply to areas where hiding cover has not been abundant historically because of intrinsic environmental conditions (primarily in dry grasslands and shrublands and in dry Douglas-fir and ponderosa pine forests).

The guidelines also recognize that forest cover that is not dense enough or tall enough to provide classic hiding cover may still provide concealment in certain circumstances or otherwise allow animals to elude hunters. In this analysis, I refer to three levels of forest cover:

- *"hiding cover"* provided by conifers capable of hiding 90 percent of a standing elk or deer at 200 feet, the standard definition from the *Forest Plan*;
- *"screening cover"* provided by conifers and other vegetation that afford longer sight distances than hiding cover but that can obstruct a clear view toward standing or moving animals;
- *"concealment cover"* provided by small conifers, shrubs, boulders, or coarse woody debris that can hide calves/fawns and bedded adults (and may serve to impede hunter movement).

The Role of Off-Forest Lands in Providing Elk Security

Another factor contributing to elk security is land ownership pattern. In recent years, more elk have been finding fall refuge on large blocks of private land off the National Forest. This occurs when ranchers or other owners of large parcels near the Forest prohibit or restrict public hunting. In parts of the Divide landscape, elk have been quick to identify the security value of these private lands. A recent study by MFWP concluded that, given the choice, elk prefer unhunted sanctuaries on private lands to traditional security areas on public land (MFWP 2011c; Proffitt *et al.* 2010, 2013) (see also Burcham *et al.* 1999). The immediate impetus to move to private land prior to or early in the hunting season may be driven by inadequate security and an overabundance of hunters and motorized recreationists on public lands. Later in the season, because most private refuges are located at lower elevation, it may be generated by accumulating snow and declining forage availability in the mountains. It may also be a function of elk instinctively returning to historic valley ranges as lands become available for them to do so.

Regardless of the reasons, these private sanctuaries are acting as valley and foothills "security areas" that augment security (as defined by Hillis *et al.*) on public land. With private land, however, hunter access is often completely precluded rather than simply made more difficult by walking distance and terrain as with National Forest security areas [see discussion of the Deerlodge and Granite Butte EMUs in the *Montana Elk Management Plan* (MFWP 2004, p. 187-203)]. Hunting opportunity is thus diminished. On the other hand, given the checkerboard pattern of public and private land ownership in the valleys, groups of elk sometimes drift into unprotected areas where they are vulnerable to being surrounded and indiscriminantly shot by opportunistic hunters in vehicles. For these reasons, wildlife managers see the accumulation of elk in the valleys during the hunting season as problematic.

Current Security in the Divide Landscape

Table 89 displays the current acreage of elk security areas and smaller intermittent refuge areas in the Divide landscape and the percentage of each herd unit that they occupy.

Table 89 - Hunting Season Security for Elk Herd Units

Elk Herd Units	EHU acres within HNF boundaries	Acres in elk security areas	Acres in intermittent refuge areas	% of EHU in elk security areas	% of EHU in intermittent refuge areas
Little Prickly Pear – Ophir Crk	59,311	13,863	0	23%	0%
Greenhorn Mtn	21,693	1,494	971	7%	4%
Spotted Dog – Little Blackfoot	63,561	18,880	2,400	30%	4%
Jericho Mtn	29,364	3,435	923	12%	3%
Black Mtn – Brooklyn Bridge	35,874	5,781	1,738	16%	5%
Quartz Crk	23,036	0	1,124	0%	5%
Divide Landscape Total	232,839	43,453	7,156	19%	3%

As seen in Table 89, only one herd unit, Spotted Dog-Little Blackfoot, approaches the 30 percent security acreage threshold proposed by Hillis *et al.* (1991). Even when intermittent refuge areas are added in, percentages of all herd units remain well below the idealized 50 percent goal set for the Blackfoot and Divide landscapes. Strategic road closures can bring some percentages up appreciably, but this is not feasible in some herd units. These percentages represent the baseline condition that allow each of these herd units to comply with the amended elk security standard at the present time (alternative 1). As long as the acreages and perc entages do not decline, the herd units remain in compliance.

It should be noted that although some of the herd units have very low on-Forest security levels, elk are able to compensate in most cases by taking advantage of private lands where public hunting is not allowed or where access is difficult. The relationship between these security area percentages and the status of local elk populations will be discussed in following sections.

Figure 23 shows the current configuration and distribution of elk security areas and intermittent refuge areas across the six elk herd units of the Divide landscape. Some of the Individual security areas and intermittent refuge areas are discussed in following sections.

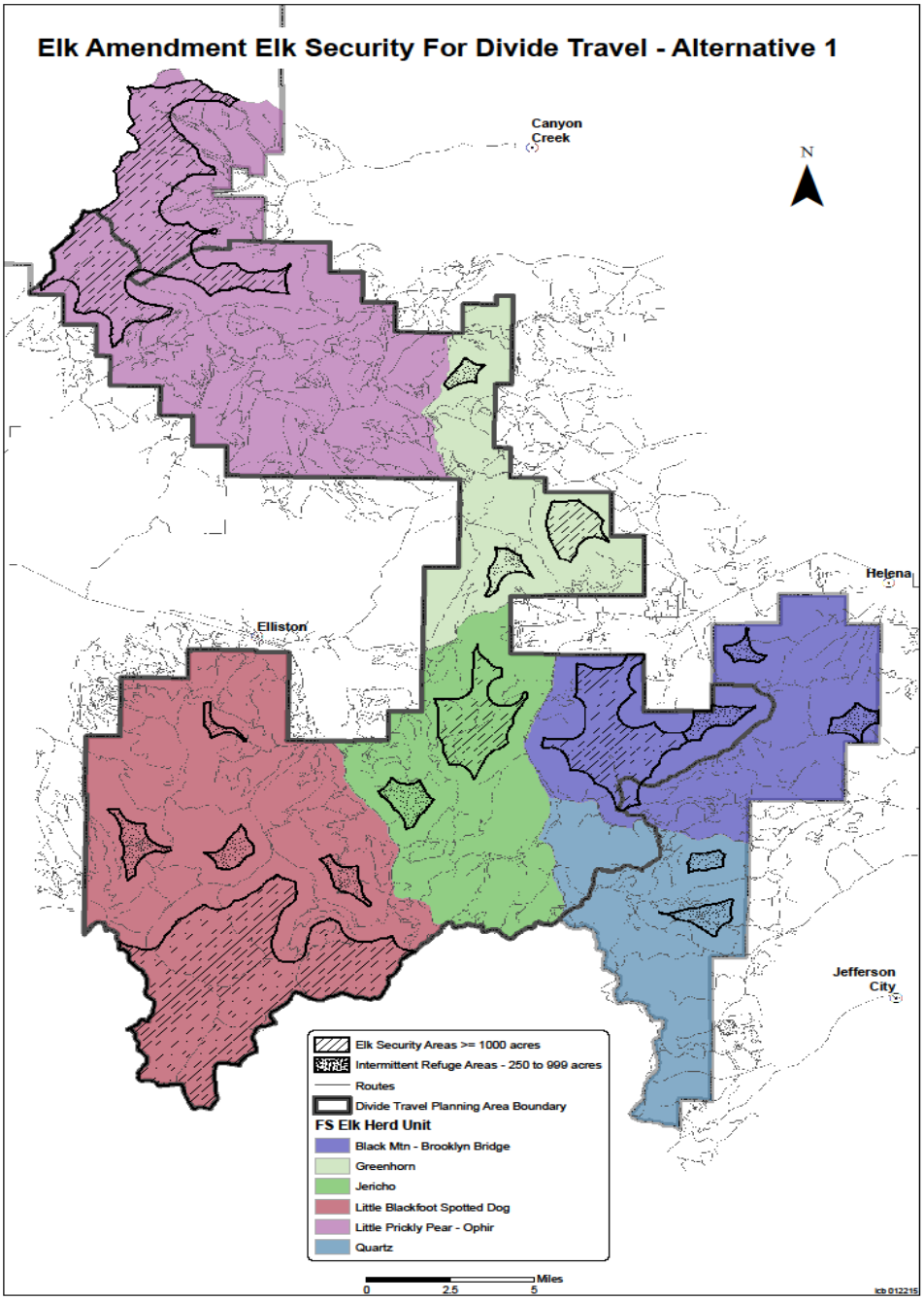

Figure 23 - Current elk security and intermittent refuge areas.
Also displayed are elk herd units (EHUs), as discussed in the next section.

Figure 24 - Photo 17: Elk Security Areas
The Blackfoot Meadows-Bison Mountain elk security area, the largest security area (18,883 acres). This region around Bison Mountain includes old clearcuts and closed roads, as seen here.

Figure 25 - Photo 18: Refuge Areas
Looking into upper Elliston Creek, a small intermittent refuge area (264 acres). Roads in the clearcuts visible on the far edge of the area are closed to motorized use.

Figure 26 - Photo 19:Colorado Mountain Elk Security area
A view into the western portion of a 5,569-acre elk security area in the Lazyman Gulch Roadless Area. This part of the security area around Colorado Mountain and Black Hall Meadows retains remnants of an old road system, now converted to non-motorized trails. Forests in this area have been heavily impacted by mountain pine beetle and cover conditions will be changing.

Elk Herd Units

To analyze the effects of Helena NF actions on elk, we have partitioned the Divide landscape into six elk herd units *(EHUs)* [Figure 23 and Figure 27]. Elk herd units include all lands within Helena NF boundaries, public and private and adjacent land out to 1.5 miles beyond the boundary (mostly private holdings, but some BLM and State land) [see Figure 27, following]. This extension delineates an off-Forest area used by elk that remain dependent on the National Forest throughout the winter (often returning to the Forest to bed after foraging in off-Forest grasslands) [see *appendix D of the wildlife specialist report*]. The delineation eliminates areas occupied by elk that move well away from the Forest for the duration of the winter. The only area excluded from 1.5 mile extension occurs along the northeast edge of the Black Mountain–Brooklyn Bridge EHU where the off-Forest zone extends into the City of Helena, an area inhabited by deer, but not elk. EHUs are used to calculate compliance with Forest Plan big game standards 2, 3 and 4a (*HFP*, pp. II/17-18).

Current EHUs in the Divide landscape were delineated in 2003 by Helena NF and MFWP biologists and modified in 2007, 2008 and 2011. Three modifications were made: (1) the addition of the 1.5 mile zone beyond the Forest boundary to better represent the influence of Forest management on wintering elk; (2) extension of the Greenhorn EHU boundary well beyond the 1.5 mile limit to reflect known movements of MFWP radio-collared elk and (3) the merging of the Spotted Dog and Little Blackfoot herd units into a single unit to better reflect how elk groups intermingle in that area in summer and fall.

Herd units are designed to encompass areas occupied by relatively cohesive groups of elk on the National Forest. The delineations are imperfect, however, for a number of reasons: (1) herd units are mapped as discrete areas, whereas elk herd home ranges often overlap; (2) mapped herd unit boundaries are fixed, whereas elk ranges on the ground may be fluid from one year to another; (3) some groups of elk within a herd may occupy one mapped herd unit in summer and another in winter; (4) the delineation of what constitutes a unified "elk herd", "herd unit" or "herd group" is often difficult to pin down and mapped herd units may differ in size and pattern depending on the idiosyncrasies of the mapper and the quality of the field data; (5) yearlong elk ranges often run well beyond National Forest boundaries and for purposes of analyzing the impacts of Forest management, herd unit boundaries need to be cut off at some point near the Forest boundary, often well short of where elk may actually go in some winters.

Given these circumstances, a case can be made for using terms such as "elk analysis unit" or "elk analysis area" to identify the fixed, discrete areas that the Helena NF has mapped out for purposes of assessing elk habitat and reserving the term "elk herd unit" to describe the dynamic groupings of elk that management agency biologists have identified through long-term field observation. For the time being, however, in order to maintain a certain consistency, I will continue to apply the term "elk herd units" to these Helena NF elk assessment areas.

In the Divide landscape, most EHU boundaries have been drawn along primary drainage bottoms so that the EHUs encompass cohesive summer ranges at higher elevation. Before 2003, most herd unit boundaries had followed major ridgelines, thus splitting the areas used by elk herd groups in summer. In winter, elk that have spent the summer in a given herd unit on the National Forest may diverge onto two or more non-Forest winter ranges, where they mingle with elk that have summered on other herd units (G. Joslin, pers. comm. 2003). Summer range centered units thus seemed a more accurate characterization of elk activity on Helena NF ground.

Current herd units in the Divide landscape are quite large compared to those used prior to 2003 and those in use on several other Forests in Region 1. Pre-2003 Divide herd units were the size of timber compartments, roughly 4,000 to 12,000 acres, whereas present-day Divide units range from around 35,000 acres to 87,000 acres (Table 88). This brings them into line with herd units in the Elkhorn and Big Belt landscapes. These units may encompass the ranges of two or more smaller elk "herd groups". Because the movements of these smaller groups on summer and transitional ranges may be difficult to map with any consistency from year to year (without radio telemetry data), the larger, stable units make more sense for habitat analysis.

The Travel Plan Area takes in parts of six elk herd units in the Divide landscape: The Plan Area does not include the 1.5 mile extension beyond Helena NF boundaries or National Forest land covered by previous travel planning efforts. These include the Clancy-Unionville area (much of the Quartz and Black Mountain – Brooklyn Bridge EHUs) and most of the upper Little Prickly Pear drainage (half of the Little Prickly Pear–Ophir EHU). Forest Plan compliance, however, is calculated for entire elk herd units, not just on the portions that fall within the Travel Plan Area.

In Table 90, "Total Acres in EHU" includes all public and private land within administrative boundaries of the Helena NF plus the 1.5 mile extension onto non-Forest land. The category "EHU Acres within Helena NF Administrative Boundaries" is larger than "Total Acres of Helena NF land within EHU" due to non-Forest inholdings inside the administrative boundary. The arrangement of elk herd units in the Divide landscape is shown on the map in Figure 23, which

shows the on-Forest portion of the six units but not the 1.5 mile extension beyond the Forest boundary. The herd units are shown in their entirety in Figure 27.

Table 90 - Dimensions of Elk herd units (EHUs) in the Divide Landscape

Elk Herd Unit (EHU)	Total acres in EHU	Total mi² in EHU	EHU acres within HNF boundaries	EHU mi² within HNF boundaries	Acres of HNF land within EHU	% of EHU in the Travel Plan Area
Little Prickly Pear–Ophir Crk	87,022	136.0	59,311	92.7	49,725	50%
Greenhorn Mtn	56,314	88.0	21,693	33.9	19,914	39%
Spotted Dog–Little Blackfoot	82,314	128.6	63,561	102.4	47,261	80%
Jericho Mtn	35,345	55.2	29,364	45.9	23,521	83%
Black Mtn–Brooklyn Bridge	53,840	84.1	35,874	56.1	34,010	26%
Quartz Crk	36,733	57.4	23,036	36.0	18,235	13%
Divide Total	351,568	549.3	232,839	367.0	192,666	50%

LITTLE PRICKLY PEAR–OPHIR Elk Herd Unit

The Little Prickly Pear–Ophir Creek EHU straddles the Continental Divide south of the Helena/ Lincoln RD boundary. It covers the upper reaches of the Little Prickly Pear Creek watershed east of the Divide and the headwaters of the greater Dog Creek and Ophir Creek drainages west of the Divide. Prior to 2003, the Helena NF recognized two herd units in this area ("Ophir" west of the Divide and "Little Prickly Pear" east of it). Regular movement of elk across the Divide in summer and fall, led MFWP to suggest merging the two units in 2003. The resulting Ophir–Little Prickly Pear EHU is now the largest in the Divide landscape at 87,022 acres. About 37,300 acres (43 percent) of the EHU are in private or other non-Forest ownership.

Much of the northern half of the unit (mostly east of the Divide) is in unroaded country that abuts the Nevada Creek Roadless area on the Lincoln District to the northwest. As a result, elk security in this half of the unit is good. Hunters are aware of the high fall elk density in this roadless country and a substantial number of them push into the area on foot or horseback during both the bow and rifle seasons and with a certain degree of success. This is the kind of area that MFWP feels is producing a "high-quality hunting experience". Security west of the Divide (the southern half of the herd unit), however, is impaired. Open roads are ubiquitous, particularly in the Dog Creek drainage and there are no unroaded habitat patches large enough to qualify even as intermittent refuge areas. Shortly after the start of the rifle season, elk in this area retreat to a limited number of small enclaves, the largest being in unroaded country south and west of Black Mountain. Overall, 23 percent of the area within Helena NF boundaries in the Little Prickly Pear–Ophir EHU is occupied by effective elk security areas (Table 89, Table 91). Elk do make use of a number of smaller unroaded enclaves for temporary refuge, in particular, in forested sites around Esmeralda Hill, LaSalle Gulch, Cellar and Ogilve Gulches and Spring Gulch.

Summer habitat effectiveness (based on open road/ motor trail density) shows a similar pattern: very high in the Little Prickly Pear watershed east of the Divide, considerably lower west of the Divide. Overall habitat effectiveness for the entire EHU (including the 1.5 mile off-Forest extension) is 54 percent, above the recommended minimum of 50 percent. The non-motorized portion of the Little Prickly Pear watershed is particularly effective as summer habitat. One of the only "large" burns to have occurred in the Divide landscape in the past few decades is located here in Beartrap Gulch and the South Fork of Little Prickly Pear Creek. It dates from the 1960s and while it retains few snags, it provides excellent summer foraging opportunities for

elk. Mule Deer, black bears and grizzly bears also make use of the burn in summer. GIS modeling estimates that 60 percent of the EHU provides hiding cover (Table 91).

Bona-fide winter range [see the Helena NF Oil and Gas Leasing EIS (USFS, USFWS 1995)] is limited to the northern end of the EHU around Cayuse Ridge and Ogilve Gulch and to private ranchlands in the broad valleys of Little Prickly Pear Creek and its tributaries to the east. Elk utilize the Helena NF portion of the "winter range" primarily as transitional range in spring and fall but may remain through part of the winter if snow conditions allow.

GREENHORN Elk Herd Unit

The Greenhorn EHU lies astride the Continental Divide. Roughly 80 percent of it is on the east side of the Divide in the upper Tenmile and Silver Creek drainages. The west side is drained by tributaries of Dog Creek. The EHU encompasses MacDonald, Priest and Mullan Passes, all primary cross-over corridors for big game animals and humans. Although the EHU occupies 56,314 acres, approximately 36,400 acres (65 percent) are in private or other non-Forest ownership. The acreage of National Forest land in this EHU is the smallest in the Divide landscape. The extensive off-Forest acreage is a function of the eastern EHU boundary being extended well beyond the normal 1.5 mile limit, based on MFWP radio-telemetry data from the 1990s [see Figure 27]. This data is not available for other herd units.

Most of the National Forest portion of the unit is at high elevation along the Divide and serves as elk transitional range (mostly spring) and to a lesser extent as summer range. Although summer habitat effectiveness, as indicated by open road density, is acceptable (55 percent), elevated levels of human activity associated with the three passes (each with a primary road running through) and widespread livestock grazing dilute summer use potential in some areas. The unit supports broad grasslands along the Divide and down the west slope [Figure 10] and elk graze through these areas conspicuously in spring before human use begin to escalate and cattle arrive. GIS modeling estimates that hiding cover occupies about 56 percent of EHU summer range. Summer range in this herd unit covers only about 54 percent of the unit, another derivative of MFWP radio-telemetry data. Hiding cover on the unit as a whole is only 41 percent (Table 88, Table 91).

Effective elk security areas (greater than or equal to 1,000 acres) occupy only about seven percent of the area within Helena NF boundaries, with the unroaded areas concentrated between Greenhorn and Sweeney Creeks, around Greenhorn Mountain and in the upper Little Porcupine drainage. Smaller, less effective security enclaves are situated in upper Greenhorn Creek, upper Blue Cloud Creek, Rich Spur Gulch and around Priest Pass, among other sites. The lower elevation segments of the herd unit east of the Divide between Sweeney and Greenhorn Creeks provide some winter range, but most winter use occurs off the Forest on both sides of the Divide.

SPOTTED DOG–LITTLE BLACKFOOT Elk Herd Unit

The Spotted Dog–Little Blackfoot EHU is a complex unit. It is situated west of the Continental Divide in the upper Little Blackfoot watershed and occupies a large area between Telegraph Creek to the east and the Helena NF boundary area to the west. It includes the headwaters of the Little Blackfoot River (the Electric Peak Roadless Area), which covers about 28,000 acres in the southern part of the unit [Figure 12]. The herd unit was formed in 2011 by merging two smaller units (the Spotted Dog and Little Blackfoot EHUs) because of the tendency of elk herd

groups to move between the two areas in summer and fall. It is now the second largest herd unit in the Divide landscape with 82,314 acres of public and private land.

Currently, 31 percent of the herd unit is in non-Forest ownership. About 5,750 acres are in private inholdings on the National Forest and another 20,075 acres in private and State ownership in the 1.5 mile extension beyond the Forest boundary (most of it private). The western part of the herd unit extends into the 38,000 acre Spotted Dog Wildlife Management Area (WMA) established by the State of Montana in 2010 following the purchase of a large private holding. In addition to the 1.5 mile herd unit extension into the WMA, another 3,700 acres of newly acquired State land within the Helena NF boundary is also part of the management area. Most of the old road system in the WMA is off-limits to public vehicle traffic yearlong and this contributes to the quality of big game security and habitat effectiveness in the herd unit.

MFWP seasonal range maps identify the eastern quarter of the EHU, the broad grasslands atop Baldy Ridge and the ridges south of Elliston, as potential winter range [Figure 39]. However, MFWP aerial surveys (late winter or early spring) over the last 15 years, Helena NF field observations and relocations of radio collared elk (1983 to 1997) demonstrate that these sites are being used as spring/fall transitional range and as summer range, but not as wintering areas. Aside from the presence of a few isolated individuals early and late in the season, there is no evidence of winter use. Virtually all true winter range associated with this herd unit occurs off the National Forest on private and State land to the west and north [Figure 21] where winter foraging habitat is extensive and not limiting (at least under current circumstances) [see the discussion of elk winter range in the *"Environmental Consequences"* section].

Most of the Spotted Dog–Little Blackfoot herd unit functions as elk summer range. In the west half of the unit, the best habitat is concentrated around the heads of stream tributaries, which drain the area in all directions. The east half of the EHU includes much of the headwaters of the Little Blackfoot River and greater Telegraph Creek, virtually all of it summer range for elk, mule deer, moose, black bears, lynx, coyotes, mountain lions and others. It is amply forested, most typically by mature lodgepole pine that originated with stand replacing fires around 1900. Much of the forest canopy in these stands is now dead from bark beetle infestation, although stands dominated by smaller diameter trees often manage to resist the beetle [Figure 24]. Productive wet habitat occupies the headwaters of the unit's multifarious streams, but large wet meadows are limited, some of the most conspicuous being located in upper Bison and Ontario Creeks [Figure 20], around Slate Lake [Figure 54] and at Blackfoot Meadows near the origin of the Little Blackfoot.

There has been considerable timber harvest around Treasure Mountain and along Ontario and Telegraph Creeks, as well as in the upper Spotted Dog drainage to the west, all with attendant road systems. But, because of the extent of the Roadless Area, overall habitat effectiveness is sufficient (56 percent). Habitat effectiveness in the Roadless Area (including that in the extensive unroaded country to the immediate south on the Beaverhead-Deerlodge NF) is 100 percent. GIS modeling estimates that 65 percent of the EHU provides hiding cover (Table 89, Table 91), although this percentage is beginning to decline as beetle-killed lodgepole pine comes down over thousands of acres. This lost cover will be replaced eventually by natural regeneration of the pine forests, but it is a process that will take 20 to 30 years to run its course.

Montana Fish, Wildlife and Parks biologists recognize the Spotted Dog and upper Little Blackfoot country on the Helena NF, along with adjacent private and State land to the west (much of it in

the Spotted Dog Wildlife Management Area), as a fertile area for elk [the northern part of Hunting District 215]. Winter surveys in the last decade have typically 400 to 500 elk west of the National Forest in this region (R. Vinkey, personal communication, 2005 to 2008). Surveys from 2010 to 2014 have counted over 1,000 elk in this area (MFWP *Elk Surveys in HD 215, 2010 to 2014)*.

The Spotted Dog – Little Blackfoot EHU affords excellent security for elk through as much of the hunting season as snow conditions allow. Currently, effective elk security areas occupy 29 percent of fall elk range, the most of any herd unit in the Divide landscape. The combination of security and intermittent refuge areas comes to 33 percent. The largest block of security is associated with the Electric Peak Roadless Area in the southern half of the unit [Figure 24]. Most problems with elk security involve lower elevation security habitat that comes into play after elk have been forced out of higher elevation roadless areas by snow and deteriorating forage later in the hunting season. Cover and road density is at issue in the Negro Mountain, Treasure Mountain, lower Telegraph Creek and Spotted Dog Creek areas [see local area assessments in *"Local Effects in Key Areas"* toward the end of this report].

In addition to taking advantage of security habitat on the National Forest, many elk, beginning in September, drop down into the Wildlife Management Area immediately west of the Forest. Until recently, most of this land (about 27,000 acres) was owned by the Rock Creek Ranch Corporation and MFWP had identified it as a problem area because of the refuge it provided for substantial numbers of elk on ground where public hunting was highly restricted [*Montana Elk Management Plan* (2004), Deerlodge EMU]. In September 2010, the State was able to purchase a large portion of the private holdings and establish the Wildlife Management Area. The area is open to public hunting, but with limitations (the main restraint being that most of the area is closed to motor vehicles) [see summary in the Helena *Independent Record,* Oct. 21, 2010; MFWP website http://fwp.mt.gov/news/article].

I have no harvest data specific to the Wildlife Management Area for the 2010 to 2014 seasons, but it seems likely that from now on, hunting-generated mortality in this elk herd will be a bit higher than in the past. Still, the fact that the Wildlife Management Area is mostly non-motorized allows it to function much like an elk security area on the National Forest.

JERICHO Elk Herd Unit

The Jericho Mountain EHU lies south of U.S. Highway 12, extending westward from Tenmile Creek over the Continental Divide to Telegraph Creek. It includes private land in the valleys off its northern edge and encompasses a total of 35,345 acres, 29,364 acres within Helena NF administrative boundaries. Aside from the valleylands to the north, most private land in the EHU is on old mining claims, including part of the town of Rimini. Approximately 33 percent of the EHU is in private ownership. Much of the northern half of the herd unit is occupied by the 9,440-acre Jericho Mountain inventoried Roadless Area, located primarily on the east side of the Divide in the Tenmile Creek watershed, but lapping westward into the Telegraph Creek drainage in the vicinity of Mike Renig Gulch in the north and Jericho Mountain in the south. This largely unroaded habitat block provides most of the fall elk security in the Jericho EHU.

Some of the montane grasslands in the northern end of the unit above Lazyman and Mike Renig Gulches provide winter habitat for elk in most years. These areas are identified as such on both the MFWP seasonal range map and the Helena NF "Oil and Gas" winter range map. The rest of the unit is transitional and summer range, with viable summer habitat concentrated in the southern half toward the headwaters of Tenmile and Telegraph Creeks and their tributaries.

Most of the herd unit is covered with mature forest (much of it deteriorating from mountain pine beetle infestation). Upland grasslands occur in the northern end of the unit and at a few locations along the Divide (as at Bullion Parks). Wet meadows also break the forest continuum in some areas: those in Flume Gulch, Sure Thing Swamps and Sally Ann Creek are particularly productive as summer wildlife habitat [Figure 8, Figure 20, Figure 49].

Extensive clearcutting (mostly in the 1970s and 1980s) in the greater Hahn Creek and upper Telegraph Creek drainages west of the Divide also serves to disrupt the contiguity of the mature forest. Cutting units are now dominated by regenerating conifer saplings (mostly lodgepole pine and Douglas-fir), many of which provide hiding cover for big game animals and habitat for snowshoe hares and the lynx that prey upon them [Figure 51, Figure 52]. Lynx are resident in this area year-round, as are wolverines. The Tenmile drainage, east of the Divide, serves as part of the water supply for the City of Helena and as a result, has seen very limited timber harvest on public land over the past several decades. Forest cover is ubiquitous, but as with other areas in the Divide landscape that are dominated by pine forests, mountain pine beetle infestation is taking out a majority of the overstory trees.

Historic logging (dating from the late 19th and early 20th centuries) and mining have generated far-flung road systems, some still open to vehicle use, others closed. Habitat effectiveness in summer is now at 70 percent, which is quite good (Table 91). GIS modeling estimates that 73 percent of the EHU provides hiding cover, a percentage that is beginning to decline as pine beetle mortality escalates. About 12 percent of Helena NF hunting season elk range is currently in security areas, much of it associated with the Jericho Mountain Roadless Area. When intermittent refuge areas areas are added in, security rises to around 15 percent. Because the herd unit is relatively close to the city of Helena and other local population centers, fall hunting pressure is fairly high.

BLACK MOUNTAIN – BROOKLYN BRIDGE Elk Herd Unit

Less than half of the Black Mountain–Brooklyn Bridge EHU lies within the Divide Travel Plan Area: The rest is in the Clancy-Unionville Travel Plan Area to the east [Figure 27]. The EHU as a whole covers 53,840 acres. Roughly 40 percent is in private ownership, much of it along Forest boundaries in the Little Prickly Pear and Tenmilevalleys to the north and east. There are, in addition, a couple arrays of interconnected private inholdings in the major gulches running northward into Helena and in the greater Buffalo Creek drainage further south.

This herd unit supports a variety of summer, winter and transitional ranges. About 85 percent of the unit is mapped as potential winter range (by both MFWP and the Helena NF), more than any other EHU in the Divide landscape, but most elk winter use is confined to the northern half of the unit toward Helena and the Tenmile Valley [and outside the Divide Travel Plan Area]. The rest of the unit to the south sees most of its elk use from May through November. Most of the northwest half of the EHU lies within the Lazyman Inventoried Roadless Area, which provides excellent habitat for elk in spring, summer and fall [see Figure 26]. By contrast, the eastern half of the unit sits adjacent to the City of Helena and to burgeoning rural settlement in the lower Tenmile and Prickly Pear valleys. As a consequence, the road and trail systems in this area are the most heavily used of any in the National Forest. The eastern and western halves of the unit thus stand in stark contrast to one another in terms of human activity levels.

Given the influence of the Roadless Area, which occupies more than half the National Forest land in the herd unit, summer range habitat effectiveness in the Black Mountain–Brooklyn Bridge EHU is the highest in the Divide landscape at 65 percent (Table 91). This has been

augmented in the east half of the unit by new road/motor trail closures under the Clancy-Unionville Travel Management Plan (Helena NF 2003). The area centered on Black Hall Meadows in the Roadless Area is particularly important as summer habitat. The proportion of fall range in effective elk security areas is 16 percent in the EHU as a whole (Table 89 and Table 91). The combined contribution of security and intermittent refuge areas is 18 percent. All security and refuge areas (greather than or equal to 250 acres) are situated in the western half of the herd unit (within the Divide Travel Plan Area), accounting for nearly 50 percent of that area. This is important because the area's proximity to Helena consistently translates to high hunting pressure each fall. GIS modeling estimates that 57 percent of the EHU provides hiding cover, although cover levels are on the verge of declining as beetle-killed pine trees continue to come down.

QUARTZ Elk Herd Unit

The Quartz Creek EHU lies mostly within the Clancy-Unionville Travel Plan Area, but its western extremities around Red Mountain fall into the Divide Travel Plan Area [Figure 27]. The unit encompasses the headwaters of several drainages flowing eastward into Prickly Pear Creek: Corral Gulch, Lump Gulch, the North and South Forks of Quartz Creek, Clancy Creek, Kady Gulch, Wood Chute Creek and Spring Gulch. The diminutive western segment of the herd unit in the Divide Plan Area takes in the westward slope down to Tenmile and Banner Creeks, including the country around Chessman Reservoir and Red Mountain. The EHU includes much private and BLM land in the Prickly Pear valley to the east: Just over 50 percent of the herd unit is in non-Forest ownership. The unit covers 36,733 acres, with 23,036 acres inside Helena NF boundaries, making it one of the two smallest herd units in the Divide landscape.

Most of the Quartz Creek EHU serves as transitional and summer range for elk. Typically, the drainage-head basins in the western half of the unit provide the basic summering areas. Some of this habitat has been disrupted by timber harvest and roading and more significantly, by old mining operations that have polluted wet meadows and other key summer habitats. These contaminated sites are gradually being reclaimed, one by one, with mine wastes hauled to off-site repositories and the local habitats returning to a semblance of normalcy. Recent closures of a number of roads and motor trails under the Clancy-Unionville Travel Management Plan have improved habitat effectiveness in this area as well. Current summer habitat effectiveness is 75 percent, comfortably above the recommended level of 50 percent. The main contribution of the Clancy-Unionville restrictions has been the elimination of motor routes into a number of key wet sites important to elk and other wildlife species.

Because of the fairly even distribution of roads throughout the herd unit, Clancy-Unionville travel restrictions have been less effective at producing viable elk security areas. Currently, there are no unroaded blocks large enough to qualify as elk security areas (greater than or equal to 1,000 acres), but there are two intermittent refuge areas (Little Corral Gulch and Roe Gulch). Elk survive the hunting season by moving between numerous smaller unroaded habitat enclaves and taking advantage of private lands east of the EHU where public hunting is barred or limited. Public lands in this herd unit are readily accessible to nearby population centers in the Helena and Prickly Pear Valleys and hunting pressure is substantial. GIS modeling estimates that 57 percent of the EHU currently provides hiding cover, although pine beetle-generated mortality will reduce cover dramatically in the next 10 to 15 years.

MFWP has mapped over 80 percent of the herd unit as potential winter range. The Helena NF "Oil and Gas" seasonal range maps, on the other hand, show only the northeastern 20 percent

of Helena NF land within the unit as winter range, which, as it turns out, is where more than 95 percent of the on Forest winter elk use in this herd unit has been observed over the last 25 years. This is the area between Corral Gulch to the north and Quartz Creek to the south. The majority of the winter elk use occurs in the foothills and valleylands east of the Helena NF boundary.

Summary of EHU Habitat Parameters

Table 91 summarizes the current status of several key parameters used to assess elk habitat in elk herd units. Three parameters, percent hiding cover on summer range, percent thermal cover on winter range and percent of fall range in security areas, are Helena Forest Plan big game standards. The remaining parameters, hunting season open route density and percent habitat effectiveness on summer range, are not Forest Plan standards, but they are recognized as useful indictors of elk habitat status. The measurements in Table 91 are for entire Elk Herd Units, not just the portions of the units that fall within the Divide Travel Plan Area.

Currently, only one herd unit (Spotted Dog–Little Blackfoot) is close to the Hillis recommendation of 30 percent security for "westside" fall ranges and none approaches the Blackfoot/Divide goal of 50 percent. All of these EHUs will comply with the new Programmatic Amendment for big game as long as security is maintained at current levels or increases. Under current circumstances, these security levels are allowing MFWP to meet its elk population objectives in areas influenced by Divide elk herd units [see following discussion, *"Local Elk Populations"*]. All five of the EHUs that include winter range are out of compliance with the *HFP* thermal cover standard (greater than or equal to 25 percent cover on winter range). All six herd units comply with the summer range hiding cover standard (greater than or equal to 50 percent cover on summer range), but within the next 10 to 15 years as large numbers of lodgepole, ponderosa and whitebark pine trees killed in the bark beetle outbreak begin to fall, all of these units will eventually fail to comply with this standard. Although many standing trees are now dead, they continue to provide essentially the same level of hiding cover as when they were alive. Eventually (greater than 25 years), new hiding cover will be provided by regenerating pine saplings in most beetle-impacted areas. But for now, the situation is in flux.

Table 91 - Key Measures of Elk Habitat

EHU	Summer range % hiding cover	Winter range % thermal cover	% of fall range in elk security & refuge areas	Fall open road density (mi/mi²)	Summer range % habitat effectiveness
Little Prickly Pear–Ophir Crk	60%	7%	23%	1.5	54%
Greenhorn Mtn	56%*	4%	11%	1.4	55%
Spotted Dog–Little Blackfoot	65%	no winter range	33%	1.1	56%
Jericho Mtn	73%	1%	15%	1.3	56%
Black Mtn–Brooklyn Bridge	57%	14%	21%	0.8	65%
Quartz Crk	57%	7%	5%	1.1	58%

*Greenhorn differs from other EHUs in that summer range covers only part of the unit (54 percent). Cover percentage is thus different for summer and fall ranges [fall range = the entire EHU]. Summer range cover is 56 percent, fall range cover is 41 percent [Table 88].

Local Elk Populations

Elk Management Units

The Divide Travel Plan Area falls within two of the Elk Management Units (EMUs) described in the *Montana Elk Management Plan* (2004): the northern half of the Plan Area lies within the Granite Butte EMU and the southern half within the Deerlodge EMU. Both EMUs straddle the Continental Divide. The Granite Butte EMU takes in Hunting Districts 293 and 343 north of U.S. Highway 12 (in addition to others further north); the Deerlodge EMU takes in Hunting Districts 215 and 335 south of Highway 12 (in addition to others southward toward Butte).

The population objective for the Granite Butte EMU is 2,100 elk. In 2004 when the *Montana Elk Management Plan* was released, MFWP estimated the population to be just below the objective (based on aerial winter range surveys). Today, aerial surveys indicate that it is somewhat above the objective. Bull/cow ratios in the southern part of the EMU that take in the Divide Travel Plan Area are close to the objective of 10 bulls/100 cows (a bit below the objective in HD 293, somewhat above it in HD 343).

The population objective for the Deerlodge EMU is 2,100 elk. In 2004, MFWP estimated that numbers were a bit below this level (at around 1,875 elk). The numbers have risen in the last seven years. Elk populations are now near or above objectives in the northern half of the EMU (which includes the Divide Travel Plan Area), but they are still below objectives in the southern portion of the EMU toward Butte. As well, bull/cow ratios in the northern half of the EMU have been holding at around 12 to 13 bulls/100 cows in recent years, above the 10 bulls/100 cows objective.

Coordinating Helena NF and MFWP Elk Management

Helena Forest Plan standards and guidelines for big game are designed to maintain habitat conditions on the National Forest that help MFWP meet its goals for local elk populations. MFWP's primary tool in managing elk is the manipulation of hunting regulations (setting harvest quotas for different sex/age classes, defining hunting areas, setting seasons, arranging for block management on private lands and so on). The Forest Service is able to influence the equation by managing vegetation (cover and forage) and controlling hunter vehicle access on different parts of the Forest. In spite of this reasonably well-defined division of responsibility, there remain some knotty problems in coordinating management between agencies.

For one, the quality of aerial survey data on which MFWP bases much of its annual population estimates can vary widely from year to year and from one hunting district to another. This is a function of weather conditions, snow cover, variable elk movement patterns and inherent viewing difficulty imposed by local topography, forest vegetation and artificial obstructions (most often, powerlines). The survey data (along with harvest statistics) are central to determining what adjustments the Fish and Game Commission needs to make to hunting regulations each year. Trends in this data over time also suggest what the Helena NF needs to consider in terms of cover distribution and vehicle restrictions on its road and trail system. Changes to these components, particularly forest cover, are difficult, if not impossible to make on a year-to-year basis in an attempt to follow abrupt yearly shifts in MFWP survey results; but they certain management changes can adapt to obvious long-term trends .

Another problem stems from the disconnect between the scale of analysis units. MFWP sets its elk population objectives for *elk management units* (EMUs) and *hunting districts* (HDs). In this

area, EMUs are roughly 700,000 acres in size [Deerlodge EMU ≈ 695,000 acres; Granite Butte EMU ≈ 712,600 acres]. Both EMUs cover three standard hunting districts, which vary considerably in size, but average about 235,000 acres. MFWP centers its annual population estimates and consequent tweaking of hunting regulations on hunting districts.

The Helena NF, on the other hand, focuses its habitat management on elk herd units (EHUs), which in the Divide landscape may be as small as 35,000 acres, but average a bit less than 60,000 acres [Table 89]. The problem, then, is one of determining how conditions in a given elk herd unit contribute to the population status of elk on a hunting district three to eight times its size and to the population objectives for an elk management unit eight to 20 times its size, given the multifarious conditions in other herd units and private land operations that feed into the scenario.

In many cases, it is possible to scrutinize the MFWP flight data and divide hunting districts into distinct segments in terms of how local elk populations fare in each area. In HD 293, for example, elk herds in the northern half of the district, which is centered on the Big Blackfoot River Valley, are beset by high rates of natural predation and consequent shifts in population structure that are not characteristic of elk groups in the southern half of the district. Wherever it has been possible to partition hunting districts into smaller sub-areas based on elk population properties, I have done so, in order to provide a better match between MFWP and Helena NF management units and to potentially tease out some correlations between population dynamics and habitat status of elk herd units.

Hunting Districts

This section summarizes the status of the four hunting districts in the Granite Butte and Deerlodge EMUs that cover the Divide Travel Plan area. A map illustrating how these districts overlap the Divide Travel Plan Area are shown in Figure 27. Key elk population parameters for each district are summarized in Table 92 and Table 93 following the hunting district narratives.

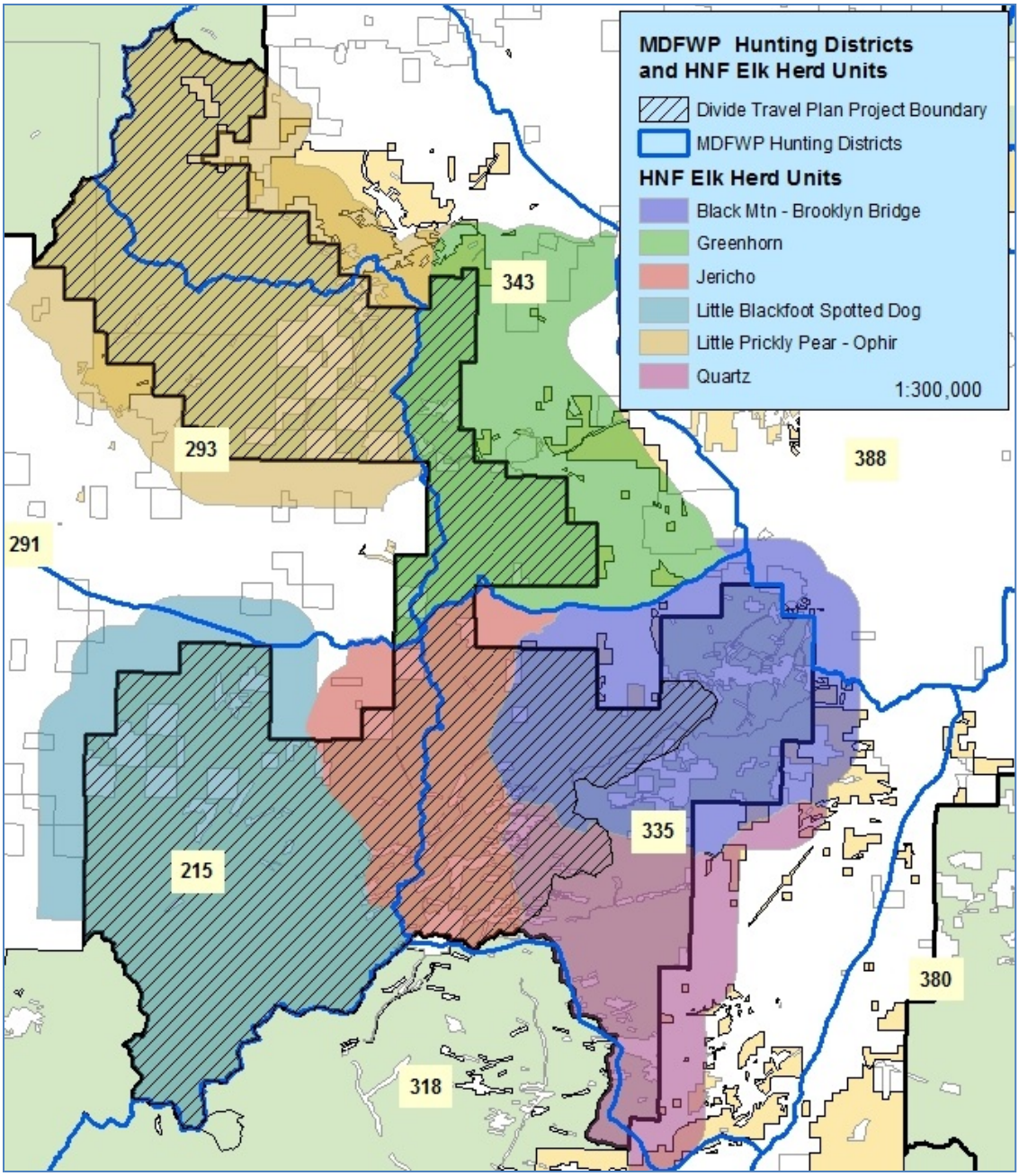

Figure 27 - MFWP elk/deer hunting districts (HDs)
Most of HDs 335 and 342 are included in this view, but substantial portions of HDs 215 and 293 extend beyond the edges of the map to the north and south.

Hunting District 293

Hunting District 293 lies west of the Continental Divide and north of U.S. Highway 12. It includes the southwestern half of the Little Prickly Pear–Ophir EHU and the southwestern edge of the Greenhorn EHU (the portions of those two units on the west side of the Divide). These herd units account forjust over 15 percent of the hunting district, which extends westward across private land to the center of the Avon Valley and northward across the Lincoln Ranger District to State Highway 200 in the Big Blackfoot River valley.

In the early 1990s, aerial surveys often revealed more than 1,000 elk on HD 293 winter ranges. MFWP responded in 1994 by increasing antlerless elk hunting permits from 250 to 450. The antlerless elk harvest spiked dramatically in that year (to about 500) but then began falling: It averaged 121 antlerless elk between 2000 and 2009 [see *Elk Survey and Harvest Data for Blackfoot Hunting Districts, 1986 to 2010*]. After 1996, there was a dramatic drop-off in the annual winter range population count (from 1,087 elk in 1996 to 387 elk in 1997). And since then, trends in the elk population have been somewhat difficult to decipher, primarily because aerial surveys have been erratic, sometimes done in spring, often when visibility was limited by unfavorable weather or ground conditions, sometimes on only part of the district and sometimes not at all [see *MFWP Elk Surveys, HD 293,* 1998-2010; *Elk Survey and Harvest Data for Blackfoot Hunting Districts, 1986-2010*]. The average count for HD 293 from 1999 through 2010 (on years when the entire district was surveyed) is 554 elk. The most recent available count for the district (2013) is 609 elk.

The population objective for HD 293 in the 2004 Elk Management Plan is 750 elk, but the northwest segment of the district was transferred to HD 298 (a new district) in 2008, so that now there is a bit of a disconnect between the original population objective and what is possible under the new configuration. Average ratios of 14 bulls/100 cows from 1999 through 2009 were above hunting district objectives of 10/100. During the same period, calf/cow ratios were typical of hunting districts in this area, averaging 38 calves/100 cows, comfortably above the expected norm of around 30 to 35 calves/100 cows.

In the last five years, the number of elk counted during aerial surveys for the hunting district as a whole (495 to 609 elk) has remained in the same general range as in previous years (back to 1997). But, in the northern half of Hunting District 293 (the Blackfoot River Valley) the number of animals observed by MFWP biologists on the ground and by local hunters and landowners has declined noticeably. Likewise, while calf/cow ratios during this same period have remained relatively stable for the district as a whole (averaging 31 calves/100 cows), calf survival in the Blackfoot Valley has plummeted. Much of the decline has been attributed to rising predation from mountain lions, wolves, black bears and grizzly bears, whose populations have all burgeoned at the same time, due to a variety of circumstances [J. Kolbe, quoted in the *Helena Independent Record,* Feb. 26, 2012]. Other factors, including several years of drought, changes in vegetation patterns from large fires and hunting quotas over the last decade, may be contributing to the observed shifts in elk (and deer) population size and structure. But predation appears to be the primary limiting factor in the northern half of HD 293.

Meanwhile, in the south half of the district (the Avon Valley south of the Ogden Mtn–Dalton Mtn ridge), predation has not been an obvious problem for big game populations. Population estimates for this part of the district were in the range of 300 to 450 elk from 1998 through 2003. Some recent counts (2004, 2005) have been in the 180 to 190 range. These numbers may reflect temporary population decline due to over-harvest or the fact that surveys were conducted after many elk had already migrated off winter ranges (late April). More likely, they reflect a seasonal shift in elk distribution [see *HD 293 Elk Surveys, 2004, 2005*]. Biologists have noted that in some years, elk from HD 293 have moved eastward into HD 343 to escape late-season hunting pressure (extending into January) and occasionally to move to less severe snow conditions [see comments accompanying *MFWP Elk Surveys, HD 343,* 2007]. By 2006, counts for the southern half of HD 293 were once again over 300 elk. In 2010, 311 elk were counted.

In the end, MFWP objectives for elk populations (herd numbers, bull/cow ratios, calf survival) continue to be met in the southern half of the HD 293, the area influenced by the Helena NF

road and trail network in the Divide landscape. Problems in the Blackfoot Valley in the north half of the district appear to be primarily a consequence of abnormally high rates of predation and *not* a result of habitat dysfunction on that part of the National Forest (the Blackfoot landscape).

Hunting District 215

Hunting District 215 covers a large area west of the Continental Divide and south of U.S. Highway 12. A majority of the district lies south of the Helena NF on the Beaverhead-Deeerlodge NF toward Butte. The northern 45 percent of the district covers the southwest quadrant of the Divide Travel Plan Area (118 mi²), including the entire Spotted Dog-Little Blackfoot EHU and the western half of the Jericho Mountain EHU [Figure 27]. It also takes in a broad region of the private and state lands northeast of Deerlodge (142 mi²). This region of rolling hills and valley lands provides virtually all of the winter range for elk in this area. MFWP considers the northern part of HD 215 to be a key area for elk. An average of 67 percent of the elk in the hunting district have been counted on these northern winter ranges since 2000 and the population has been increasing steadily since around 2005.

Table 92 and Table 93 summarize some of the data from MFWP aerial surveys of elk winter range in HD 215 since 1999. Winter range counts are usually conducted sometime between late January and mid-March (depending on weather conditions and plane availability). Occasionally, spring surveys have been conducted instead of or in addition to the winter counts. Spring surveys are typically run in late April and early May and find most of the elk in the open mountain grasslands on the western and northern edges of the southern Divide landscape on or near Helena NF ground.

Prior to 2007, MFWP had been counting roughly 800 to 950 elk on HD 215 winter ranges in most years. This number jumped to 1,365 animals in 2008, to over 1,700 in 2009 and to over 2,000 by 2011. In 2013, nearly 2,500 elk were counted on HD 215 winter ranges. Approximately 67 percent of elk observations have been in the northern half of the district (the portion encompassed by the Divide Travel Plan Area). These numbers are well above the population objective of 1,400 elk in this district (the original *Elk Plan* objective of 1,000 elk having been raised to 1,400 in 2010).

Observed bull/cow ratios, on the other hand, have been erratic and often low. The average ratio over the last 15 years has been just over 12 bulls/100 cows (the objective being a minimum of 10 bulls/100 cows), but in some years the counts have been as low as five or six bulls/100 cows. The 2013 count was right on the 15 year average [Table 92]. The percentage of mature bulls in the population, however, has decreased in recent years, with bulls older than 1.5 years accounting for only about two percent of the population in 2012 and 2013. This is an indication of hunting pressure too heavy for the available security on fall range. Overall bull numbers have remained adequate only because of a profusion of raghorns and spike bulls [2012, 2013 Elk Surveys in HD 215; R. Vinkey, personal communication 2014].

Table 92 also shows that calf numbers are down in the last two years, usually an indication of disruptive weather, poor adult nutrition, or heavy predation. Currently the reason for the drop-off in calf production/survival is unknown, but there has been no sign of an increase in predation pressure in this area. A number of wolf packs have centered their activity along the western edge of the Helena NF and in the adjacent ranchlands since 1995, but until 2012, calf/cow ratios remained in the range of 30 to 40 calves/100 cows year after year (and the overall population continued to increase). With the removal of wolves from the Endangered

Species List and the advent of the State wolf hunting season in 2010, the ability of wolves to impact livestock and big game populations in this area has been minimal. Wolves attacking livestock have been dispatched quickly and there has been no evidence of their having built up sufficient strength to measurably affect the local elk population. So, something else is at work here.

Security areas available to elk in the northern part of HD 215 cover a substantial amount of ground (accounting for 30 percent of the Spotted Dog-Little Blackfoot EHU). The largest block of security (nearly 19,000 acres) is associated with the Electric Peak Roadless Area in the southwest corner of the Divide landscape. The problem for local elk is that, because of its elevation and topographic position, much of this area becomes unavailable to them during part of the hunting season as snow builds up and the forage base shrinks. This is true for most of the other security areas in this part of the Forest as well. How long elk are able to remain in National Forest security areas depends on fall weather in any given year, but often they are forced down into transitional and winter ranges on the edge of the Forest and on private/State lands where hunting season security can be marginal.

Until recently, elk moving off the Forest to the west had been able to settle in a large block of private ranchland in the Spotted Dog country, which was been off-limits to public hunting. Elk began moving to this winter range area as early as the start of the bow season in September. The move may be a direct response to pressure from bow hunters and motorized recreation on the Forest, but it may also reflect an established pattern of migration down to secure and benign valley habitat regardless of other circumstances. MFWP felt that the refuge provided by this private land suppressed hunting opportunity and allowed the elk population to maintain itself well in excess of *Motana Elk Management Plan* objectives (although mature bull numbers remained low) [MFWP 2004a]. In August 2010, the State was able to purchase most of this land and convert it to a Wildlife Mangement Area. Public hunting is now allowed, but most of the area is off-limits to motor vehicles, which tempers the effect.

In spite of the change in ownership and management, elk continue to move to this off Forest area and recent population trends in HD 215 still hold. In response, the Fish and Game Commission increased the number of B-licenses for cow elk in this district in from 150 in 2008 to 200 in 2011 and 400 in 2012. Nonetheless the upward population trend continues. At the same time, mature bull numbers remain very low and in spite of the burgeoning cow population, calf numbers over the past three years have dropped to half of what had been the norm for over a decade.

Hunting District 343

Hunting District 343 lies east of the Continental Divide and north of U.S. Highway 12. It takes in most of the Greenhorn EHU and the northeastern half of the Little Prickly Pear–Ophir EHU (which is outside the Divide Travel Plan Area). These EHUs account for roughly ⅓ of the hunting district. The rest of the district extends eastward off the Forest into the Helena and Little Prickly Pear Valleys and northward to Flescher Pass on the Lincoln Ranger District.

Counts of the elk population in this district were relatively stable between 1999 and 2008, ranging from 644 to 973 animals (average equals 787); but then they dropped into the 445 to 580 range in 2009 and 2010 [Table 92]. Given the absence of a commensurate increase in hunter success and natural mortality (although mortality due to wolf kills has increased somewhat over the last decade), or a drop in calf production and survival, MFWP suspects that the lower winter counts reflected the switch to a less effective survey method and movement of

elk off winter range prior to survey flights rather than a large population decline. The 2011 count was back up to 713 elk. This is well within the population objective for HD 343, which is 700 elk (plus or minus 20 percent equals 560 to 840 elk) [see *2011 Post-season Survey of Elk in HD 343*].

Bull/cow ratios have averaged 12.4 bulls/100 cows since 1999 (range equals 8 to 18), which is considered a "moderate" ratio and is in excess of the hunting district objective of 10 bulls/100 cows [Table 93]. Calf/cow ratios have averaged 30.5 calves/100 cows since 1999, ranging from 16 in 2008 to 49 in 2011. This is typical of calf survival rates throughout the Divide Travel Plan Area and suggests that natural predation has not been unduly suppressing calf survival in these populations. Counts for 2013 and 2014 have been below average (around 19 calves/100 cows), a pattern which has shown up in other local hunting districts as well [Table 93]. MFWP biologists are uncertain as to what is driving this pattern, but the fact that it has been consistent over a relatively broad area suggests that it is weather related.

In recent years, HD 343 has sometimes picked up elk from HD 293 to the west later in the year because of extended hunting seasons in that district. Many elk in HD 343 seek refuge during the hunting season on large blocks of private land where landowners do not allow public hunting. Of the large landowners in the district, five allow hunting, five do not. With private lands accounting for 52 percent of the district, this has a real impact on hunting success, which has been relatively low (about 40 percent on antlerless permits) in recent years. Statewide success averages about 50 percent.

Hunting District 335

Hunting District 335 lies east of the Continental Divide and south of U.S. Highway 12. It encompasses the Quartz EHU, the eastern half of the Jericho EHU and most of the Black Mountain–Brooklyn Bridge EHU [Figure 27]. These Helena NF herd units make up the western 60 percent of the hunting district, the eastern reaches of which occupy BLM and private land in the adjacent foothills and Prickly Pear Valley south of Helena.

MFWP winter range surveys showed the elk population increasing in the decade 1999 to 2008: Population counts that averaged 510 elk earlier in the decade had risen into the 667 to 776 range by 2006 to 2008 [Table 92]. MFWP biologists felt that this was a function of mild winters, increased travel restrictions in the Clancy-Unionville area of the Helena NF and fewer hunting permits for antlerless elk (*MFWP HD 335 Elk Survey 2005,* 2007). In 2009 the number of elk counted dropped to 450 and then to 388 in 2010. As in some other local districts, MFWP believes that the lower counts were a function of a less effective survey method and of elk having moved off winter range by the time surveys were conducted [see *Post-season Survey of Elk in HD 335* for 2010 and 2011]. There was no evidence of a sudden increase in hunter success, elevated natural mortality, or decreased calf production/survival that might initiate a downward trend in local elk numbers. In 2011, the elk count was back up to where it had been prior to 2009: 670 elk were tallied, which is well within the population objective for HD 335 (600 elk plus or minus 20 percent). The most recent counts (2012 to 2014) have ranged from 827 to 1,187 elk, well above the objective.

Bull/cow ratios have been fairly consistent over the last decade, averaging 12.6 bulls/100 cows. The 2011 count was the highest in the last 25 years at 19 bulls/100 cows. The objective for the hunting district is a minimum of 10 bulls/100 cows [Table 93]. Brow-tined bulls, however, have accounted for only about two percent of the count during this period (almost certainly an underestimate, but lower than biologists would like to see). Calf/cow ratios have been more

variable over the last 10 years, ranging from 15 calves/100 cows (2008) to 56 calves/100 cows (2001). The 15-year average is 31.6 calves/100 cows, which is typical of hunting districts in the Deerlodge and Granite Butte EMUs and indicates a level of calf production and survival sufficient to maintain current elk populations under a normal regime of hunting and natural predation. As with the other three local hunting districts discussed here, calf counts have been below average for the last three years [Table 93].

MFWP feels that elk in HD 335 are being impacted by livestock grazing, partly on the Helena NF, but more so on privately-owned winter ranges. In addition, MFWP believes that the big Montana Tunnels mine east of the Forest on Clancy Creek has reduced winter range opportunity for elk (and more so for mule deer) in the area southwest of Jefferson City east of the Forest boundary. Native forage is limited, therefore, elk turn to agricultural fields and haystacks stockpiled for winter livestock feed. This, in turn, has led to ranchers requesting special hunts to trim elk numbers. Elk numbers have been particularly high over the last four years, in spite of deficient elk security in the Quartz Creek EHU on the National Forest [Table 88 and Table 89]. As with some other local hunting districts, elk are taking advantage of closed private lands off the Forest for security, allowing the population to expand.

Elk Population Summary

Key population parameters that MFWP uses to gauge the status of elk populations within hunting districts and elk management units are summarized for the four local hunting districts over the the last 15 years in Table 92 and Table 93 below. Most of this information derives from annual survey flights of winter range. These surveys have provided a stream of data that has allowed MFWP to estimate total elk numbers, bull/cow ratios and calf/cow ratios over a period of decades and thus to illuminate population trends and indicate to what degree elk populations are meeting management objectives. Occasionally, surveys are missing for some districts (for a variety of technical reasons) and in other years, the accuracy of the counts has been compromised by unfavorable flying conditions, poor visibility, inopportune flight timing and so on. But, in most years, the estimates are accurate enough for management purposes [see State of Montana 2002].

Table 92 - Elk Numbers Observed During Aerial Surveys

	HD 215		HD 293		HD 335		HD 343	
Year	Number of elk observed	Relation to objective	Number of elk observed	Relation to objective	Number of elk observed	Relation to objective	Number of elk observed	Relation to objective
1999	--	--	400	below	380	below	644	at
2000	--	--	484	below	614	at	973	above
2001	--	--	--	--	513	at	--	--
2002	799	below	--	--	529	at	827	above
2003	--	--	476	below	569	at	704	at
2004	465	below	--	--	418	below	791	above
2005	894	below	--	--	555	at	--	--
2006	953	below	663	at	771	above	725	above
2007	--	--	708	at	776	above	821	above
2008	1,365	at	--	--	667	at	810	at
2009	--	--	592	below	--	--	--	--
2010	1,716	above	--	--	388	below	443	below
2011	2,055 *	above	--	--	670	at	713	at
2012	2,206	above	495	below	998	above	630	at
2013	2,493	above	609	at	827	above	656	at
2014	2,234	above	264	below	1,187	above	650	at
average: 15 years	1,518	at	521	below	704	at	722	at
average: last 5 years	2,141	above	553	below	814	above	618	at
objective	1,120 – 1,680		600 – 900		480 – 720		560 – 840	

*The 2011 population estimate for HD 215 is only a rough approximation. Poor viewing conditions during survey flights precluded obtaining a direct count that could be accurately compared to other years or other areas.

Table 93 - Elk Bull/Cow and Calf/Cow Ratios

Year	HD 215		HD 293		HD 335		HD 343	
	bulls/ 100 cows	calves/ 100 cows	bulls/ 100 cows	calves/ 100 cows	bulls/ 100 cows	calves/ 100 cows	bulls/ 100 cows	calves/ 100 cows
1999	--	--	19	41	8	17	11	37
2000	--	--	--	42	18	38	14	28
2001	--	--	--	--	11	56	--	--
2002	5	32	13	45	13	18	10	27
2003	--	--	12	36	12	32	18	42
2004	13	38	--	29	12	42	18	38
2005	6	35	11	30	13	35	--	--
2006	6	40	14	31	10	27	10	36
2007	16	31	--	--	13	35	9	26
2008	--	--	15	45	12	15	14	16
2009	21	38	15	41	--	--	--	--
2010	18	34	5	22	13	32	8	24
2011	--	37	--	--	19	45	13	49
2012	14	17	13	18	13	28	14	24
2013	12	19	13	22	9	23	10	19
average: 15 years	12.3	32.1	13.0	33.5	12.4	31.6	12.4	30.5
average: last 5 years	16.2	29.0	11.5	25.8	13.5	32.0	11.2	29.0
objective→	≥10	≥30	≥10	≥30	≥10	≥30	≥10	≥30

Mule Deer

Of the two deer species that inhabit the Helena NF, the mule deer (*Odocoileus hemionus*) is the more common. In spring, summer and fall, mule deer are most often found in montane habitats from the foothills on up into the high alpine zone, whereas white-tailed deer (*Odocoileus virginianus*) focus much of their activity on riparian bottomlands, lowland forest and agricultural lands in the valleys, most of it off the Forest (Foresman 2012, p. 384-393). In winter, both species occupy winter ranges in the lower foothills and valleys, sometimes living in close proximity to one another when deep snow forces them into the same areas.

Like elk, the mule deer serves as an MIS for hunted wildlife on the Helena NF. Most big game standards and guidelines in the Forest Plan, however, are directed specifically at elk, the assumption being that management addressing the needs of elk will automatically take care of mule deer (and other big game species). This is true to a degree, but deer are different enough from elk that resource management, vegetation manipulation, in particular, needs to account for certain local habitat configurations that are important specifically to deer. Shifts in the road and trail system proposed in the Divide Travel Plan, however, would not generate problems specific to mule deer that are different from those that impact elk and for this reason, mule deer analysis is not carried forward as a separate section in the *"Environmental Consequences"* portion of this report.

Habitat Relationships

As with elk, a majority of mule deer in the Divide landscape over-winter on private and State land in the foothills and valleys. Unlike elk, however, not all deer move *en masse* to high elevation summer ranges. Some may remain in the valleys all year. The deer population in the City of Helena, for example, is a year-round resident population, distinct from adjacent migratory groups. Other deer that winter in the valley move only a short distance up onto neighboring Helena NF land where they remain through the fall. This is an example of what Pac *et al.* (1991, p. 97) call "adjacent" seasonal ranges. Many more continue on to more distant summer ranges at higher elevation, an example of "distinct" seasonal ranges (Pac *et al.* 1991, p. 97). These migrating deer tend to follow the spring green-up as it spreads from the valleys up through the foothills and into the montane summer ranges in June.

Mule and white-tailed deer are in the rut for much of the hunting season in October and November and bucks are often on the move within their fall ranges. But because deer are less inclined than elk to move off local ranges to security areas several miles away (Mackie *et al.* 1998), they often rely on local hiding cover to avoid hunters. Thus, local blocks of hiding cover outside unroaded security areas (in patches considerably less than the 40 acres recommended for elk) are more important to deer than to elk.

As a rule, the quality of summer range (not winter range) is the primary factor regulating deer numbers (Mackie *et al.* 1998, p. 131; Pac *et al.* 1991, p. 279). In mountain and foothills environments, summer habitat should provide high forage quality (of leafy forbs) and security for fawn rearing. Management needs to emphasize habitat diversity (Mackie *et al.* 1998, p. 136). Mature and over-mature conifer stands with multiple layers, numerous openings, abundant edge and inclusions of other diverse micro-communities are ideal (Mackie *et al.* 1998, p. 49, 55; Pac *et al.* 1991, p. 279). A balance of high-quality forage, summer thermal cover and screening/hiding cover are important for raising fawns and building energy reserves for winter survival and future fawn production.

While summer nutrition may be the key factor that provides deer the wherewithal to survive the winter, effective winter habitat is also important, allowing animals to hold onto as much of their accumulated body weight as possible. Pac and others (1991, p. 276) emphasize the need to manage mule deer winter ranges as maintenance habitat where animals can conserve energy. Their studies in the Bridger Range of southwest Montana suggest that forage characteristics are often of secondary importance to local topography and to the abundance of conifer stands that can ameliorate snow depth and temperature. The conclusion that thermal cover (greater than or equal to 70 percent canopy closure) is seldom a key habitat component for elk on winter range [see previous discussion of elk winter range] does not necessarily apply to deer. Research indicates that mule and white-tailed deer are more dependent on thermal characteristics of forest cover than are elk. At least on some winter ranges, deer appear to require dense stands of mature timber with canopy closure in excess of 60 percent to withstand prolonged bouts of severe winter weather. While typically deficient in forage, these stands can provide a favorable thermal environment and minimize snow depth (Mackie *et al.* 1998, p. 52, 136; Pac *et al.* 1991, p. 77, 276, 279).

While deer are more likely than elk to become habituated to open roads and associated human activity (as common observation across the Helena NF and adjacent lands will attest), most deer do in fact avoid roads as much as possible (Rost and Bailey 1979). As a result, regular vehicle traffic will lower habitat effectiveness, thus reducing the amount of habitat that deer find suitable for foraging, resting, raising young and escaping from perceived danger. It is important

that Forest road systems do not occupy so much key summer habitat that many deer do not have good access to the high quality habitat they need to maintain productivity and survivorship. The impact of roads on deer summer habitat in general can be estimated via the "habitat effectiveness" indices calculated for elk summer range

Deer in many sub-populations have adapted to living in close proximity to humans, especially in winter (as in numerous local subdivisions and in the City of Helena). But, those that winter on less-settled agricultural lands and in the foothills are more likely to try to avoid humans in winter. Some researchers have noted that in order to minimize all responses by mule deer to snowmobiles or hikers, they would have to be more than 350 meters away (Freddy *et al.* 1986). Perry and Overly (1976) recommended a distance of one half mile away to prevent disturbance and displacement of mule deer. They found that mule deer were interrupted more often and longer, by persons afoot than by snowmobiles.

Local Mule Deer Population Management

Mule deer numbers have cycled up and down over past decades, hitting low points in the 1970s and 1990s. MFWP does not survey deer as rigorously as elk in the Divide landscape, picking them up incidentally during elk winter range flights and as a result, population estimates are often murky. However, the aerial surveys of elk/deer winter range, check station data, hunter surveys and field observations by biologists provide enough information on population trends to allow the Fish and Game Commission to make yearly adjustments in the allowable mule deer harvest.

As discussed earlier, four hunting districts overlap the Divide landscape: HDs 215 and 293 west of the Divide and HDs 335 and 343 east of the Divide. In all of these districts, antlered deer harvest is managed via the general deer license or by B license permits; these two licenses place no limits on the number of hunters but restrict the take to one deer per hunter. This pattern has remained constant over several decades in spite of population fluctuations. The allowable harvest of antlerless deer, however, has varied over time and between districts and has been the primary mechanism for making adjustments in response to population shifts revealed by field data. During the population ebb of the 1990s, no antlerless harvest was permitted, thus protecting the reproductive segment of the population. In 2001, with local populations increasing east of the Divide, a total of 50 B-licenses for antlerless deer became available in HDs 335 and 343. The number of antlerless B-licenses in these districts peaked at 500 in 2008 and has since dropped to 300 licenses as deer numbers again look to be falling off. In the two hunting districts west of the Divide, no antlerless deer B-licenses were issued until 2008 when 50 licenses were permitted in HD 215. This number dropped to 25 in 2012. In HD 293, no B-licenses for antlerless deer have been issued in the last two decades.

All this is now in the process of changing, however, as numbers of mule deer (and white-tailed deer) are again dropping precipitously (by 60 to 90 percent) across much of Montana. Reasons for the current population decline are multiple: they include the aforementioned cyclical trends in deer populations, increase in disease (primarily a problem in white-tailed deer), harsh winter conditions in 2011 to 2012 and a rise in predator populations. Shifts in habitat quality and road patterns have not been implicated in the decline. In response, the Fish and Game Commission has eliminated B-licenses for both antlered and antlerless deer across much of the state. In the case of the four hunting districts that overlap the Divide Travel Plan Area, the 2014 regulations do allow for harvest of antlered mule deer during the general rifle season but eliminate harvest of antlerless deer (does and young bucks with antlers shorter than four inches) in three of the

districts. The only rifle season opportunity for antlerless mule deer comes in the form of 50 B-tags on private land in HD 293. The end result of the new regulations is that hunters are limited to one deer and presure is taken off reproductive females [see *Helena Independent Record:* 2013 Dec. 13, 2013 and Jan. 5, 2014; Montana 2014 Hunting Regulations: http://fwp.mt.gov/hunting/regulations].

Moose

The Shiras moose (*Alces alces shirasi*), the smallest of the four North American moose subspecies, is widely, but erratically distributed across the Rocky Mountains of southern Canada and the northern U.S. During the 20th century, Shiras moose dispersed southward into areas where they had not been observed by explorers and settlers in the 1800s, ranging as far south as northern Utah and Colorado by the 1990s (Kay 1997). Recently, however, moose populations have been declining in several parts of the west (as well as in other parts of the country, most notably Minnesota). In Montana, populations appear to be dwindling in some areas (the Big Hole country) but expanding in others (the Centennial Valley; eastern Montana along the Missouri River) (Foresman 2012, p. 374-375). Given the absence of hard data, Montana Fish, Wildlife and Parks has initiated three long-term population studies to decipher trends in the Montana moose population. Current hypotheses as to why some local moose populations are shrinking include climate change-driven increases in parasites, decline in the quality of foraging habitat and rising predator populations. Hunting pressure on moose has dropped off significantly since 2006 and is not seen as a driving factor (see *Helena Independent Record,* 2013 Oct. 31).

The Helena Forest Plan addresses the needs of moose by specifying that moose habitat "will be managed to provide adequate browse species diversity and quantity to support current moose populations" (HFP, p. II/19). Moose are also covered, to an extent, by Forest Plan management guidelines for elk that limit road density, maintain certain levels of forest cover and protect key habitat components, particularly riparian areas and other productive wet habitats [Figure 8, Figure 50]. As with mule deer, because moose are unlikely to be affected by changes in the road and trail system proposed in the Divide Travel Plan differently than elk, they will not be analyzed separately in the *"Environmental Consequences"* section of this report.

Moose are solitary for most of the year, aside from cows-with-calves and loose winter groupings and their numbers in and around the Helena NF are inherently low compared to those of elk and deer (MFWP observation records; personal observation). The Divide landscape provides numerous patches of suitable moose habitat. Key habitat is naturally fragmented because of its association with riparian areas, drainage-head basins, productive north- and east-slope forest and other habitat features with disjunct distribution on the landscape (Costain 1989, p. 138-143; Costain and Matchett 1992, p. 27-31).

From mid-spring through mid-fall, moose move between productive local foraging sites every few days, sometimes traveling several miles (Matchett 1985, p. 123, 130). Although they often travel at night, moose are sometimes seen on the move during the day in habitats that seem to offer them little in the way of food or cover. The travel routes moose choose in moving around appear to have no consistent habitat characteristics and they may use open roads for this purpose. While moose may spend part of the winter in stands of mature timber at mid-elevation, most winter range is concentrated in lower elevation riparian areas where browse is plentiful and snow depths are more moderate (Costain 1989, p. 89-90, 34-36).

The number of annual moose licenses issued to hunters in the three moose hunting districts that cover the Divide landscape is small. From 1995 through 2007, the combined total for the three districts (which extend from Butte in the south to the Scapegoat Wilderness in the north) was 10 to 12 licenses per year. Since then, the total has dropped to seven licenses per year, all for antlered bulls. Nonetheless, because many moose choose to feed and rest in key habitat sites near roads, putting up with nearby human activity, they are susceptible to poaching or accidental shooting. As a result, human induced mortality inevitably exceeds the hunting quotas set by MFWP (Matchett 1985, p. 132; G. Joslin, comments in MFWP 2007 Elk Survey, HD 335; personal observation). The higher the open road density in areas with productive moose foraging habitat, the greater the risk to moose.

Threatened and Endangered Species

Sections addressing threatened/endangered species and sensitive species in this report serve as the Biological Evaluation for these species. A summary of the evaluation can be found in *appendix F of the wildlife specialist report.*

Grizzly Bear

Grizzly Bear Biology

Habitat Use, Behavior, Movements

The grizzly bear (*Ursus arctos horribilis*) is the largest carnivore in North America and one of the only animals that consistently alters the way in which humans function in wildland settings. Grizzlies are imposing, intelligent animals with both genetic and learned abilities to take advantage of the resources in their local environments, to adapt to new ranges and to deal with environmental change, including human intrusion and habitat alteration (Jonkel 1978, p. 227).

Grizzly bears are individualistic in their habitat use and behavior. Adult males are normally solitary wanderers within extensive home ranges, which they come to know in detail (McLellan 1985). Likewise, adult females, in spite of the need to tend cubs, are perpetually on the move scouting out the resources needed for survival. The home ranges of adult male grizzlies are generally two to five times larger than those of adult females: average range estimated from four Montana populations was 71 mi^2 for females and 319 mi^2 for males (Schwartz et al. 2003, p. 566). Home ranges of adult bears overlap to a certain extent and they vary in size and location depending on food availability, weather conditions and interactions with other bears (USFWS 1993). The densities of established populations vary considerably, but they are inevitably low, an average of 102 bears/1000 mi^2 for five Montana populations (with a range of 18 to 207 bears/1000 mi^2) (Schwartz et al. 2003, p. 573-574). These estimates are for core populations: densities are substantially lower in more marginal habitats and linkage zones, such as the Divide landscape.

Grizzlies, while formidably equipped as carnivores, behave basically as omnivores. The majority of their food intake consists of vegetation (green plant matter, roots, seeds), which they consume in huge quantities (Foresman 2012, p. 347). Items with high crude protein content are particularly important. Seeds from whitebark pine are an important food source wherever they occur, but if they become unavailable for a time, the bears switch to other foods. As opportunistic feeders, grizzlies prey on or scavenge any animal food source that becomes available, including insect larvae, rodents, elk and moose calves, incapacitated or unwary adult ungulates, domestic livestock and carrion of any sort. Winter-killed ungulates and other carrion

are a key source of energy in spring when green vegetation is less available (Craighead et al. 1995, p. 235-237).

While grizzly bears make extensive use of forest cover, they generally prefer to operate in a landscape with a variety of habitat formations ranging from dense interior forest [Figure 6, Figure 57, Figure 60] to open meadowlands [Figure 8, Figure 20, Figure 53] (Dood et al. 2006, p. 18). The bears use forested habitats for resting, general concealment, thermal relief in summer and foraging and hunting (USFWS 1993, p. 7-8). They spend considerable time feeding on vegetation in more open habitats or in brushy areas along streams. They are drawn to areas with an abundance of deciduous shrubs in both forested and unforested habitats [Figure 49]. In mountainous terrain, avalanche chutes often serve as foraging areas (USFWS 1993, p. 7). The search for food is a primary influence on grizzly movements and the bears will adapt to local conditions and go wherever they need to in order to meet their food requirements (USFWS 1993).

Influence of Roads and Human Presence

Historically, grizzly bears occupied a variety of habitats across much of central and western North America, but by mid 20th century, human domination of the landscape had reduced their range in the lower 48 states to pockets of well-forested montane habitat in the northern Rockies (Foresman 2012, p. 346). Five areas in this region, representing less than two percent of the grizzly's historic range, now support grizzly bear populations (USFWS 1993) and these are the areas in which Grizzly Bear Recovery Zones have been esablished. Of the five areas, two of them straddle the Continental Divide in Montana: The Greater Yellowstone Ecosystem (GYE) and the Northern Continental Divide Ecosystem (NCDE). The Divide Travel Plan Area is located along the Divide partway between these large wildland ecosystems and thus is in a position to intercept any exchange between the two. Virtually all movement through the landscape is from the Northern Continental Divide Ecosystem toward the Greater Yellowstone Ecosystem, north to south.

Field studies in the northern Rockies, Montana, British Columbia, Alberta, have lent support to the presumption that grizzly bear persistence in any given area is determined by (1) habitat quality, (2) the number of humans within that habitat and (3) the behavior of those humans (Apps et al. 2004). To that end, 'effective' habitat in and around Recovery Zones is described in terms of "core areas", blocks of suitable habitat free of motorized access during the non-denning period (IGBC 1994).

Research has indicated that grizzly bears, in order to avoid negative interactions with humans, underutilize habitat near roads (Apps *et al.* 2004; Mace and Waller 1998; McLellan and Shackleton 1989). Mace and Manley (1993) determined that adult grizzlies used habitat with open road densities exceeding 1.0 mi/mi^2 less than expected. All sex and age classes used habitat with total road densities above 2.0 mi/mi^2 less than expected. Grizzly bears generally adjust to disturbance associated with roads by avoiding the areas around regularly-traveled routes, which diminishes the amount of habitat available to them. New roads often escalate human access into previously remote areas, increasing the frequency of human-bear confrontations, elevating mortality, reducing habitat availability and ultimately suppressing grizzly populations.

Be that as it may, ongoing research in the Northern Continental Divide Ecosystem suggests that, in spite of the grizzly's aversion to contact with humans, a substantial number of bears are now

spending time outside of mountainous wilderness areas, focusing instead on the agricultural lands of the intermountain valleys and the prairies east of the Rocky Mountain Front [Mace 2014; Mace and Roberts 2012]. This research, based on tens of thousands of telemetry points, emphasizes the importance of areas with diverse and abundant food sources, be they roaded or unroaded and the propensity of grizzlies to opportunistically move from one place to another in search of different foods, regardless of the season. Blocks of roadless habitat remain important, however, as areas where bears can avoid human activity and where the probablity of life-threatening interactions is low. This evolving trend in habitat use is likely a consequence of increasing population density and competiton for resources in the core Northern Continental Divide Ecosystem back-country.

With or without roads, regular human presence in occupied grizzly range increases the likelihood of negative interactions. While many such encounters between grizzlies and backcountry recreationists are a matter of chance, others are created by slipshod sanitation and food storage that can draw bears into camps. Gut-piles and other parts of downed animals left unattended by hunters are an additional attractant that may bring bears and humans into close contact. Trash, bird feeders, gardens, fruit trees and other outdoor food sources may also attract grizzlies to rural residences that they would otherwise avoid. In some areas, the presence of free-ranging livestock on both public and private lands provides a relatively easy prey source for grizzlies, leading to ranchers calling for predator control.

Considering the gamut of human activity in grizzly country, the USFWS identifies three primary management elements that adversely affect grizzly bears in and around the Northern Continental Divide Ecosystem (NCDE): (1) human access management (roads and trails), (2) sanitation and (3) livestock grazing. While other land management activities influence grizzlies, these are the three human generated components that produce most of the adverse effects (USFS 2013). Of the three elements, “human access management”, which encompasses both roaded and unroaded means of access, is directly relevant to Divide Travel Plan proposals.

Population Dynamics

General Parameters

Grizzly bears are long-lived and many individuals survive more than 20 years in the wild. However, they have one of the lowest reproductive rates among terrestrial mammals, which precludes rapid population increase. Age of first reproduction and litter size varies and appears often to be related to nutritional state. In areas where suitable resources are less plentiful or compromised by human development and activity, the ability of local populations to multiply is limited (USFWS 1993).

Sources of natural mortality have proven difficult to quantify, but old-age, conflicts with other bears, starvation and accidents (avalanches, den collapse) are known to be factors. Disease and parasites appear not to be major sources of mortality (Dood et al. 2006, p. 21; Schwartz et al. 2003, p. 571). Most mortality in dependent young (cubs and yearlings) is natural, but the exact causes are often unknown because so few are radio collared. The bulk of adult mortality is human-caused. Bears are hit on railways and highways, shot by hunters (accidentally, maliciously, in self-defense), killed by residents protecting themselves or their property, or removed for management purposes (usually for killing livestock or threatening humans). Death rates in northern Rocky Mountain grizzly populations have varied dramatically over past decades, but in recent years, rates of mortality in the two large Recovery Zones [Northern Continental Divide Ecosystem and Greater Yellowstone Ecosystem] have been regularly

exceeded by rates of production (and survival of young), resulting in slow but consistent population increase (USFWS 2014, p. 12-23). Population parameters in "Distribution Zones" and other more marginal areas beyond the Recovery Zones are unknown.

Population Status in the Northern Continental Divide Ecosystem

Analysis by Mace and others (2011), based on six years of demographic data derived from a variety of field research, indicates that by 2009 the Northern Continental Divide Ecosystem and adjacent areas were supporting a growing population of more than 1,000 grizzly bears. The analysis estimated annual population growth rate at about three percent. Annual monitoring since 2009 (Mace and Roberts 2012a, 2012b) shows that the rates of reproduction and mortality that have been producing the three percent growth rate are continuing. Current population numbers (approxmately 1,100 grizzlies) are significantly greater than the estimate of 440 to 680 bears believed to have inhabited the ecosystem in 1975 when the grizzly was listed as a threatened species.

Also, work by Kendall and others (2009) has shown that this population is characterized by high genetic diversity and is expanding its distribution beyond the Northern Continental Divide Ecosystem in all cardinal directions. This expansion, documented by targeted survey work and many fortuitous observations in the field, led USFWS, USFS, MFWP and IGBC biologists in 2002 to designate the northern half of the Divide landscape on the Helena Ranger District as part of a "Grizzly Bear Distribution Zone", an area outside the Recovery Zone that was beginning to be occupied by grizzlies. Given the number of credible grizzly reports in the southern portion of the Divide landscape since 2002, the Helena NF has now extended this Distribution Zone southward to encompass the entire landscape down to the Helena/Beaverhead-Deerlodge NF boundary [USFS 2013]. In sum: research and monitoring over the last decade clearly point to a continuing "positive trajectory in population trend" in the Northern Continental Divide Ecosystem grizzly bear population (Mace et al. 2011).

Management Guidance

Regional Management

The grizzly bear has been listed as a threatened species in the lower 48 states since 1975. The governing management document is the *Grizzly Bear Recovery Plan,* initially approved in 1982 and revised in 1993 (USFWS 1993). The 1993 version remains in effect today, although as bear distribution and management needs have shifted, the Recovery Plan has been clarified by more recent documents such as the Interagency Grizzly Bear Committee Guidelines (IGBC 1986), the Biological Assessment for Grizzly Bears Inside the Northern Continental Divide Ecosystem and the Grizzly Bear Distribution Zone (USFS 2005) and the Grizzly Bear Management Plan for Western Montana (Dood et al. 2006). The 1993 Recovery Plan identified seven grizzly bear ecosystems (five currently occupied, two unoccupied) around which the primary recovery zones were to be centered. The intent of the Recovery Plan has been to generate viable grizzly populations sufficient to remove the bear from the Endangered Species List in each of the seven ecosystems. The U.S. Fish and Wildlife Service (USFWS) felt that this goal had been achieved in the Greater Yellowstone Ecosystem in 2007 and delisted the species at that time. This action was reversed by a court ruling in 2009 (due primarily to concerns over the decline of whitebark pine as a food source) and as a result, grizzlies remain listed as threatened in all seven ecosystems.

As of 2014, the USFWS has no active proposals for delisting grizzlies in either the Greater Yellowstone Ecosystem or the Northern Continental Divide Ecosystem. However, discussion within Federal agencies and ongoing research are heading in that direction. Among other findings, monitoring of the Greater Yellowstone Ecosystem population has indicated that with the loss of much of the whitebark pine seed resource, the bears have simply switched to other foods, which have proven sufficient to maintain ongoing population increases.

Interagency Grizzly Bear Committee Guidelines

The 1986 Interagency Grizzly Bear Committee Guidelines *(IGBC* 1986, p. 3-5*)* outline five "Management Situations" (MS's), three of which (MS 1, 2 and 3) apply to areas in and around recovery zones and two of which (MS 4 and 5) apply to areas further afield. The Helena Forest Plan has mapped the areas where Management Situations 1 and 2 apply (namely, inside the Northern Continental Divide Ecosystem Recovery Zone) but it has not done so for Management Situations 3, 4 and 5 (since their introduction post-dated the release of the Forest Plan). The status of these latter three management situations in any given area is often in a state of flux, due to shifts in human settlement, roading, recreational activities, vegetation conditions, bear distribution and so on. As a result, their site-specific delineation has been left to biologists at project level as needed.

Given the small number and low density of grizzlies in the Divide landscape, the management situation that most often applies (irrespective of the area's status as a Distribution Zone), is *MS 5.* Although the description of MS 5 in the *Guidelines* is an imperfect fit for much of the landscape, it comes the closest of the five management situations. Population and habitat conditions for MS 5 are described as follows: "Grizzlies do not occur, or occur only rarely in the area. Habitat may be unsuitable, unavailable, or suitable and available but unoccupied. The area lacks survival and recovery values for the species or said values are unknown….." (IGBC 1986). A primary element that reduces suitability of grizzly bear habitat in the Divide landscape is the density of roads and motor trails. Management direction for MS 5 is that grizzlies are to be given deference up to a point but are subject to "control" in cases of conflicts with humans. Maintenance of habitat for grizzlies is an "option" but "is not directed"

Helena Forest Plan

The Helena Forest Plan *(HFP)* (1986) addresses grizzly bear management via the following Forestwide standards and guidelines:

- *HFP Appendix D, Guidelines for Management of Grizzly Bear Habitat:* These guidelines provide direction based on the 1982 version of the *Grizzly Bear Recovery Plan.* "Grizzly bear habitat" (as of 1986) is identified and population/habitat conditions and management direction are specified for two "management situations" that occur in areas occupied by grizzlies. All grizzly bear habitat identified in the *Forest Plan* is on the Lincoln Ranger District: management situation 1 lands are inside the Northern Continental Divide Ecosystem Recovery Area; management situation 2 lands are south of the Northern Continental Divide Ecosystem boundary.
- *HFP Appendix E, Grizzly Bear Management Outside of Recovery Areas.* These guidelines specify steps to be taken in identifying and inventorying potential grizzly habitat, documenting grizzly "biological activity centers" (BACs), protecting areas used by grizzlies and determining if management direction for the areas should be changed to emphasize grizzly bear needs. The guidelines apply to the Divide, Big Belts and Elkhorns

landscapes on the Helena and Townsend Ranger Districts, as well as the Lincoln District south of Highway 200.

- *Indicator Species* (*HFP,* p. II/17). The grizzly bear is to be monitored as a management indicator for the threatened and endangered species group, the objective being to determine whether or not viable populations are being maintained.
- *Biological Evaluations* (*HFP,* p. II/19). A biological evaluation must be written for all projects that have potential to impact grizzly bears and appropriate mitigations developed (in consultation with the USFWS, if necessary) if adverse impacts are likely.
- *Field Studies* (*HFP,* p. II/19). Field studies should be conducted in areas not yet designated as occupied grizzly habitat but where grizzlies are known to be present. The areas should be managed according to guidelines in *appendix E of the wildlife specialist report.*
- *Open Road Density* (*HFP,* p. II/19): In occupied grizzly habitat, so as to minimize human-caused mortality, open road density should not exceed 0.55 mi/mi².

Linkage Zone Considerations

An objective of the 1993 Recovery Plan has been to develop management tactics that will help remove limiting factors that retard population recovery. One such factor is the presence of unsuitable habitat and barriers to movement (roads and motor trails being a prime example) in linkage zones between recovery zones (USDI 1993). The Divide Landscape is not identified as a primary linkage zone in the Recovery Plan or in recent modeling efforts (Servheen *et al.* 2003; Walker and Craighead 1997), mostly because of "intense roading in the Helena National Forest" (Walker and Craighead 1998). However, increasing observations of bears throughout the landscape since the 1990s suggests that it may in fact be functioning in this way (J. Jonkel, personal communication 2007; Servheen 2005). Limited DNA sampling has found that grizzlies as far south as Elk Park just north of Butte and the Anaconda Range have come from the Northern Continental Divide Ecosystem, possibly having moved through the Divide landscape to get there (J. Jonkel, personal communication 2007, 2012).

Management in the Northern Continental Divide Ecosystem Recovery Zone vs the Distribution Zone

The Helena NF portion of the Northern Continental Divide Ecosystem Recovery Zone occupies the northern half of the Lincoln Ranger District, north of State Highway 200 in the Blackfoot landscape. Much of the management guidance for the Recovery Zone does not apply to the Grizzly Bear Distribution Zone in the Divide and southern Blackfoot landscapes. In particular, *Forest Plan* requirements for Management Situations 1 and 2 and the requirement for maintaining a minimum open road density of 0.55 mi/mi² in occupied grizzly habitat do *not* apply to the Distribution Zone (*HFP,* p. II/19; Appendices D and E). Likewise, guidelines for maintaining a certain acreage of unroaded grizzly bear "core areas" apply only to bear management units (BMUs) in and around the Recovery Zone: While we have used these core area guidelines as a means of gauging the quality of grizzly bear habitat in the Distribution Zone, they do not apply to that area as a management requirement (see IGBC 1998; USFS 2005, p. 7, 32; USFWS 2006, p. 22).

Grizzly Bear Status in the Divide Travel Plan Area

Non-Motorized Habitat Blocks and Road Densities

Non-Motorized Habitat (Core Areas)

Effective grizzly bear range requires a reasonable distribution of core areas that can provide the bears with basic habitat components (food and cover) in an environment free from motorized disturbance and other forms of "high-intensity" human use (as along popular hiking trails) during the period when bears are active (April to November) (IGBC Motorized Access Management guidelines 1998). For the Northern Continental Divide Ecosystem Recovery Zone (Management Situations 1 and 2), the Helena NF delineates grizzly bear "core areas" as blocks of suitable habitat larger than 2,500 acres with all boundaries 0.3 miles from motorized routes open during the non-denning period (see IGBC 1998; USFS 2005, p. 7, 32; USFWS 2006, p. 22). These core area parameters are not intended to be applied outside the Recovery Zone, but I have calculated them for the Divide landscape as a means of comparing conditions in the Distribution Zone with those in primary grizzly bear range in the Northern Continental Divide Ecosystem.

The Divide landscape currently supports four areas that would qualify as "core areas" in the Recovery Zone [see Table 113 in *"Environmental Consequences"*]. These non-motorized areas (based on open road and motor trail patterns in summer) represent about 29 percent of the landscape south of Highway 12 and about 15 percent north of the highway (24 percent overall). Compare this with core area percentages of 67 percent to 75 percent in Bear Management Subunits within the Northern Continental Divide Ecosystem Recovery Zone on the Lincoln District (USFWS 2006, p. 21-22). These percentages relect the difference in grizzly bear habitat potential between wildland areas in and around the Bob Marshall Wilderness complex and lands in and around the Divide landscape, which have been roaded, settled, mined, grazed, logged and otherwise meddled with since the mid 1800s.

The effectiveness of these non-mototized areas as grizzly bear habitat, in terms of their size, abundance of key habitat components and proximity to other such core areas, is variable. Grizzly bears have been reported in two of these areas [Black Mountain–Deadman Creek (Figure 61 and Figure 62) and Electric Peak Roadless Area (Figure 12, Figure 24)]. But observations have also come in from smaller non-motorized habitat patches (less than 2,500 acres) both north and south of Highway 12. The Divide landscape, while not a region with enough secure habitat to provide for a core grizzly bear population, does provide habitat enclaves for bears moving through and apparently, for a very small resident population.

Road Density

Another key to determining habitat suitability for grizzly bears is the overall density and distribution of roads and motor trails. Mace and Manley's (1993) research in northwest Montana suggest open road densities above 1.0 mi/mi^2 and *total* road densities above 2.0 mi/mi^2 are likely to suppress local habitat use by grizzly bears. The IGBC Motorized Access guidelines (IGBC 1998) thus recommend calculating the overall density of open roads and total roads (open and restricted) in addition to delineating core areas in and around Recovery Zones. Although "closed" or "restricted" roads exclude motor vehicles, they still provide travelways for hikers, equestrians, bicycle riders and hunters afoot. If these uses occur at high levels, the ability of an area to hold grizzly bears may be compromised much as it would be by open roads and motor trails (Mace and Manly 1993).

Open route densities for the Divide Travel Plan Area (in summer) are shown in Table 114 [alternative 1]. Open road density is notably higher north of U.S. Highway 12 than south of the highway. Overall density of 1.36 mi/mi² in the Travel Plan Area is 3 to 10 times higher than densities in Bear Management Subunits of the Northern Continental Divide Ecosystem Recovery Zone on the Lincoln Ranger District. Those units, which are managed specifically to enhance grizzly bear recovery, show densities in the range of 0.14 to 0.47 mi/mi² [a maximum of 0.55 mi/mi² is the Forest Plan standard for Recovery Zone Management Situations]. The fact that grizzlies continue to move through and occupy parts of the Divide landscape in spite of road densities that approach or exceed levels recommended by Mace and Manley (1993) may reflect the rough, primitive condition of many Forest and private roads and the low levels of vehicle use they receive in summer, to the point that bears may often not perceive them as functioning roads [Figure 11, Figure 13, Figure 14, Figure 39 to Figure 43, Figure 46 to Figure 49, Figure 59, Figure 60]. The presence of a few larger unroaded enclaves the size of core areas in the Recovery Zone also ameliorates the impact of surrounding road networks [Figure 12, Figure 26].

Grizzly Bear Area Use

The Divide Landscape in General

Grizzly bears have been observed throughout the Divide landscape several times over the past 20 years [Helena NF wildlife observation data base; MFWP records (Helena Area Resource Office)]. A majority of observations have come from the northern half of the landscape toward the Northern Continental Divide Ecosystem Recovery Zone and have probably been of transient bears. Some of these animals have been recognized from one year to the next and are assumed to be bears that den and center much of their activity in the Blackfoot landscape on the Lincoln Ranger District but that range southward during part of the year.

Most, though not all, observations south of Highway 12 have been in the upper Little Blackfoot watershed and along the border between the Helena and the Beaverhead-Deerlodge NFs (including the upper Cataract and Basin Creek drainages just to the south). The number of credible grizzly bear reports in these areas has been increasing in recent years as the population in the Northern Continental Divide Ecosystem expands to the point that more bears are exploring new territory further to the south (J. Jonkel, personal communication, 2007). Since 2010, the Helena NF has participated in monitoring efforts designed to identify individual grizzlies through DNA analysis of hair samples collected from rub trees. So far, no bears have been identified by this method south of Highway 12, a further indication of their scarcity in this area.

The tally in Table 94 is incomplete, but it includes most credible observations made by or reported to Helena NF and Helena-area MFWP biologists from 1999 to 2012. Most of the reports are from the Helena NF, but seven observations are from south of the Forest boundary on the Beaverhead-Deerlodge NF. One of these consists of a series of close-up photos from a camera station on the Continental Divide south of Electric Peak in 2012; another is a MFWP report of a grizzly shot in the Boulder River Drainage further to the south [both, obviously, verified occurrences]. I eliminated reports that were vague or otherwise dubious (of which there are many) and retained those deemed credible by professional wildlife specialists or that seemed reliable for other reasons.

Table 94 - Observations of Grizzly Bears Reported 1991 to 2012

Area	Observations from HNF Records	Additional Observations from MFWP Records	Total Observations 1991-2012
North of U.S. Highway 12	22	22	44
South of U.S. Highway 12	12	23	35
Divide Landscape Total	34	45	89

The actual number of grizzlies that have ranged into the Divide landscape since 1991 is considerably less than these totals might suggest since some of the bears have been observed and tallied multiple times over 20 years.

Additional reports have come in since 2012 but at this point, I do not have complete data from MFWP for those years. Observations in the Helena NF database, 2013 to 2014, include credible sightings south of Elliston and in Conners Gulch in the upper Little Blackfoot drainage; observation of a grizzly sow and cub in Spotted Dog Creek; a good set of tracks on Bison Mountain; and a mass of grizzly-sized scat in Little Corral Gulch in the southeast part of the landscape (for which we are awaiting DNA analysis).

North Divide

The northern half of the Divide landscape is an area still in transition with regard to its role in grizzly bear recovery. Although it lies adjacent to the Blackfoot landscape where a resident grizzly population has been established for several decades, only its northernmost reaches, the Little Prickly Pear watershed, may accommodate resident bears (animals that either den in the upper drainages or spend much of their active spring-summer-fall season there). Bear activity in the rest of the landscape appears fluid, associated with long-distance dispersal or with wide-ranging seasonal forays beyond core home ranges to the north. The number of bears likely to be present in the northern Divide landscape at any given time is unknown. But, two decades of fortuitous observations and occasional targeted field checks suggest the following:

- In spite of the fact that the original grizzly bear “Distribution Zone” extends southward to Mullan Pass, there is currently no bonafide “resident” population in the area south of the Little Prickly Pear watershed (at the northern end of the Divide landscape).
- Bears observed in most of this area appear to be either transient animals moving southward through a linkage zone or those with ranges centered further north (the Lincoln Ranger District) that sometimes range southward.
- Neither denning nor reproduction has been documented in the Divide landscape between the Dog Creek/Little Prickly Pear divide in the north and the upper reaches of the Little Blackfoot watershed to the south.
- The north Divide landscape is thus not currently part of a Biological Activity Center for grizzlies [which requires that females with cubs be observed five out of 10 years (*HFP, Appendix E*)].

South Divide

Grizzly bears that occupy or move through the Expanded Distribution Zone in the southern half of the Divide landscape also range into the drainages flowing southward into Boulder River on the Beaverhead-Deerlodge NF. Although rural residences, open roads, motorized trails, developed recreational facilities (campgrounds, etc.), livestock grazing, mining operations and other human activities are spread throughout this block of territory, substantial portions of it

are unroaded or lightly roaded [Figure 12, Figure 24, Figure 26]. While the area is not sufficiently untrammeled to serve as a Recovery Zone, the fact that grizzlies seem to have persisted here for at least two decades (albeit in very low numbers) suggests that it has a role to play in the recovery process, potentially providing local habitation opportunities and linkage between bonafide Recovery Zones.

As with the area north of Highway 12, the southern half of the Divide landscape is still very much in transition with regard to its role in grizzly bear recovery. At this time, the the number of grizzlies operating in this area is unknown and their status uncertain. All that can be said, based on field observations to this point, is the following:

- Population density is very low (only five verified occurrences in the general area 2004 to 2012, although several additional observations are highly credible).
- Reproduction is uncommon (five reports of a sow with cubs since 1991).
- The stability and persistence of the current population may be tenuous (since the presence of grizzlies may be indicative of a linkage zone with transient individuals rather than an incipient Biological Activity Center) (*HFP, Appendix E*).

Canada Lynx

Biological Factors

Population Parameters and Habitat Relationships

The Canada lynx (*Lynx canadensis*) is confined to regions of North America with cold, snowy winters. Core populations are centered in Canada with persistent peripheral populations across the northern tier of the lower 48 states and a patchy southward extension along the Rockies. Lynx inhabit coniferous forests capable of supporting snowshoe hares as a prey base: In North America, the distribution of lynx is nearly coincident with that of snowshoe hares (Ruediger *et al*. 2000). In the northern Rockies, most lynx occurrence is associated with conifer forests dominated by lodgepole pine, subalpine fir and Engelmann spruce in the 4900 to 6550 foot elevation zone. Secondary interspersed vegetation includes Douglas-fir, grand fir, western larch and aspen. Dry forest types, such as ponderosa pine and dry Douglas-fir seldom provide suitable lynx habitat (Aubry *et al.* 1999).

Females establish maternal denning sites in a variety of forest structures ranging from mature and old-growth coniferous forest to young regenerating stands (USFS 2007a, p. 16). In all cases, the key component of lynx den sites appears to be the abundance of coarse woody debris, not the age of the forest (Mowat et al. 2000). Middle-aged conifer stands (40 to 120 years old) with open understories and sparse deadfall do not provide good denning or foraging environments but often serve as travel habitat (Koehler and Aubry 1994).

Lynx usually avoid large unforested areas and prefer to move between primary habitat sites under cover of mature forest, dense early-seral forest, or tall shrubs, typically following ridges or riparian zones and moving through saddles. Based on fieldwork in north-central Washington, Koehler (1990) surmised that openings created by regeneration harvest, where the distance to cover was more than about 325 feet (100 meters), might restrict local lynx movement and habitat use patterns until forest cover had regrown. On the other hand, research has documented many instances of lynx crossing unforested openings (Roe et al. 2000, cited in USFS 2007a, p. 10). Lynx will move across extensive non-forested areas as needed during dispersal or other long-range excursions (Koehler and Aubry 1994, p. 88; Ruediger et al. 2000, p. 1-12; Aubry

et al. 1999, p. 379), although they prefer to travel through forested habitats or along forest edges (Squires et al. 2013; Ruediger et al. 2000, ch.1 p.4; Mowat et al. 1999). Lynx seldom forage in open habitats, most likely because preferred prey species are uncommon there (Maletzke et al. 2007).

Snowshoe hares are the primary prey, making up anywhere from 35 percent to 97 percent of lynx diet. Koehler (1990) reports that snowshoe hare densities are correlated with densities of trees and shrubs less than 1.0 inch diameter-at-breast-height. Preferred lynx foraging habitat consists of dense young conifer growth, either in early seral stands or in mature forest understories, that provides cover and browse for hares (Koehler 1990). Koehler and Brittell (1990) recommend that seedling/sapling stands in the lodgepole/subalpine fir zone be well dispersed to provide optimal lynx foraging. Squires (2010) found that in the Seeley Lake region of western Montana, lynx hunted for hares primarily in mature, multi-storied spruce-fir forest in winter and in dense early-seral stands in summer. He cautioned, however, that in southern lynx populations, regional and local habitat differences were likely to generate variations in lynx foraging patterns: a number of southern populations depend primarily on early successional forests year-round and some inhabit primarily lodgepole pine rather than spruce-fir forests (McKelvey et al. 1999; Aubry et al. 1999, p. 8). These differences are a function of the local availability of key forest types and the distribution of snowshoe hares among them (Maletzke et al., p. 1473; Squires et al. 2010, p. 1656).

In the mountains of Montana and further south, lynx prey on a wider diversity of species than northern populations because of lower hare densities and the presence of different small mammal communities. Potential alternate prey includes red squirrels, jackrabbits, cottontails, woodrats, marten, marmots, ground squirrels, chipmunks, mice, voles and grouse (Buskirk et al. 1999b, p. 408-409; Aubry et al. 1999, p. 375-378). Of these, red squirrels are, in most locales, the most important (Ruediger et al. 2000, ch.1 p.8-10; Buskirk et al. 1999b, p. 408-409). Field research indicates that while lynx will opportunistically take advantage of the full array of potential prey species in summer, they focus almost entirely on snowshoe hares in winter whenever they are abundant (Aubry et al. 1999, p. 378).

Lynx are highly susceptible to declines in the prey numbers. When hare populations are low, many lynx are unable to raise litters successfully and in some cases, adults are unable to sustain themselves. As a result, local populations decline (Koehler and Aubry 1994). The other principal natural cause of mortality is conflict with larger carnivores, most notably, mountain lions [Squires (unpublished data, 2009); Buskirk et al. 1999a, p. 89-95]. Among human caused mortality factors, trapping has historically been primary. Heavy trapping throughout the 19th and 20th centuries extirpated lynx from many areas of the Rocky Mountains where they had once been consistently present and in some areas, common. Montana set restricted trapping seasons for lynx from 1991 to 1998 and then suspended trapping after the 1998 to 1999 season (Ruediger et al. 2000). Lynx are still taken incidentally in traps set for wolves, coyotes and other large/mid-sized carnivores. Lesser mortality factors in recent decades have included disease, shooting and roadkill (USFS 2007b, p. 2; Squires and Laurion 1999, p. 10).

Despite this plethora of mortality factors, lynx population numbers in western Montana do not appear to have declined appreciably in recent years, increasing slightly in some areas, decreasing in others. Based on monitoring of 129 lynx over a 10 year period (1998 to 2007), Squires (unpublished data, 2010) concluded that the lynx population in the Seeley Lake region of west-central Montana has been inching downward while the population in the Purcell Mountains in the northwest corner of the state has been increasing slightly. These are

preliminary conclusions and population data on lynx in the Rocky Mountain region of the U.S. and southern Canada remains sparse and inconclusive. It can be said, however, that these southern lynx populations are substantially smaller than those of the boreal forests of northern Canada and Alaska (because snowshoe hare populations are much smaller and more fragmented). On the other hand, southern lynx populations appear to be more stable (Aubry et al. 1999, p. 15-18).

As solitary, wide-ranging predators, lynx in both northern and southern ranges maintain low population densities relative to most other North American carnivores. Home range size varies primarily with the dispersion pattern of suitable habitat, the abundance of prey, lynx population density and the intensity of trapping (Koehler and Aubry 1994, p. 89-91). In Montana, Brainerd (1985, cited in Koehler and Aubry 1994) has reported home range sizes of about 17 mi^2 for females and 122 mi^2 for males. Nellis (1989) concludes that most home ranges fall between five to 20 mi^2. In northern populations where hares are more abundant, home ranges are typically smaller (Squires and Laurion 1999, p. 347).

Lynx have been documented throughout the mountains of western Montana from the Canadian border into the Yellowstone area. Current distribution is disjunct and a number of areas that support what seems to be extensive blocks of suitable habitat are unoccupied. On the other hand, some localities that appear to have little classic lynx habitat may be supporting small local populations or serving as linkage zones through which lynx move. On the Helena NF, the most robust lynx habitat and resident population is in the Blackfoot landscape of the Lincoln Ranger District. The Divide landscape supports a sparse but apparently persistent population. While some of these animals are probably transients, winter tracking surveys backed by DNA analysis of scat and hair over the past five years indicates that others are long-term residents (Gehman 2006; Gehman *et al.* 2007-2010; Pilgrim 2009-2010; Pilgrim and Schwartz 2007-2008).

Influence of Roads

Koehler and Aubry (1994) identified road management as an important aspect of managing lynx habitat. Construction of Forest roads destroys local habitat for some lynx prey species (mature forest for red squirrels) and creates new opportunities for others (edge and eventually, dense young conifer habitat for snowshoe hares). Lynx are not averse to hunting along the roads and using them for travel, a behavior that can make them more vulnerable to human-caused mortality. Rarely, lynx may be shot from roads or killed by vehicles on some of the primary gravel roads that allow higher speeds (typically County roads on the Helena NF).

Occasionally, lynx are caught in traps along roads that serve as conduits for trappers on snowmobiles. Even though lynx can no longer be targeted for trapping, they continue to fall victim to traps set for other species. Lynx are curious and opportunistic carnivores and they are likely to check out any baited traps along one of their travel routes. Roads that allow vehicle access to lynx habitat in winter, plowed routes or snowmobile trails, may serve as travelways for carnivores that compete with lynx (esp. bobcats and coyotes) and that would otherwise be unable to probe into lynx foraging areas in winter (Ruediger *et al.* 2000; USFS 2007b). The significance of such competition is still open to debate, but it may not be as severe as initially hypothesized (see USFS 2007b, p. 22-25; Kolbe *et al.* 2005).

Most research suggests that the types of roads managed by the Forest Service seldom adversely affect lynx directly (USDI 2007). Vehicle strikes are unlikely because of the relatively low speeds most vehicles are forced to travel and the meager traffic volume. Ruggiero *et al.* (2000) concluded that the evidence accumulated to date suggests that lynx do not avoid roads. In fact,

the *Northern Rockies Lynx Management Direction* (USFS 2007b, p. 27) concluded that one of the primary efforts of Forest road management should be to eliminate shrub growth, young conifer thickets and other habitat features that might support hares and thus attract lynx to the road corridors. Studies also show that Forest road density does not appear to affect lynx habitat selection (McKelvey *et al.* 2000; Ruediger *et al.* 2000).

Lynx Management

Management Direction

The Canada lynx was listed as a threatened species in 2000 and is now managed via the *Northern Rockies Lynx Management Direction* (*NRLMD)* (USFS 2007a, 2007b, 2007c, 2007d), which has been amended into forest plans in the northern Rockies. Attachment 1 in the *Record of Decision* for the *Management Direction* (2007b) displays 13 objectives, seven standards and 24 guidelines designed to achieve the goal of conserving the Canada lynx. These are divided among five categories. All management practices and activities (ALL), vegetation management (VEG), livestock management (GRAZ), human use projects (HU) and linkage areas (LINK).

Six of the 12 guidelines that address human use projects are potentially relevant to travel management. Guidelines HU G6 and HU G8 deal with upgrading and maintenance of *existing* Forest roads; guidelines HU G7 and HU G9 address the placement, design, reclamation and closure of *new* Forest roads; guideline HU G11 restricts expansion of over-snow routes (mostly snowmobile trails) in lynx habitat; and guideline HU G12 limits winter access for non-recreation special uses and for mineral and energy projects to designated routes in lynx habitat.

Two other directives of potential relevance are in sections addressing linkage areas and "all" management practices and activities. These are (1) Standard LINK S1, which mandates identification of potential lynx highway crossings when highway construction or reconstruction is being contemplated in identified *linkage areas;* and *(2)* Guideline ALL G1, which advocates pursuing methods to minimize effects on lynx from construction or reconstruction of highways.

Lynx Analysis Units (LAUs)

The basic units for analyzing the effects of management actions on lynx are lynx analysis units (LAUs), areas about the size of individual female lynx home ranges. The rationale for defining units on this scale is discussed in the *Canada Lynx Conservation Assessment and Strategy* (*CLCAS*) (Ruediger *et al.* 2000, p. 7-2). Based on this guidance, biologists delineated LAUs for the Helena NF in 2000 as part of the process by which the lynx was listed as a threatened species. Some of the units have been adjusted since that time, leaving a current total of 29 LAUs on the Forest, six of which are situated in the Divide landscape (designated di-01 through di-06). Because lynx home ranges tend to be smaller in areas of better habitat (with higher prey density), LAUs are smaller and more numerous in the Blackfoot landscape, where habitat is of higher quality and larger in the Big Belt landscape where habitat is often marginal. LAUs in the Divide landscape fall somewhere in between these two, averaging 34,920 acres.

Basic logistics of the six Divide landscape LAUs are shown in Table 95. The LAUs are mapped in Figure 28 and Figure 29, on following pages.

Table 95 - Lynx Analysis Units (LAUs) in the Divide landscape.

LAU	LAU Location	LAU Total Acres	Lynx Habitat Acres	% of LAU in Plan Area
di-01	Little Prickly Pear Crk–Ophir Crk	37,260	18,669	46%
di-02	Dog Crk – Greenhorn Mtn	41,855	10,618	100%
di-03	Spotted Dog Crk – Blackfoot Mdws	46,105	24,644	100%
di-04	Telegraph Crk – Ontario Crk	28,280	20,154	100%
di-05	Tenmile Crk	36,530	16,632	100%
di-06	South Helena – Quartz Crk	46,485	12,512	17%
Total	Divide Landscape	236,515	103,229	75%

Delineating Lynx Habitat

Most objectives, standards and guidelines in the *Lynx Management Direction* apply only to designated lynx habitat within LAUs on National Forest System lands (*NRLMD,* Attachment 1, p. 1-6). The Helena NF delineates lynx habitat based on information in the timber stand database and satellite imagery (the Region 1 VMAP database). In the Divide landscape, potential "lynx habitat" consists of cool, moist coniferous forest habitat types, in any stage of development, on Helena NF land above 5,500 feet. These are environments that we feel are likely to support habitat components suitable for lynx denning and foraging or that can be expected to develop such characteristics over time. In most Divide landscape LAUs, only a small percentage of "potential" habitat currently supports vegetation structure that provides for effective lynx denning and foraging.

Within potential lynx habitat, the Helena NF has delineated snowshoe hare habitat as the key component, that is, dense stands of young conifers capable of providing hiding cover and enough overhead structure to create under-snow shelter and feeding enclaves. These conditions occur in young sapling conifer stands (stand initiation structural stages) and in the understories of mature forests (multistoried structural stages).

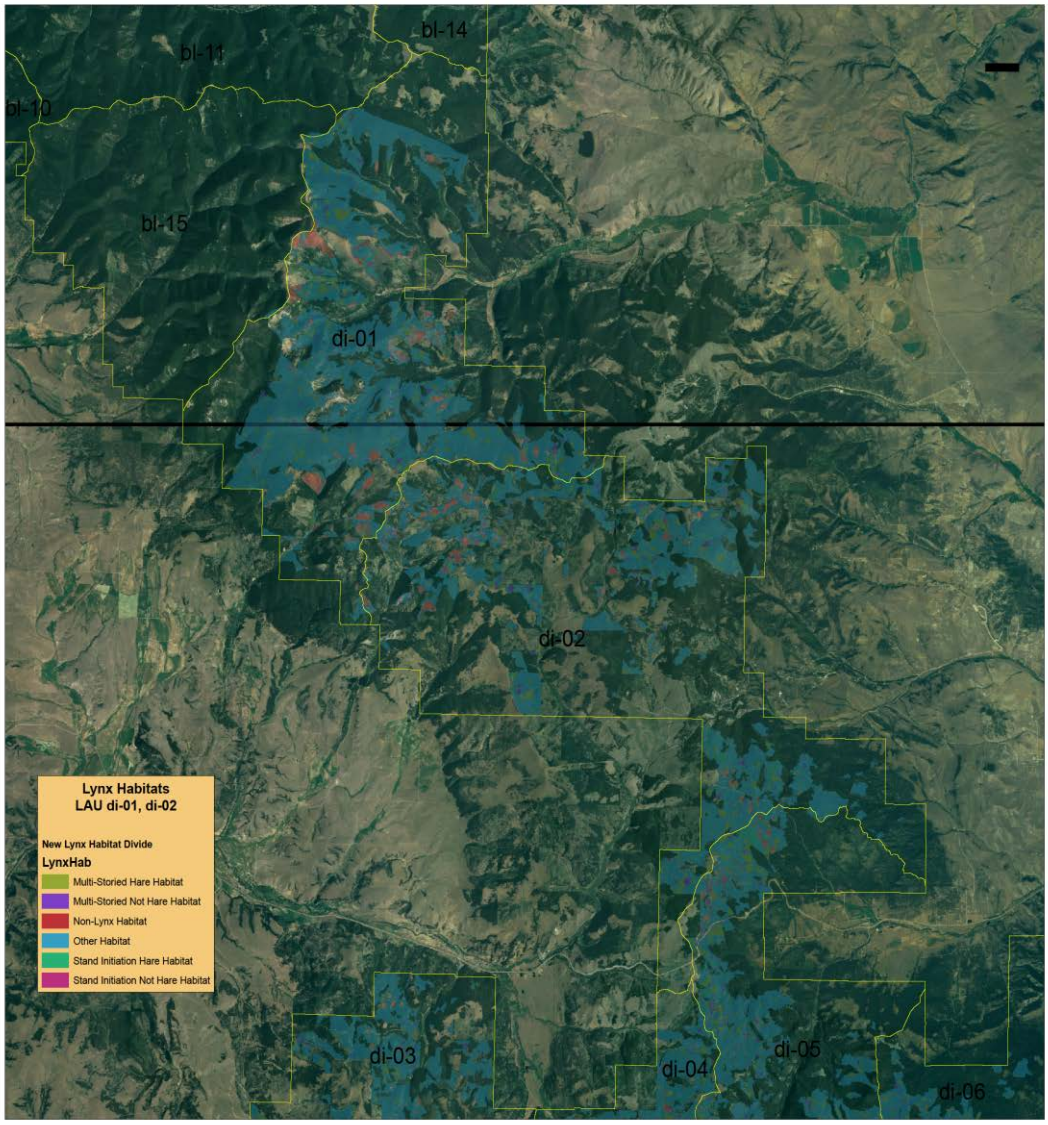

Figure 28 - Lynx analysis units di-01 and di-02 in the northern half of the Divide landscape.

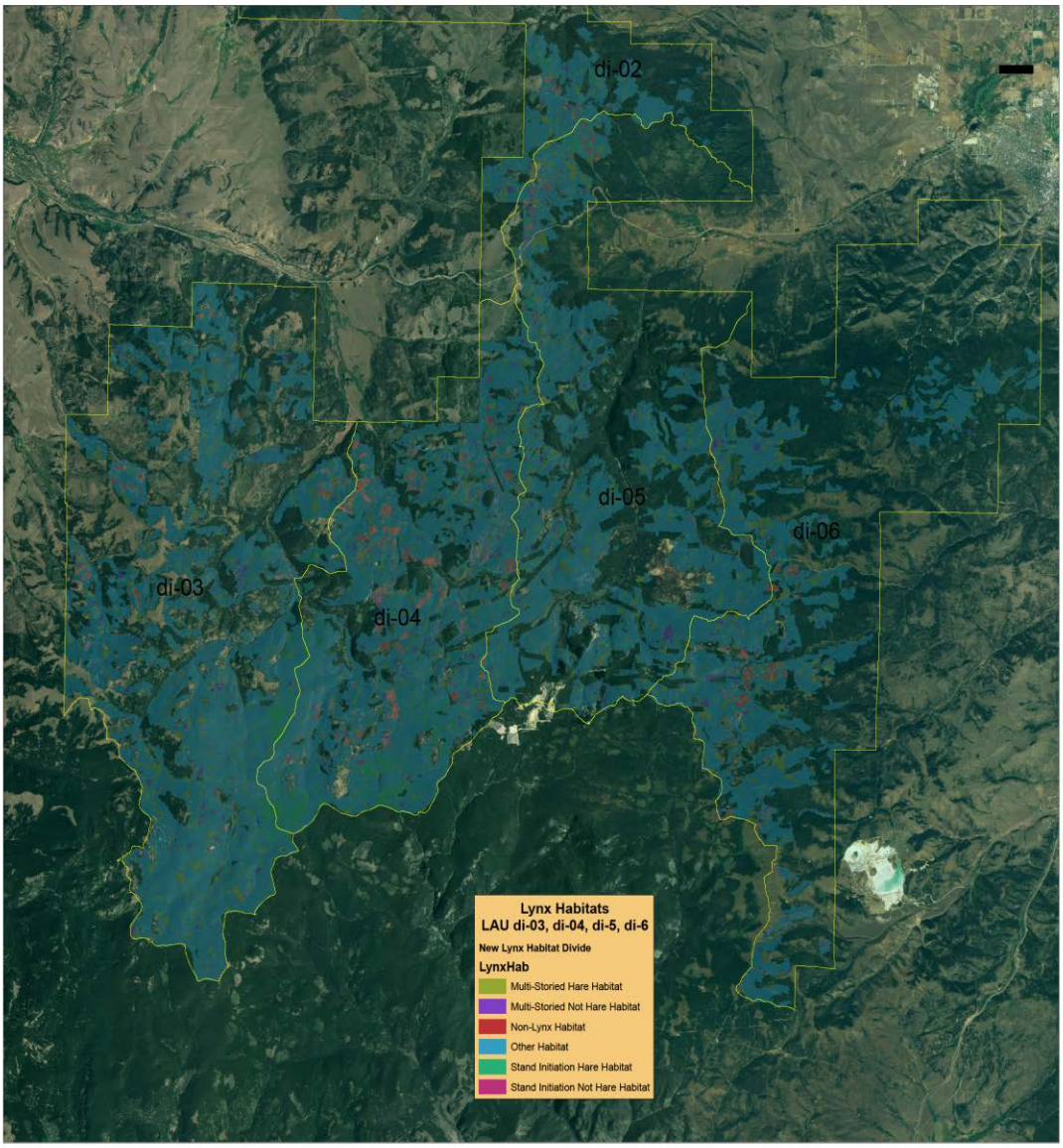

Figure 29 - Lynx analysis units di-03, di-04, di-05, di-06 in the southern half of the Divide landscape.

Delineating Occupied Habitat

The *Lynx Management Direction* applies to National Forest lands "occupied" by the lynx. On the Helena NF, the Blackfoot and Divide landscapes are considered to be "occupied". The Big Belts and Elkhorns landscapes are not currently occupied by resident lynx, although transient animals have been documeted in the Big Belts [*Lynx Mgmt Direction* ROD (USFS 2007b, Attachment 1)]. In the Divide landscape, areas north of U.S. Highway 12 are categorized as "core" occupied habitat and those south of the highway as "secondary" occupied habitat [Northern Rockies Lynx Planning Area Map (USFS 2007a)]. Preliminary objectives for "secondary" habitat areas are somewhat different than those for "core" areas (USFS 2007c, p. 3-4), but we apply Management Direction standards and guidelines to both areas in the same way.

Critical Lynx Habitat

The USFWS *Final Rule* (50 CFR Part 17) designating "critical" habitat for lynx in the contiguous U.S. (*Federal Register*, Vol. 74, No. 36, Feb. 25, 2009) has been in effect since March 2009. It expands upon previous mapping efforts and designates approximately 101,000 acres of critical lynx habitat in the contiguous 48 states, 26,200 acres of which are in the northern Rockies. The critical habitat designation is based on field research and professional opinion. On the Helena NF it takes in the entire Blackfoot landscape (Lincoln Ranger District) and the northern part of the Divide landscape (north of U.S. Highway 12) [Figure 30]. Critical habitat includes all National Forest land: (1) the previously designated area of "occupied core lynx habitat" and (2) all of the surrounding and intervening non-lynx habitat, "matrix habitat" that may provide linkage.

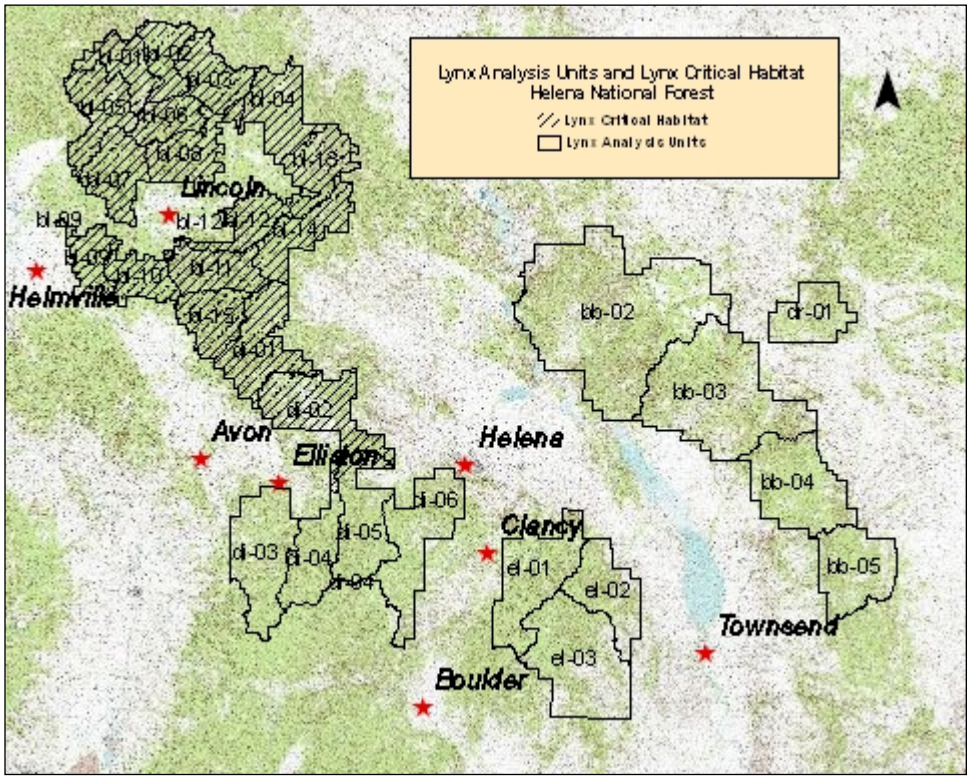

Figure 30 - Lynx analysis units (LAUs) and critical lynx habitat on the Helena NF.
The critical habitat zone covers the entire Blackfoot landscape on the Lincoln Ranger District and the northern part of the Divide landscape on the Helena Ranger District (LAUs di-01 and di-02).

Besides designating critical habitat, the *Final Rule* identifies "physical and biological features that are essential to the conservation" of lynx: that is, "primary constituent elements" (PCEs). The overarching PCE for lynx critical habitat is summarized as "boreal forest landscapes supporting a mosaic of differing successional forest stages". These landscapes contain (a) snowshoe hares and their "preferred habitat conditions, which include dense understories of young trees, shrubs, or overhanging boughs that protrude above the snow and mature multi-storied stands with conifer boughs touching the snow surface"; (b) "winter snow conditions that are generally deep and fluffy for extended periods of time"; (c) "sites for denning that have abundant coarse woody debris, such as downed trees and root wads"; and (d) matrix habitat (not supporting hares) "that occurs between patches of boreal forest in close juxtaposition (at

the scale of a lynx home range) such that lynx are likely to travel though such habitat while accessing patches of boreal forest within a home range" (*Fed. Register*, Vol. 74, No. 36, p. 8638).

The *Rule* indicates that "lands within critical habitat will require some level of management to address the current and future threats to the lynx and to maintain and protect the physical and biological features essential to the conservation of the species" (*Federal Register*, Vol. 74, No. 36, p. 8638). That is, management actions need to maintain the PCEs. The USFWS is to decide whether a proposed Federal action amounts to "adverse modification" of lynx habitat based on whether it allows "the affected critical habitat to remain functional…to serve the intended conservation role for the species" (*Federal Register*, Vol.74, No. 36, p. 8644).

At this point, the Helena NF, knowing that lynx are in fact resident in the "non-critical" habitat zone south of Highway 12, applies the standards and guidelines of the *NRLMD* to all areas of the Divide landscape. While the PCE guidance does not currently apply to the region south of Highway 12, the Helena NF takes it into account when planning projects in this area.

Local Status

Lynx Survey Work and Field Observations

The Helena NF wildlife data base shows 12 observations (or groups of observations) of lynx or lynx tracks in the six Divide landscape LAUs since 1999 that have been verified or are considered highly credible (by MFWP and/or Helena NF biologists). These include an adult lynx photographed in a tree in Hahn Creek in 2006 and a juvenile female killed on Highway 12 west of MacDonald Pass in 2003. Other reports have come from these areas, but their credibility is unclear (HRD/ Helena NF wildlife observation files). In particular, a number of reports of "unknown credibility" from LAU di-01 probably represent valid lynx sightings, given the proximity of that LAU to high quality habitat on the Lincoln Ranger District.

In addition to these fortuitous observations, data is available from systematic tracking surveys conducted by MFWP along the Continental Divide between Boulder River in the south and Bullion Parks/ Jericho Mountain in the north [B. Giddings, personal communication; HNF/ HRD observation files]. Most lynx tracks encountered in these surveys over the past 15 years have been in the Boulder River drainage a few miles south and east of the Helena NF boundary. But some, are from the Continental Divide trail (CDNST) where it runs along the HNF/ B-D NF line.

Since 2006, Wild Things Unlimited of Bozeman has run winter track surveys over a wide area north and south of MacDonald Pass. Surveys have identified several carnivores, but the primary targets have been wolverines and lynx. Much of the fieldwork has been done in the upper Little Blackfoot and Telegraph Creek drainages south of the pass, but areas along the Divide toward Greenhorn Mountain and in the upper Tenmile drainage have been surveyed as well. Surveys involve systematic back-tracking and collection of hair, scat and urine samples, which are then sent to the USFS Rocky Mountain Research Station in Missoula for DNA analysis [see Gehman 2006; Gehman *et al.* 2007 to 2010; Pilgrim 2009 to 2010; Pilgrim and Schwartz 2007-2008]. DNA analysis allows identification of species and individual animals.

In the winter of 2007 to 2008, Wild Things Unlimited tracked lynx through the greater Telegraph Creek drainage (Telegraph Creek, Hahn Creek, Flume Gulch, Mike Renig Gulch) [LAU DI-04] and cataloged resting sites and prey kill sites (Gehman *et al.* 2008) [Figure 25, Figure 26]. The Rocky Mountain Research Station confirmed that a majority of the tracks had been made by a single adult male (Pilgrim and Schwartz 2008). Several samples from this area could not be tagged to an individual, but their pattern suggested the presence of a second lynx. This data

supports earlier reports by longtime local residents that lynx have been present in the area for some time (Helena NF wildlife observation files). The Mike Renig/Flume Gulch data are also in line with photos of an adult lynx in that area from 2006 (Helena NF and MFWP wildlife files).

In the winter of 2008 to 2010, Wild Things Unlimited tracked lynx through accessible reaches of the Little Blackfoot and Telegraph drainages [LAUs DI-03, DI-04] and also followed animals into upper Minnehaha Creek in the Tenmile drainage [LAU DI-05] (Gehman *et al.* 2009). DNA labwork on samples from these surveys identified the same male that had been present in 2007 to 2008, in addition to an adult female. More limited survey work around Greenhorn Mountain north of Highway 12 yielded no definitive results for lynx [although wolverines were found]. Fieldwork in the winter of 2009 to 2010 again found numerous signs of adult lynx in the Telegraph Creek drainage. DNA analysis verified the presence of the same adult male that had been in the area the previous two years (Pilgrim 2010). Lynx tracks were also followed in the Mullan Pass area north of U.S. Highway 12, but no DNA samples were taken (Gehman *et al.* 2010). Behavior patterns deciphered during four seasons of tracking, coupled with the fact that at least one lynx has been present for three years, is a strong indication that some of these animals are local residents rather than transients lingering in the area as they make their way through a linkage zone.

Figure 31and Figure 32, following, illustrate the kinds of habitats where lynx have frequently been located in the greater Telegraph Creek drainage in winter and in which they have been able to successfully forage for snowshoe hares. These habitats, while marginal by standards applied to moist westside and more northerly Forests, have been sufficient to support snowshoe hares in winter as well as a small group of lynx in the Divide landscape. Over the past several years, lynx have spent much of the winter in the areas such as those depicted in Figure 31 and Figure 32.

Figure 31 - Photo 20: Lynx foraging area in Mike Renig Gulch.
Dispersion is irregular, but there are enough saplings throughout to support snowshoe hares in winter.

Figure 32 - Photo 21. Lynx foraging area in Little Flume Gulch.
A subirrigated meadow with colonizing conifers and deciduous shrubs in Little Flume Gulch. Conifer and shrub density is irregular and often fairly open. Nonetheless, lynx have been documented foraging for snowshoe hares here in winter and probably do so in summer as well.

Snowmobile Trails in Lynx Habitat

Of the 426 miles of regularly-used snowmobile routes in the Travel Plan Area, approximately 349 miles are specifically identified for snowmobile use under the current Travel Plan (Table 99). Another 77 miles, although shown on the Forest Visitor Map as closed to motorized use year-round, have been regularly used by snowmobiles for the past 25 years. In the absence of any evidence of resource damage or conflict with other resources, this use has not been challenged by the Helena NF. [For a more complete discussion of how snowmobile routes have been classified, see the lynx "*Effects*" section and Table 96, Table 99 and Table 115; See also the map of *Snowmobile Routes on the Helena National Forest* for 2003 and maps for Travel Plan alternatives].

Snowmobile trail mileage is a relevant parameter because it figures into *NRLMD* Guideline HU G11 (expansion of designated over-the-snow routes). Table 96, following, compares the mileage of regularly used snowmobile routes in potential lynx habitat in the "core occupied habitat" region north of U.S. Highway 12 and the "secondary occupied habitat" region south of the highway. These data are for the Divide Travel Plan Area only and do not include those portions of LAUs di-01 and di-06 that fall outside the Plan Area. An estimated 165 miles of active snowmobile trails currently pass through potential lynx habitat, resulting in a trail density of 1.4 mi/mi² in these areas. This trail system has been relatively stable over the last two decades.

Road miles/densities within LAUs are not addressed by standards or guidelines in the *NRLMD.* So, those figures are not provided here. Open road density data for elk and grizzly bear units

elsewhere in this report (Table 87, Table 88, Table 91, Table 101, Table 107, Table 108, Table 114) give a sense of relative road densities in LAUs.

Table 96 - Snowmobile Routes in Lynx Habitat.

Occupied Lynx Habitat	Area of Potential Lynx Habitat	Miles of Snowmobile Trail in Lynx Habitat	Snowmobile Trail Density in Lynx Habitat
North of Highway 12	32 mi^2	70 mi	2.2 mi/mi^2
South of Highway 12	81 mi^2	95 mi	1.2 mi/mi^2
Total Travel Plan Area	114 mi^2	165 mi	1.4 mi/mi^2

Sensitive Species

Species Present

USFS Region 1 issues a revised "sensitive species" list each year, the latest being from August 2014. Currently, six species on the 2014 list are known to inhabit the Divide Travel Plan Area, although some are rarely observed . These species, gray wolf, wolverine, fisher, flammulated owl, black-backed woodpecker and boreal toad, are discussed in this section and in the "*Environmental Consequences"* analysis later in the report. These sections serve as the Biological Evaluation for sensitive species in the Travel Plan Area. Species likely to be directly and measurably affected by Travel Plan alternatives or that inherently generate public controversy are discussed at greater length. Sensitive species that have not been observed in the Divide landscape or that pass through only occasionally as transients are summarized briefly in the following section, but they are not discussed further.

Species Not Present

Sensitive species that are resident elsewhere on the Helena NF but have not been identified in the Divide landscape are the bighorn sheep, Townsend's big-eared bat, fringed myotis bat, bald eagle, peregrine falcon and plains spadefoot toad. The northern bog lemming and harlequin duck are suspected to occur on the Forest, but have not been positively identified as being present.

Bighorn sheep inhabited the Divide landscape historically but have not been present since the late 19th or early 20th century. There is a certain amount of suitable habitat in the Travel Plan Area, but so far, MFWP has chosen not to reintroduce the sheep and none have migrated in from neighboring regions. Bighorn sheep populations are at risk primarily from disease. Travel management issues for the sheep are similar to those affecting elk and mule deer, although on a more limited scale and in a different assortment of habitats.

The Townsend's big-eared bat has not been found in the Divide landscape. Bat surveys conducted on the Helena NF in recent years have located big-eared bats in the Big Belt Range to the east but not elsewhere on the Forest [Point Observation Database, Montana Natural Heritage Program (http://mtnhp.org/tracker/HNTMap.aspx)].

Road construction may destroy potential roosting sites in large decadent trees, but once in place, roads and motor trails have not been demonstrated to have any direct effect on these bats. Indirect effects may occur where travel routes facilitate human access to bat caves, abandoned mines and large snags.

Northern bog lemming habitat is present but highly fragmented and uncommon. Bog lemmings may be present on the Helena NF but they have not yet been reported here. The best habitat is

on the Lincoln Ranger District west of the Divide. Management of roads and motor trails in higher elevation riparian and wetland areas is directly related to the welfare of this species.

Bald eagles are occasionally reported in the Divide landscape, but so far, only as transients. For several years a pair nested west of the Forest boundary along Snowshoe Creek, but these birds spent virtually all of their time along the lower Little Blackfoot River on private and State land. This nest is no longer active, but bald eagles are still regularly reported along the lower Little Blackfoot River several miles west of the Helena NF boundary. Potential nesting, roosting and foraging habitat is available on the Forest, in particular, along the upper Little Blackfoot River, but to date no eagles have chosen to occupy it. The *Montana Bald Eagle Management Plan* contains guidelines for road management and human access around nest sites that would guide management if eagles were to establish themselves in this part of the Forest.

Peregrine falcons have been reported in the Divide landscape at various times over the past 20 years, mostly in the vicinity of Mount Helena and around Sheep Mountain just east of the Helena NF boundary near Clancy. Most observations have been during the spring and fall migration periods and no eyries are known to have been established. Since 1989, when the falcons returned to the Helena NF, all known eyries have been in the Big Belt Range. Management of these birds focuses on keeping recreationists off the cliffs where the eyries are established. Motorized travel management is seldom an issue.

Harlequin ducks are suspected to be present on the Lincoln District of the Helena NF, but none have been reported in the Divide landscape. Only marginal habitat is present, mostly on the upper Little Blackfoot River. Open roads can serve to introduce human disturbance into areas of otherwise suitable habitat for these reclusive ducks.

The plains spadefoot toad has been found only along the Missouri River below Meriwether Canyon in the Big Belt Mountains. Its range barely edges onto the Helena NF in an area where there are no roads.

The leopard frog, once relatively common in and around the Helena NF, including the Divide landscape, has not been reported in this part of Montana in nearly 20 years. It has almost certainly been extirpated, probably as a result of global factors (increased ultra-violet radiation, global warming, the spread of pathogenic chytrid fungus) in addition to local habitat change. Leopard frogs are still relatively common in parts of eastern Montana. Standard management for the common spotted frog and the western (boreal) toad will take care of habitat needs for leopard frogs, if they are in fact still present.

Wolverine

The North American wolverine (*Gulo gulo*) has been classified as a “sensitive” species in Forest Service Region 1 for 20 years. The USFWS proposed listing the wolverine as a “threatened species” under the ESA in February 2013, but, after an 18 month review of the most recent scientific information, withdrew the proposal in August 2014. As a result, the wolverine is discussed here as a sensitive species.

Biological Factors

Population Parameters and Habitat Relationships

Wolverines are generally solitary animals. They range widely from high alpine regions to low-elevation big game winter ranges but may exhibit some fidelity to particular areas for months or years. Long-term observations indicate that the species exhibits flexible behavior when

environmental conditions (such as food supply) change, leading to movement beyond normal boundaries (Hatler 1989). Wolverine habitat is best defined in terms of adequate year-round food supplies in large sparsely inhabited areas, rather than in terms of particular topography or plant associations (Kelsall 1981). However, studies indicate that wolverines select alpine fir forests over other forest types with some preference for lodgepole pine and western larch (Hornocker and Hash 1981). Copeland (1996) found that wolverines preferred Douglas-fir forests in summer and lodgepole pine forests in winter. Generally, habitat use follows distinct seasonal shifts with higher elevational talus/rock areas preferred in summer, montane conifer forests in winter and riparian habitats in spring (Copeland 1996). Wolverines also exhibit a particular affinity for higher elevation alpine habitats that accumulate deep snow in winter.

Preferred ranges appear to be large, isolated tracts of land supporting a diverse prey base (Hornocker and Hash 1981). Wolverines will range into roaded areas with a modicum of human activity, but this use often occurs in winter when many of these areas become, because of winter conditions, "remote". During summer, wolverines typically move to higher elevations. These behaviors effectively separate wolverines and humans other than for rare encounters. Human encroachment into existing refuges may threaten the wolverine's ability to maintain basic life history requirements (Copeland and Hudak 1995). Human activity (road building, developed campgrounds) near subalpine boulder talus sites may eliminate historic foraging or denning habitat. It has been hypothesized that persistence of wolverines in Montana, despite unlimited historic trapping and hunting, may be attributed to the presence of designated wilderness and remote, inaccessible habitat (Hornocker and Hash, 1981).

Wolverines occur in low densities in all places they have been studied. This is generally attributed to naturally low reproductive rates and delayed sexual maturity as well as the unreliability of adequate food supplies throughout the year (Banci 1994). Maintenance of large territories and susceptibility to trapping also play a role (Hatler 1989). Overall, food availability seems to be the primary factor determining movement and specific habitat use and is probably the primary limiting factor for wolverine populations (Hornocker and Hash 1981; Hatler 1989).

Although the wolverine is primarily a scavenger, it forages for most of its own food during the summer. Common foods include the eggs and young of ground nesting birds, burrowing rodents, snowshoe hares and berries. In winter, wolverines rely on carrion and therefore are dependent upon the presence of other predators. They establish food caches in winter and are also adept at seeking out and raiding caches made by other wolverines and other carnivores such as mountain lions and foxes. Ungulate carrion is a primary winter food item, mountain goats at higher elevations; elk, deer and moose at low and mid elevations (Banci 1994).

Beginning in late winter, reproducing females establish a series of dens ranging from natal dens (associated with the birth of kits) to maternal dens (post-birth, pre-weaning) and post weaning dens (rendezvous sites) (Copeland 1996). Natal dens are established at high elevations, typically in talus or cirque basins while maternal dens occur in both talus and among fallen trees (Copeland 1996). Rendezvous sites may occur in talus or coniferous riparian zones. Protection of natal denning habitat is critical for wolverine persistence.

Data collected in northwestern Montana indicate that average yearly ranges are 262 mi^2 for males and 241 mi^2 for females (Hornocker and Hash 1981). Although wolverines maintain large home ranges and can utilize almost any habitat, they are sensitive to human disturbance and are especially susceptible to trapping because of their opportunistic eating habits. Trapping accounts for a high proportion of wolverine mortality, affecting even populations that are locally protected (Squires 2007; Inman 2007; Banci 1994; Hatler 1989).

Key components of wolverine ecology revealed by research over the past three decades can be summarized as follows: (1) wolverines need adequate space to maintain populations; (2) population fragmentation must be avoided to maintain genetic, social and spatial continuity of subpopulations; (3) the environment must be capable of providing a varied seasonal diet; and (4) security areas must be available to provide undisturbed seclusion for reproducing females (Copeland and Hudak 1995).

Recent research suggests that an additional factor of key importance to wolverines is the need for sites that retain deep snow in the spring. McKelvey and others (2010) have argued that while wolverines can be considered habitat generalists in many respects, the fact that females are highly dependent on deep snow for establishing and maintaining viable reproductive dens ties wolverine populations to areas with persistent spring snow. At present, this includes many of the major mountain ranges in the northern and central Rockies, as well as the Cascade Range in Washington and Oregon. The implication of this dependence is that wolverine habitat in western North America is likely to become smaller and more fragmented as global warming diminishes the capacity of many sites to provide suitable spring snow cover (McKelvey *et al.* 2010). This was a primary factor in the USFWS decision in 2010 to designate the wolverine a candidate for listing as a threatened or endangered species (USDI 2010, p. 78046).

Influence of Forest Roads and Trails

Extensive unroaded or sparsely roaded habitat is often cited as a characteristic component of wolverine habitat (Claar *et al.* 1999; Banci 1994; Kelsall 1981), but it is unclear whether this is a cause-and-effect phenomenon or simply a function of the species' tendency to inhabit higher elevation areas inhospitable to most human development. It is also possible that more wolverines are present in large wildland areas because of lower trapping mortality than occurs among those animals frequenting environments with ready road and trail access (Banci 1994).

Research throughout the Rocky Mountain region of Canada and the northern U.S. reveals no definitive conclusions as to whether wolverines are attracted to or avoid Forest roads and trails. Krebbs *et al.* (2007) found that roads did not seem to influence habitat associations of male wolverines. Copeland *et al.* (2007) found no aversion or attraction of wolverines to maintained trails, although they noted that, wolverines frequently used snow-packed roads in their study area as winter travel routes. In reviewing other studies, they noted a general "spatial separation of wolverines and human-related infrastructure" but did not single out roads as a key factor.

The main impact of roads and motor trails on wolverines comes from their role as snowmobile routes in winter for trappers and recreationists. They allow trappers to work traplines in wolverine habitat that they would otherwise have difficulty reaching. Trapping has been cited as a primary source of wolverine mortality in a variety of studies (see Squires *et al.* 2007; Inman *et al.* 2007; Banci 1994; Hatler 1989; Hash 1987). Roadways also provide snowmobilers with pathways up to high alpine basins where disturbance of natal denning habitat is negatively impacting wolverine production in some areas (Claar *et al.* 1999; Banci 1994; Squires *et al.* 2007).

Area Use

Wolverine Habitat

According to Copeland (pers. comm. cited in Hillis and Kennedy 2003) and Squires (pers. comm. cited in Hillis and Kennedy 2003), wolverines are distributed throughout montane habitats across USFS Region 1. Highest densities are associated with the main stem of the Rocky

Mountains, extending eastward to the Big Belt Range. Wolverines become relatively scarce in island and peninsular ranges east and west of the Continental Divide (Ranges such as the Castle, Little Belt, Snowy, Highwood and Crazy Mountains to the east; the Kettle River, Wallowa and Blue Mountains to the west).

Locally, a number of potential wolverine safe havens exist in the Travel Plan Area both as inventoried roadless areas and as undesignated blocks of non-motorized habitat where human presence is minimal for much of the year. Such blocks larger than 1,500 acres occupy roughly 67 percent of the Travel Plan Area [see discussion of Habitat Connectivity in the Divide Landscape].

While the Helena NF does not manage habitat specifically for wolverines in the Divide landscape, habitat management for other wildlife species serves to benefit wolverines. Ungulate carrion is a major food source and management of elk and deer at levels sufficient to provide for hunting enhances the potential for this resource. Management for elk security also provides large blocks of non-motorized habitat that may provide incidental havens for wolverines [see previous discussion of elk security areas]. In addition, management aimed at improving connectivity of wildland habitat enhances the ability of wolverines to move throughout the Divide and improves prospects for survival [see the discussion on Dispersal, Fragmentation and Linkage].

The Helena NF has mapped natal denning habitat for wolverines across the Forest using a model developed by the USFS Northern Regional office (Missoula). The model focuses on identifying high mountain basins, rockslides, steep slopes and other alpine terrain where woody and rocky debris along with deep snow are likely to accumulate. And while field investigation indicates that some areas in the Divide landscape meet these criteria (areas around Nevada and Black Mountains, Lee Mountain, Red Mountain, Cliff Mountain/ Electric Peak, Jericho Mountain, Thunderbolt Mountain, Bison Mountain, Luttrell Peak), none were identified by the model.

Most potential wolverine denning habitat in the Divide landscape is immune from snowmobile use because of land allocation status (the Helena NF prohibits snowmobiles in most of the Electric Peak Roadless Area, for example) or by virtue of inhospitable terrain and forest structure that makes snowmobile travel off established trails extremely difficult, if not impossible.

Wolverine Occurrence

Reports of wolverines in the Divide landscape south of Highway 12 have been infrequent but consistent over the past two decades. Most observations have come from upper Telegraph Creek (from long-term local residents). Others have come from around Jericho Mountain, the Occidental plateau and areas near Lava Mountain. In 1995, a wolverine was trapped in Cataract Basin on the Beaverhead-Deerlodge NF just south of the Helena NF boundary.

More recently, winter tracking surveys by Wild Things Unlimited (Bozeman, MT) have found wolverines along the Continental Divide both north and south of Highway 12 and in other parts of the Little Blackfoot watershed over a four year period (2007 to 2011). DNA analysis of scat and hair from 2007 to 2008 and 2008 to 2009 surveys verified the presence of two male wolverines (Gehman *et al.* 2009, p. 5; Pilgrim and Schwartz 2008; Pilgrim 2009). These animals range widely in the central and southern parts of the Travel Plan area and exhibit movement and behavior patterns consistent with those of local residents rather than those of transients moving through a linkage zone. In the fall of 2008, a hunter photographed a large adult

wolverine on an elk gut-pile in the vicinity of Greenhorn Mountain north of Mullan Pass [Figure 33]. Track surveys in 2008 to 2009 identified fresh wolverine sign in this area as well.

Figure 33 - Photo 22: An adult wolverine
An adult wolverine photographed by a hunter in the northern part of the Divide landscape in the fall of 2008. This may be one of the resident males tracked by Wild Things Unlimited between 2007 and 2011.

In the past, wolverines have been reported just north of the Travel Plan area in the upper Little Prickly Pear drainage and on the Lincoln Ranger District. Surveys from 2009 to 2012 continued to locate wolverines in the same general areas as in previous years. So, it is likely that wolverines have been resident in the Divide landscape in low numbers for several years. Breeding activity, however, remains an unknown quantity.

Northern Rocky Mountain Gray Wolf

It should be noted at the outset that the legal status of the northern Rocky Mountain gray wolf (*Canis lupus irremotus*) in the Divide landscape has changed from “endangered” to “sensitive” and back again several times since the original version of this assessment was developed. Currently (early 2015), the wolf is classified as a USFS Northern Region “sensitive” species, having been removed from the Endangered Species list in Montana and Idaho by an Act of Congress in March 2011. Irrespective of this shifting legal ground, Helena NF management of the wolf in the Divide landscape has remained more or less constant, grounded in basic guidance of the *Wolf Recovery Plan* (1987) and the *Montana Wolf Conservation and Management Plan* (2004).

Biological Factors

Population Parameters and Habitat Relationships

Gray wolves are capable of inhabiting virtually any kind of natural habitat occupied by ungulates or other large prey in temperate regions. Acceptable habitat includes forests of all types, rangelands, shrubland, steppes, deserts, wetlands, alpine regions, tundra and barren ground areas, as well as human-influenced environments such as agricultural lands and logged forests. Wolves do not have any particular habitat requirement other than a preference for avoiding areas with heavy human use whenever possible (USDI 1987).

Wolf packs occupy specific territories, typically ranging from 125 km^2 to 550 km^2 (Mech 1970 cited in Tucker 1988; Peterson 1977 cited in Tucker 1988). The number of individuals in a pack and the availability of prey determine territory size (USDI *et al*. 2003). Daily pack movements vary, as do seasonal movements: distances traveled are greater in winter than in summer. Lone wolves cover larger areas than packs and their ranges may overlap two or three pack territories (Mech 1973 cited in Tucker 1988; Fritts and Mech 1981 cited in Tucker 1988).

Wolves are generally not considered migratory but they may wander great distances within their home ranges searching for prey. When local population increases, young adults disperse to new areas, the primary source of new wolves that appear regularly in the Divide landscape. Vegetative cover affects wolf survival by providing shelter for prey such as deer and elk and as a means for quickly eluding humans. In general, healthy wolves themselves need little cover to deal with heat, cold, or severe weather (Mech 1970 cited in Tucker 1988).

Wolf dens, for bearing and protecting pups, may be inhabited year after year, though pups are sometimes moved from one den to another. Den sites are typically dug in sandy and well-drained soils near water, although they can be located in a variety of landforms (Mech 1970 cited in Tucker 1988; Fritts 1982 cited in Tucker 1988). Aside from these local site conditions, the primary condition allowing successful wolf reproduction is isolation from human meddling.

Wolves typically hunt in packs but they may do so individually as well (Mech 1970 cited in Tucker 1988; Fritts 1982 cited in Tucker 1988). Wolves prey primarily on large wild mammals such as deer, elk, moose, bison and bighorn sheep (Kunkel *et al.* 1999; MFWP 2003). However, they are opportunistic foragers and will take advantage of other foods, including domestic livestock, dogs, small and midsized mammals (such as ground squirrels or beavers) , birds (particularly grouse and waterfowl), fish, green vegetation and fruits, depending on their availability and ease of capture (Kunkel et al. 1999). Wolves are also successful scavengers.

Because of the impact that wolves, as top predators, may have on domestic livestock and big game populations, their presence on the Montana landscape inevitably stirs controversy. MFWP has conducted intensive research on wolf-ungulate relationships in the greater Yellowstone area (GYA) and southwest Montana (2001 to 2008) and continues to pursue less intensive but more widespread monitoring throughout the rest of the state (Sime *et al.* 2010, p. 25-29). They have found that while elk (particularly elk calves) are the primary wolf prey in Yellowstone and the southwest, white-tailed deer are the most common ungulate prey in the northern half of the state, including the area around Helena. They found that, in spite of much public opinion to the contrary, elk calf and adult female survival rates in most of southwest Montana and the GYA following the return of wolves have been similar to rates prior to wolf restoration. However, in certain areas with high predator-to-prey ratios (typically involving both wolves and bears and sometimes mountain lions), elk numbers have declined substantially. These areas include the northern Yellowstone, Gallatin Canyon and Madison-Firehole winter ranges, as well as the West Fork of the Bitterroot (Sime *et al.* 2010, p. 27).

MFWP also concluded that "some areas in Montana are unsuitable to wolves because livestock depredations continually lead to wolf removals, preventing wolves from increasing to densities that are seen in protected areas. In these areas, wolves are probably less likely to limit ungulate populations than in areas where depredation removals do not limit wolf survival and population growth" (Sime *et al.* 2010, p. 29). The greater Helena area, including the Divide landscape and its neighboring ranchlands, appears to be one of these areas where predation on livestock occurs at low levels but is an ongoing problem and where consequent wolf removals will inevitably prevent wolves from having any measurable effect on big game populations.

Just to the north in the Big Blackfoot River Valley, an overabundance of wolves, black bears, grizzly bears and mountain lions appears to be a primary determinant of local elk and deer population configurations. However, the same is not true for the greater Helena and Little Blackfoot Valleys that flank the Divide landscape. Elk populations are not declining in these areas and other population parameters (calf production, bull/cow ratios) remain more or less where they have been for the past several years [see MFWP post-season aerial elk surveys for HD 343, 335, 293, 215: 1999-2011].

Most of the difficulty that hunters have had in bagging elk in and around the Divide Travel Plan Area in recent years appears to be a function of (1) mild fall weather, which allows elk a broad spectrum of far-flung escape areas and (2) the increasing tendency of elk to seek out private lands in the fall where they are safe from most public hunting. Elk population decline due to wolf predation is not a problem in the Divide landscape.

Influence of Roads

Wolves are not impeded by most Forest roads and in fact, often use primitive roads with low traffic volume as travelways any time of year. Wolves are also attracted to road corridors that focus prey, as when deer graze roadside green-up or rabbits concentrate in roadside brush. On the other hand, some studies have worked out road density thresholds above which wolf pack activity is suppressed. In Minnesota and Wisconsin, average threshold road density was determined to be 0.72 mi/mi^2 (Mladenoff *et al.* 1995 cited in Forman *et al.* 2003). Whether or not this density applies to National Forest road systems in the west has not been determined. But given the facility with which wolf packs have made use of ranchlands and well-roaded portions of the Helena NF in the last 15 years [weighted summer open road density in the Travel Plan Area averages 0.81 mi/mi^2], it seems likely that at least in parts of their territories, wolves are able to deal with road densities higher than the Wisconsin thresholds.

While few roads on the Helena NF allow vehicle speeds high enough to threaten wolves, U.S. Highway 12 in the center of the Travel Plan area has proven deadly in the past [at least one adult having been killed on the highway near MacDonald Pass in 2002]. Roads may also be indirectly lethal in that they funnel hunters and other Forest users with rifles into areas occupied by wolves, leading to inadvertent or deliberate shooting. So far, however, neither strikes on the highway nor illegal/accidental shooting have been significant road-related factors in wolf mortality on the Helena NF since wolves began arriving in this area in the late 1980s.

Wolf Management

Wolf Recovery Plan

The Northern Rocky Mountain gray wolf (*Canis lupus irremotus)* was listed as an *endangered* species in 1973. Since 1987, wolf recovery has proceeded according to steps outlined in the *Northern Rocky Mountain Wolf Recovery Plan* (USDI 1987). The Plan was designed to provide

direction and coordination for recovery efforts. It is not a decision-making document, however and has been modified as new information has become available, species status has changed and tasks have been completed.

In 1994, the Final Rule on the Establishment of a Nonessential Experimental Population of Gray Wolves (50 CFR Part 17) allowed reintroduction of wolves into the Greater Yellowstone and Central Idaho Wolf Recovery Areas. It also expanded the size of the three insular recovery areas delineated in the Wolf Recovery Plan. The Greater Yellowstone and Central Idaho Areas were enlarged to include the entire state of Wyoming, most of Idaho and the southern half of Montana. These two areas came to be referred to as "Experimental Population Areas" rather than "Recovery Areas". The third area, the Northwest Montana Recovery Area, originally within the Bob Marshal Wilderness complex, was expanded to encompass the northern half of Montana and the Idaho Panhandle [Sime *et al.* 2008, 2009, 2010]. The Divide Travel Plan Area is located in the southwestern sector of the Northwest Montana Recovery Area.

In assessing the potential impacts of Helena NF projects on wolves, we apply relevant provisions of the Wolf Recovery Plan and look to the most recent research findings and management advice from MFWP and USFWS wolf biologists to deal with specific local issues. In general, we focus on (1) protecting active denning and rendezvous sites from human interference, (2) maintaining abundant big game as a prey base, (3) reducing factors that might lead to negative confrontation with humans (open roads, untended livestock) and (4) retaining sufficient forest cover to provide for local screening and concealment [see Oakleaf *et al.* 2006; USDI 1987].

Wolf Reintroduction and Dispersal

In 1995 and 1996, a total of 66 wolves from Alberta were introduced into the Greater Yellowstone and Central Idaho Recovery Areas. In the absence of competition from resident wolves, these animals quickly established robust populations. While the Yellowstone National Park population appeared to have stabilized by 2009 to 2010, the Greater Yellowstone population as a whole was continuing to expand. Likewise, the central Idaho population continued to increase in distribution and abundance (Sime *et al.* 2008, 2009, 2010). However, the introduction of wolf hunting seasons in Idaho and Montana since 2010 has now inserted a new dynamic into the population equations, the outcome of which remains at issue.

No reintroduction has been needed in the Northwest Montana Recovery Area, as natural southward migration of wolves from Canada has been gradually populating this region since the mid-1980s and continues to do so [personal observation: Yaak River drainage 1984 to 87, Big Hole Valley 1987 to 1992, Helena NF Divide and Blackfoot landscapes 1991 to present] [see also Rocky Mountain Wolf Recovery Annual Reports 1995 to 2013; Interagency Annual Reports (Sime *et al.* 2007, 2008, 2009, 2010)]. Annual population increase in this recovery area has been varied, but the overall trend has been upward. Wolf populations in Montana as a whole increased 34 percent in 2007, 18 percent in 2008, four percent in 2009, eight percent in 2010 and 15 percent in 2011 [see Table 97].

Increasingly, wolves are moving between the Northwest Montana and Central Idaho Recovery Areas, enough so that the two populations appear to be gradually merging (Sime *et al.* 2008). There is little movement, however, from these areas into the Greater Yellowstone Recovery Area, a function, apparently, of low quality dispersal habitat (Oakleaf *et al.* 2006) and of the high wolf density in the greater Yellowstone ecosystem. On the other hand, wolves from the greater Yellowstone area in northern Wyoming and southern Montana are now beginning to show up in

the more northerly reaches of that experimental population area and occasionally, in the Northwest Montana Recovery Area (see examples in Sime *et al.* 2010, p. 47-67).

The Divide Travel Plan Area lies entirely within the Northwest Montana Recovery Area, near its eastern edge). Individual wolves began to be regularly reported in the Divide landscape in the late 1980s and the first resident pack was identified in 1995 (in the Telegraph Creek drainage of the upper Little Blackfoot watershed). The number of packs on the Helena NF has waxed and waned over the past 17 years, with most mortality stemming from management actions by State and Federal agencies attempting to minimize predation on livestock. Until 2010, all verified packs on the Helena NF had been located in the Blackfoot and Divide landscapes, which provide the primary north-south dispersal zone for wolves moving southward from northern populations. In 2010, a pack was identified in the Elkhorn landscape and in 2011 and 2012, multiple wolves were reported in the central Big Belt landscape.

State Wolf Management and the Delisting Process 2004 to 2011

By the end of 2002, the biological requirements for wolf recovery in the northern Rockies had been met (at least 10 breeding packs each in Montana, Idaho and Wyoming for three consecutive years). State management plans for Idaho and Montana were in place by 2004 and in 2004 to 2005, day-to-day management of wolves in Montana was transferred from the USFWS to MFWP. The Wyoming state plan (though considered marginal by the USFWS) was tentatively approved in early 2008, allowing the USFWS to proceed with delisting.

The USFWS removed the northern Rocky Mountain gray wolf from the Endangered Species list in February 2008. However, litigation led to a court injunction (July 2008) and eventually, restoration of wolves to the list (October 2008). The primary rationale for this action stemmed from the relatively low genetic diversity measured in the Greater Yellowstone wolf population and the uncertainty as to long-term prospects for wolves under State management programs (particularly in Wyoming).

Given these circumstances, the USFWS revised its original delisting order and removed the wolf from the Endangered Species List (May 2009) in Montana and Idaho where State management plans were deemed adequate and where effective genetic interchange between subpopulations appeared to be occurring. Unlike Yellowstone, where wolves were reintroduced from two Canadian populations of Mackenzie Valley wolves, the Northwest Montana Recovery Area has been repopulated by wolves naturally migrating in from a variety of areas to the north, a circumstance that may be producing a more genetically diverse population (although this has not yet been verified by systematic studies).

Following standard procedure, USFS Region 1 then added the wolf to its Sensitive Species List. Shortly thereafter, environmental groups again took the USFWS to court seeking to reinstate endangered species status and in August 2010, Federal District Court in Missoula ruled that the Service could not drop the wolf from the List in some states (Montana and Idaho) and continue to list it in another (Wyoming). The wolf thus returned to its pre-May-2009 status as an “endangered” species in the Divide landscape. Once again, local ranchers could take wolves that were actively chasing or attacking livestock only if authorized by a permit from the USFWS.

In April 2011, after a negotiated agreement between environmental groups and the USFWS to again delist the wolf was scuttled by Federal District Court, the U.S. Congress approved a measure to remove the wolf from the Endangered Species List in Montana, Idaho and parts of Washington, Oregon and Utah as of June 2011. While this action circumvents the traditional pathway for delisting a species (with regard to the role of the courts), the terms essentially

reinstate the USFWS's 2009 science-based delisting order. That is, wolves are removed from the Endangered Species List and placed under state management in areas that support viable wolf populations and are covered by management plans designed to maintain those populations.

The upshot for the Helena NF is that wolves are again classified as a "sensitive" species. While this new categorization may change the way in which local ranchers deal with problem wolves around their livestock operations, it does not alter management strategy for the Helena NF, which will continue to manage the wolf as a relatively uncommon top carnivore within the ecosystem.

Wolf Hunting Seasons 2009 to 2012

In 2009, the State of Montana initiated its first "fair chase" wolf hunting season. The state was divided into three large wolf management units (WMUs) with an overall quota of 75 wolves. The hunt was initially slated to coincide with the big game rifle season (October 25 to November 29); however, the quota was reached by mid-November and the season was closed at that point. Although MFWP had predicted that approximately 590 wolves would remain following the season, the year-end estimate put the population at 524 animals. This amounted to a net increment of 27 wolves over the 2008 population, but it represented an abatement in the rate of increase from previous years (Sime *et al.* 2010).

In 2010, the planned hunt was cancelled as wolves were returned to the Endangered Species List in August of that year. In 2011, a statewide quota of 220 wolves was set across 14 WMUs. MFWP expected that if the hunting quota were met and added to mortality from other sources, the wolf population would be reduced from around 565 wolves in 2010 to around 425 animals in 2011. But even with the season extended to mid-February 2012, only 152 wolves were harvested. This, combined with fewer dead wolves via agency control (because of lower livestock losses), resulted in a year-end wolf population of about 653 animals, notably higher than the predicted 425 (Hanauska-Brown *et al.* 2012).

Given these results, the State doubled down in 2012 with a wolf hunting season extending from September 1, 2012 to February 28, 2013. With the exception of two of the now 17 WMUs, no quotas were set for the number of animals that could be taken. In addition, a wolf trapping season extending from December 15 to February 28 was initiated. By the end of the season, hunters had harvested 128 and trappers had taken 97 wolves (http://fwp.mt.gov/fishAndWildlife/management/wolf). For 2013 to 2014, the hunting/trapping season was extended to March 15, resulting in 143 wolves shot and 87 trapped. In its 2013 annual report (Bradley *et al.* 2014), MFWP noted that between 2012 and 2013, the statewide wolf population increased by only two animals (from 627 to 627 wolves), essentially no increase at all. Population data for 2014 are not yet available, but it appears that the current level of hunting and trapping, combined with management removals and natural mortality, is holding the wolf population near its present size (http://fwp.mt.gov/fishAndWildlife/management/wolf).

Although the state is divided into 17 management units and MFWP has the authority to stop hunting in any given district if local circumstances dictate, the system has so far proven unable to bring greater hunting pressure to bear on areas with real wolf predation problems (involving livestock and/or big game) and to tread lightly in areas where wolves are causing few problems. In mid-December 2012, the Department did attempt to shut down hunting in two small areas north of Yellowstone National Park where wolves that had been collared for research purposes in the Park were being killed. A court order, however, prevented the ban from going into effect.

After five years, the wolf hunt is still a work in progress and future adjustments to the system can be expected.

Area Use

Gray Wolf: Region-Wide Status

The wolf population in Montana increased from around 35 animals in 1990 to over 650 by the end of 2011. Numbers have declined by about four percent since then, presumably because of additional mortality generated by the wolf hunting and trapping season. Table 97 shows the population trajectory of wolves in Montana over the past 10 years [from *Montana Gray Wolf Conservation and Management Annual Reports,* 2004 to 2013]. Given the intensity of ongoing field monitoring, these numbers should be an accurate reflection of the actual size of the Montana wolf population.

Table 97 - Wolves and Wolf Packs Identified in Montana 2004-2013

Year	Number of wolves	Number of packs	Number of breeding packs
2004	153	-	-
2005	256	46	19
2006	316	60	21
2007	422	73	29
2008	497	84	34
2009	524	101	37
2010	566	108	35
2011	653	130	39
2012	625	147	37
2013	627	152	28

The Montana wolf population increased by an average of 24 percent per year from 2004 to 2011, although with decreasing frequency as State wolf hunts began to take a toll beginning in 2009. As can be seen in Table 97, although overall numbers have declined since 2011, the number of packs has continued to increase, with an average annual increment of 13 packs per year. Given the slight decline in overall numbers, it would appear that hunting and trapping is reducing average pack size but not the number packs being formed. The number of breeding packs, however, which increased steadily from 1990 through 2008, reached a relative plateau after that point and in fact, declined markedly in 2013. So it may be that hunting and trapping is beginning to generate a wolf population with more small non-breeding packs. Whether or not this pattern continues to develop and its implications for wildlife populations and domestic livestock remain to be seen.

Regionwide, the USFWS estimated that the total population in the Northern Rockies was at least 1,706 wolves (115 breeding pairs; 242 packs) by the end of 2009. This was up from an estimated 1,645 wolves (95 breeding pairs; 217 packs) at the end of 2008, an increase of almost four percent (USFWS *et al.* 2010). An estimated 1,000 pups were born in these areas in the spring of 2009 (Ed Bangs, USFWS Wolf Coordinator, quoted in the Helena Independent Record, June 3, 2009). By the end of 2013, four years after the initiation of recreational wolf hunting in Montana and Idaho, the USFWS estimates a Northern Rocky Mountain population of at least 1,691 wolves in 320 packs, 78 of which represent breeding pairs. This is essentially the same

total population estimated for 2009 and as with the Montana portion of the population, pack numbers are up while the number of breeding pairs has dropped. The population has thus more or less plateaued and consists of a larger number of small non-breeding packs than prior to regulated hunting and trapping.

While the population is likely to decline further in the future if State hunting and trapping quotas and seasons are expanded, the USFWS expects that the long term average will be at least 1,000 wolves (USFWS *et al.* 2013). The Service also notes that the Northern Rocky Mountain population now represents a genetically viable 400-mile southern range extention of the contiguous wolf population of Canada and Alaska, a population that includes roughly 65,000 wolves (USFWS *et al.* 2013).

Gray Wolf: Local Occurrence 1995-2007

While the Montana wolf population as a whole is secure, the persistence of individual wolf packs across the landscape is dynamic, with new packs forming and established packs failing to persist for a variety of reasons (Sime *et al.* 2010, p. 12). Five wolf packs have been active in and around the Divide landscape at various times since 1995 (although two of the packs have formed from the remnants of previous packs).

The Boulder pack (1995 to 2000) originally denned in upper Telegraph Creek in the Little Blackfoot watershed in 1995 and then moved southward into the Boulder River drainage on the Beaverhead-Deerlodge National Forest, where it spent most of the next five years, sometimes ranging northward back onto the Helena NF. This pack preyed on livestock often enough that it was the subject of multiple control actions, a circumstance that led to its eventual demise.

The Castle Rock pack (2001 to 2003) was partially descended from the Boulder pack and centered its range west of the Helena NF boundary in the Spotted Dog Creek drainage. It operated on the National Forest, ranging eastward into the upper Little Blackfoot, as well as throughout the extensive private ranchland to the west. It, too, eventually concentrated enough on domestic livestock that management agencies (led by USFWS) removed all but a remnant.

The Spotted Dog pack (2004 to 2007) formed from a surviving female of the Castle Rock pack and a newly arrived male. It ranged through roughly the same territory as the Castle Rock pack and like its predecessor, ran afoul of management agencies over livestock predation. It was dramatically reduced in size in 2006 to 2007 and no remnant members were detected after 2007.

The Halfway pack (2002 to 2004) was established by migrants coming down through the Avon-Helmville valley and the Garnet Mountain Range. Its local range was immediately north of the Castle Rock pack, generally north of Highway 12 in the Avon and Little Blackfoot valleys and surrounding National Forest lands. It, too, was subject to management reduction because of its proficiency in preying on livestock. It faded away about the same time as the Castle Rock pack. [See Figure 39 for a view of the Spotted Dog Creek country throughout which the previous four packs operated over a 10-year period].

The Great Divide pack (2002 to 2003) initially denned in the Marysville area but soon came to center its activities near the Mullan tunnel atop the Continental Divide. It was a small pack to begin with and after its alpha female was killed on Highway 12 near MacDonald Pass in 2002, it had difficulty maintaining itself (J. Fontaine, personal communication, 2003). Field personnel

from the USFWS and MFWP were unable to locate wolves in the area after 2003 and concluded that the remnants of the pack had dissipated or not survived.

Gray Wolf: Local Status 2008 to 2011

Since 2008, MFWP biologists have monitored a variety of wolf activity in the Divide landscape. In the fall of 2008 Helena NF field personnel and field trackers from Wild Things Unlimited (Bozeman) noted numerous signs of wolves in the upper Little Blackfoot watershed (Flume Gulch, Jericho Mountain, Little Blackfoot River) [HNF wildlife observation files]. Also in the fall of 2008, MFWP received reports of wolves and wolf sign from hunters in the Tenmile drainage just east of the Divide (Sime *et al.* 2009). Wolf sightings in the vicinity of Rimini in the Tenmile drainage have continued into 2011, although no pack activity has been substantiated. Individual wolves have also been sighted north of Highway 12 several times since 2008, one animal having been photographed at Priest Pass in 2009 (Sime *et al.* 2010, p. 67).

While no regular activity from packs with breeding pairs has been confirmed in the Divide landscape since 2007, a group of seven wolves was photographed near Stemple Pass just north of the Helena RD boundary in October 2010 (Helena NF wildlife observation file). MFWP has been monitoring several packs within a few miles of the landscape to the north, northeast and west. Given the mobility of wolves, any of these packs could have ranged into the Travel Plan Area in the past four years. Of these wolves, the Elevation Mountain pack (Garnet Range/ Avon Valley), the Nevada Creek pack (Helmville/ Avon Valley) and the Mitchell Mountain Pack (Sieben Ranch/ Little Prickly Pear Creek) had been eliminated by Wildlife Services by early 2010 following persistent livestock predation (Sime *et al.* 2010, p. 52-63; MT Wolf Program Weekly Reports 2010).

The Sixmile pack (Avon Valley, just west of the Travel Plan Area) appeared in 2009 and was also slated for reduction because of livestock predation, but it managed to evade capture. MFWP had difficulty locating and monitoring these animals (Sime *et al.* 2010, p. 63): The pack was composed of at least five wolves at the end of 2009 and at least seven wolves by the end of 2010. Discovery of wolf-killed cattle between Avon and Helmville in June 2011 suggested that this pack was still active at that time (MFWP Weekly Wolf Reports).

In the spring of 2011, a small group of adult wolves began preying on calves in the Little Blackfoot valley between Elliston and Avon a few miles west of the Helena NF. This group may have had some connection to the Sixmile pack, but it was not believed to be a coherent pack in itself (K. Glazier, personal communication, June 2011). After a period, all four animals were killed by USFS Wildlife Services at the request of MFWP in June 2011. It is not known whether members of the pack had bred and produced offspring, no natal den having been located.

After mid 2010, wildlife Services moved in on another pack, the Canyon Creek pack, a few miles northeast of the Travel Plan Area, somewhat south of the old Mitchell Mountain pack's territory. These animals had been killing livestock and after a series of removals, the pack was reduced to the point that cattle losses ceased to be an obvious problem, although it took nearly two years..

All of these packs, as well as most of those that have frequented the Divide landscape in the past, have eventually preyed on livestock such that USFWS or MFWP have felt obligated to remove (via USDA Wildlife Services) all or most pack members. This is one of the areas in the state where livestock predation by wolves, while not widespread, is so persistent when it occurs that wolf population densities will never approach those of backcountry and protected areas (such as Yellowstone or Glacier NPs) or other areas of high ungulate density (such as the Big

Blackfoot River valley or the West Fork of the Bitterroot). Livestock depredation in and around the Divide landscape will continually lead to wolf removals. As a result, wolf impacts on local big game populations should continue to be minimal (Sime *et al.* 2010, p. 29).

At present, only one identified wolf pack is operating in or near the Divide Travel Plan Area, the Ophir Creek pack, along the north border. Wildlife Services has removed some members of the pack, which now appears to consist of four wolves. A second group has been identified via tracks and observation along the southern boundary of the Travel Plan Area near Cataract Meadows on the Beaverhead-Deerlodge NF, but little is known of it. We have picked up a few fortuitous observations of individuals or small groups of wolves in or near the Travel Plan Area over the past couple years, in Flume Gulch, the South Fork of Quartz Creek, near Luttrell Peak and west of the Forest boundary toward Avon. So, wolves are present, but their numbers are small and their impact on local prey populations is minimal.

Fisher

Biological Factors

Population Parameters and Habitat Relationships

The fisher (*Pekania pennanti*) is a small to mid-sized carnivore strongly associated with structurally complex forest stands, most often at low and middle elevations rather than in high montane forests (Powell and Zielinski 1994). In the Rocky Mountains, fishers most often use stands dominated by grand fir, Engelmann spruce and lodgepole pine (Jones 1991). Old-growth and mature riparian forests provide particularly good habitat. Fishers make use of hollow logs, standing tree cavities and dense tree crowns (often witch's brooms) for denning, rearing young, resting and general refuge (Jones 1991). They prey on a variety of small and mid-sized mammals (snowshoe hares, porcupines, squirrels, voles), as well as birds and carrion (Heinemeyer and Jones 1994). This diverse diet makes them less vulnerable to shifts in prey abundance than lynx and other predators that rely heavily on one or two prey species.

Like lynx and marten, fishers avoid large openings (parks, meadows, early-seral clearcuts and burns). Also, like other forest carnivores, fishers maintain low population densities and range widely in search of prey and of key habitats (structurally complex forest) (Powell and Zielinski 1994). Because of their aversion to openings, they seek out forested connections between the habitat sites in which they focus activity (Powell and Zielinski 1994). These connecting habitats may consist of any number of forest formations and seral stages and do not necessarily exhibit the complex structure and prey density of preferred habitat sites (Heinemeyer and Jones 1994).

The importance to fishers of riparian and wetland forest has been noted by researchers in several areas of North America, including Idaho (Jones 1991) and Montana (Heinemeyer and Jones 1994). In Montana, fishers prefer areas within 200 meters of water (Heinemeyer and Jones 1994). Investigators have documented that riparian corridors are often used as travel routes (Heinemeyer and Jones 1994). Jones (1991) suggests that preferred resting habitat and prey are more available in forested riparian areas.

Beginning in the 19th century, fisher populations were decimated throughout most of western North America by trapping, which continued unabated into the 1930s and by loss of key habitat to logging. Fisher populations have rebounded naturally in some areas and have been reintroduced in others (as in the Cabinet Range of northwest Montana, 1988 to 90). Still, fisher numbers remain low in the northern Rockies, leaving local populations more vulnerable to decimating factors than species with larger, more diverse populations. Given its inherently low

population density, the fisher is likely to remain on the Northern Region Sensitive species list for the foreseeable future. A recent biological status review by the USFWS has determined that the fisher population in the northern Rockies of the U.S. (Idaho and Montana) is a "Distinct Population Segment of the species". But the Service also determined that based on its current conservation status and the nature of potential threats, the fisher does not warrant listing under the Endangered Species Act at this time (Federal Register: FWS-R6ES-2010-0017, June 30, 2011).

Influence of Roads and Trails

Fishers are not averse to crossing roads and snowmobile trails or using them as travel routes in winter, as long as they are associated with mature forest cover. Overall, research has found no consistent relationship between fisher habitat use and open road density, although the absence of obvious or statistically valid patterns may be simply a function of insufficient research effort to date. High-traffic roads that run along forested stream bottoms probably reduce the attractiveness of otherwise suitable sites for birthing and raising young but they do not seem to prohibit use of the areas for hunting and resting. Several authors recommend against construction of loop routes in riparian areas, since these tend to encourage human traffic in general and trappers in particular [see Heinemeyer and Jones 1994; Claar *et al.* 1999].

As is the case with lynx and wolverines, one of the primary threats that open roads pose to fishers comes from their role as snowmobile routes for trappers in winter. Fishers are curious and opportunistic and they are prone to being caught in traps set for marten and other furbearers, as well as for themselves (Douglas and Strickland 1987). In some areas, this is a significant source of mortality, especially where snowmobile routes pass through forested riparian bottoms, old-growth stands and forested saddles (Heinemeyer and Jones 1994). Removal of large snags from the road corridor by firewood cutters is another indirect effect, although its import is related to the availability of such components elsewhere in the landscape. Fishers use cavities in dead trees for resting, concealment and protection of young.

Area Use

Local Occurrence

Fishers have seldom been reported in the Divide landscape and only one observation has been verified in the last 20 years [on Meyers Hill at the northern edge of the Travel Plan Area in 1997 (Helena NF, MFWP wildlife observation files)]. Two probable observations (of tracks and an animal) have come from Ontario Creek toward the southern end of the Plan Area. Winter track surveys over the last five winters along the Continental Divide and in the Little Blackfoot watershed (Wild Things Unlimited) have detected no sign of fishers. Recent hair snag surveys targeting fishers across the Helena NF (Pilgrim 2007, 2008) found no evidence that fishers were present in the Divide landscape but did locate them on the Lincoln Ranger District just to the north. Fishers have been caught by trappers on the Lincoln District in recent years as well. Given these results and the fact that Forestwide surveys did not find fishers in either the Big Belt or Elkhorn Ranges just to the east, it appears that the Divide landscape may be the eastern extent of the fisher's geographical range [see also map from Maj and Garton 1993 cited in Heinemeyer and Jones 1994].

Local Habitat

In the Divide landscape, most suitable habitat, low/mid elevation mature and old-growth riparian forest, is present only in relatively small plots, with more marginal habitat available in larger blocks. This habitat is patchy in that it is separated, often by some distance, from other

such tracts; but these sites are usually interconnected via forest habitat that, while unsuitable for long-term residence, provides an adequate travel environment.

The ongoing bark beetle epidemic across the Divide landscape is proving a double-edged sword for fishers, increasing snag and log density (both key habitat elements) while eliminating live forest canopy cover. Its impact, either way, will be limited since most habitat changes are occurring in drier upland pine forests, rather than in riparian sites. But where lodgepole or ponderosa pine lies adjacent to or intrudes into such riparian forests, there exists some potential for new combinations of fisher habitat components.

Black-backed Woodpecker

Biological Factors

Population Parameters and Habitat Relationships

The black-backed woodpecker (*Picoides arcticus*) is a primary cavity nester in coniferous forests. They excavate their own nest cavities in a variety of live or dead tree species and as with many woodpeckers, play a key role in creating holes later used by other birds and mammals (secondary cavity nesters) (Dixon and Saab 2000). Engelmann spruce, Douglas fir, lodgepole pine, ponderosa pine and western larch are all used as nest trees. Black-backed woodpeckers forage almost exclusively on the larvae of bark beetles and wood-boring beetles that inhabit dying and newly-dead trees. Home range size varies from around 180 to 810 acres depending on habitat quality.

Black-backed woodpeckers are largely restricted to early post-fire forests (Hutto 1995) and while they can survive in other habitats in low numbers, they appear to require a regular recurrence of new burns for long-term survival (Kotliar *et al.* 2002). They arrive in burned-over forest within the first year following a fire and remain for up to six years, as long as the post-fire supply of wood-boring insects remain sufficient, but their local population usually peaks in three to four years (Hutto 1995). The woodpeckers are far more abundant in burned forests than in any other forest configuration. They are much less frequently observed in live mature forests, even those where snags are common.

For many decades in the 20th century, black-backed woodpecker populations were depressed by effective fire suppression, frequent salvage logging and to a lesser extent, by insect eradication (Hutto 1995). In the last few years, as crown fires have increased in size and intensity on the Helena NF and throughout the west in general (due to suppression-generated fuel build-ups), habitat opportunities for black-backed woodpeckers have been increasing.

Black-backed woodpeckers also occur in unburned landscapes where insect infestations, severe winter weather, or other phenomena have produced high densities of dead or dying trees with bark beetles and woodborer beetles. But, population density in these habitats is inevitably low, one possible explanation being that the largely black birds are less visible in fire-blackened snag aggregates (Dixon and Saab 2000, p. 2) and thus less vulnerable to predation than in other snag-rich habitats. Whatever the reason, recent research focused in Montana suggests that networks of recently burned forest, not just recently dead trees, are the key to long term survival of these birds (Hutto 1995).

Influence of Roads and Trails

The presence of open roads and motor trails has no direct effect on habitat use by black-backed woodpeckers. As with most woodpeckers, human presence does little to deter the birds from

drilling for insects, excavating cavities, or attending young in a nest (Hamann *et al.* 1999). They will, however, challenge intruders that approach a nest too closely (Dixon and Saab 2000, p. 15).

The primary impact of open roads is indirect: Dead trees are lost to firewood cutting or to Forest operations that remove hazard trees along the roads. Since most of this activity occurs soon after the death of the trees, when bark insects are present in large enough numbers to attract woodpeckers, it amounts to a reduction of local habitat, at least for some species. In the case of black-backed woodpeckers, such snag removal could have an effect on potential habitat opportunity in stands where most trees have been killed (and less so in stands with variable mixtures of dead and dying trees). In the end, however, black-backed woodpeckers seem interested almost entirely in stands killed by fire and not those succumbing to bark beetles.

Area Use

Over the last 25 years, large stand-replacing fires have provided an abundance of suitable habitat for black-backed woodpeckers on the Helena NF. These include the Warm Springs (1988) and Boulder (2000) fires in the Elkhorn Range; the North Hills (1984), Cave Gulch (2000), Maudlow-Toston (2000), Jimtown (2003), Meriwether (2007) and Lakeside (2010) fires in the Big Belt Range; and the Monture (2000), Moose-Wasson (2003) and Snow-Talon (2003) fires in the Blackfoot landscape. These fires, as well as a number of smaller burns, have accounted for hundreds of thousands of acres of burned forest in these three landscapes. Targeted post-fire surveys in the Cave Gulch and Snow-Talon burns (2002 to 2006) found black-backed woodpeckers making widespread use of these areas. General surveys suggest the same result in the Warm Springs and Jimtown Burns as well (HRD wildlife files).

The Divide landscape has not experienced fires of this magnitude since the early 20th century and thus has not provided viable habitat for resident black-backed woodpecker populations. The 2009 MacDonald Pass fire (170 acres) is the only recent “large” fire that is providing some habitat. Recent wildlife surveys (spring/summer 2010) identified black-backed and northern three-toed woodpeckers, among others, in the burn about half a year after the fire [HNF wildlife observation files]. The current bark beetle outbreak is rapidly expanding habitat opportunities for a number of the more versatile woodpeckers, such as hairy and downy woodpeckers, red-naped sapsuckers, northern flickers and even pileated and northern three-toed woodpeckers. But, the scarcity of burned forest is likely to limit the number of black-backed woodpeckers.

Western Boreal Toad

Biological Factors

Population Parameters and Habitat Relationships

The Western toad (*Bufo boreas*) is widely distributed in the Rocky Mountains and the Pacific Northwest. The Montana subspecies is the “boreal toad” (*Bufo boreas boreas*), a name often applied to it in this area. Western toads are found most often in mountainous terrain, up to 9,220 feet. They are capable of breeding in shallower reaches of any clean standing water ranging from roadside ditches to lakes (Werner *et al.* 2004, p. 73-74). But, they generally prefer larger bodies of water than other local amphibians, such as spotted frogs and long-toed salamanders, which may breed in puddles and other small ephemeral pockets of water (G. Hokit, personal communication, 1995 to 1998). Eggs are laid in May or June (depending on elevation) and tadpoles and young toads are present in and around aquatic sites through the

summer. Recent research in western Montana (Schmetterling and Young 2008) suggests that the toads may also make use of calm pockets of water in mountain streams for breeding.

Adults are largely terrestrial and outside of breeding season, may wander considerable distances from their aquatic breeding sites. Females generally range farther from water than do males (Werner *et al.* 2004). Both juvenile and adult toads have been documented using small, fast-flowing streams as movement corridors as well (Schmetterling and Young 2008). Western toads occupy a variety of terrestrial habitats from valley bottoms to high elevation slopes, including both forested and unforested sites. The quality of ground-level microhabitat is more important than large-scale vegetation structure. When not feeding, toads may seek cover in rodent burrows or under logs.

Western toads, once relatively common, have declined dramatically throughout Montana and most of the West, over the last 25 years (Reichel 1996). Some decimating factors are local draining and alteration of aquatic habitat, proliferation of cattle in breeding sites, pollution of aquatic habitat, introduction of predatory fish, fragmentation of upland habitats and travel routes. Others are probably continental or global, most prominently, the proliferation of lethal chytrid fungus. The most likely scenario is that the fungus is the primary source of mortality while local human-generated activities are acting as contributing factors (Bartelt *et al.* 2004).

Influence of Roads and Trails

Toads are small, relatively slow-moving animals that are often enough on the move (between breeding, foraging and hibernating areas) that they are more at risk from roads and motor trails as barriers and agents of fragmentation than virtually any other species of interest on the Helena NF [see Maxell and Hokit 1999]. Forest roads that seldom deter mammalian and bird species from moving about can be lethal barriers to toads. The roadways are exposed, environments that are difficult to cross. Western toads are one of the few species found dead in Forest roads and motor trails during the course of general wildlife surveys (G. Joslin, pers. comm.; personal observation). While the loss is not significant in terms of total population numbers, it is high compared to other species, particularly where traffic volume is steady (see Fahrig *et al.* 1995) and it amounts to another cumulative impact on a population under stress.

Area Use

Western toads have been identified at a number of breeding sites across the Divide landscape. Biologists and students from Carroll College in Helena have conducted systematic surveys and tallied western toads at several locations in recent years (G. Hokit, pers. comm.). Helena NF wildlife surveys have found them as well, usually around aquatic breeding sites (Little Corral Gulch, Frohner Meadows, Blackfoot Meadows, MacDonald Creek, Dog Creek, Cellar Gulch) where use is concentrated. Occasionally they are observed in upland habitats, but their relatively low densities in these areas and their tendency to burrow under cover (in logs, under litter, in dense vegetation) make them difficult to discover. Population numbers are unknown, but we assume, given regionwide trends, that their numbers are lower than they have been historically.

Flammulated Owl

Biological Factors

Population Parameters and Habitat Relationships

The flammulated owl (*Otus flammeolus*) is a small insect-eating raptor with specialized habitat requirements. They are secondary cavity nesters in mature or old-growth ponderosa pine and Douglas-fir stands. Occasionally, they are found in mature aspen or cottonwood. They forage for large insects at twilight and after dark in open-grown forest formations with productive understories (tall grass, brush, young conifers) (McCallum 1994). This vegetation pattern is key to maintaining an adequate supply of insect prey while providing the owls with perches from which to forage and a substrate for large nesting cavities. Patches of denser trees or multi-storied vegetation within or near the open stands are important for roosting (Morgan 1994). Because of the nature of their food base, flammulated owls migrate south in winter.

Flammulated owls are unevenly distributed, a function of the spotty dispersion of suitable habitat and numbers now substantially lower than under historic conditions. Primary threats to flammulated owls are habitat loss to logging and human settlement and the transformation of open-grown ponderosa pine stands into dense interior forest as a result of fire prevention (Morgan 1994). The scarcity of large open-grown ponderosa pine and Douglas-fir at mid-low elevation limits habitat opportunities throughout the Divide landscape and as a result, the owls sometimes take advantage of less-traditional habitat formations: aspen stands or small patches of open-grown ponderosa pine adjacent to dense stands of Douglas-fir, for example.

Management strategy involves maintaining open-grown old-growth ponderosa pine and Douglas-fir forest at low and middle elevation with lightly grazed grasses and shrubs in the understory. The stands should contain a number of large snags with cavities similar to those that will support pileated woodpeckers and northern flickers (Bull *et al.* 1990). These conditions will not evolve naturally in the short-term and management needs to eliminate dense second-growth within these stands and burn away needle accumulations so that native grasses and shrubs can flourish and provide an environment for large insect prey (Morgan 1994). Retention of large trees, spaced fairly widely, should provide adequate perching and nesting sites for owls. Inclusions of denser tree growth is important for providing roosting habitat.

Influence of Roads

Flammulated owls are very tolerant of humans (McCallum 1994). Open roads appear to exert little direct influence on the owls and on their selection and use of habitat. As with most cavity dependent species, effects are indirect: Removal of large cavity-prone snags by firewood cutters and of roadside hazard trees by the Helena NF may reduce potential nesting opportunities. For flammulated owls, this is a concern in stands of certain composition and structure, namely, more open-grown forest environments with large trees at lower and mid elevations.

Area Use

The flammulated owl is classified as a sensitive species in Region 1 because of population viability concerns, some of which stem from obvious habitat problems and some of which are a function of insufficient field information. Information about population patterns is beginning to accumulate, primarily from research on the Bitterroot and Lolo National Forests, but also from recent wide-ranging survey work throughout Region 1 National Forests [see Climburg 2006; Smucker and Climburg 2008]. Because of their diminutive size, reclusive daytime habits and low population densities, flammulated owls are seldom seen and can normally be detected only through specialized survey methods. These efforts suggest that, in most areas, populations are small and fragmented (primarily because of the scarcity of suitable habitat).

Regionwide survey efforts, 2005 to 2008, have found that the Helena NF supports the highest flammulated owl densities of the five National Forests located east of or astride the Continental Divide, with overall densities more characteristic of the Westside Forests (Lolo, Bitterroot, Nez Perce, Kootenai) (Climburg 2006; Smucker and Climburg 2008). The surveys found, however, that the most robust Helena NF populations were on the Lincoln Ranger District, west of the Divide.

In the Divide landscape, flammulated owls have been found east of the Divide along the Mount Helena ridge and near Unionville in relatively dry, mid elevation environments (4,900 to 5,100 feet) with a mix of ponderosa pine, Douglas-fir and aspen, regularly interspersed with grassland. Both of these sites are outside the Divide Travel Plan Area. Within the Plan Area, flammulated owls have been located at Priest Pass atop the Continental Divide. This site is at higher elevation (close to 6,000 feet) than the Mount Helena and Unionville sites and is dominated by large Douglas-fir. Ponderosa pine, lodgepole pine and aspen are present but less common.

The current mountain pine beetle outbreak presents habitat opportunities for flammulated owls wherever it creates large ponderosa pine snags in open forest stands away from roads. The snags provide new cavity nesting substrate and the selective loss of live overstory trees may open up forest canopies in a manner that makes them more conducive for occupancy by the owls, allowing development of more vigorous ground vegetation and opening up understory flyways. Meanwhile, nearby Douglas-fir stands remain intact as a source of roosting habitat.

Management Indicator Species

Management indicator species (MIS) are intended to gauge the effects of Forest management practices on representative wildlife habitats. Indicator species have been designated to represent species groups whose habitats are most likely to be changed or affected by Forest management. In addition to those discussed in detail below, pileated woodpecker, hairy woodpecker, goshawk, marten, the Forest Plan also designates indicators for threatened and endangered species (grizzly bear, gray wolf, bald eagle, peregrine falcon, species listed at the time of Forest Plan release in 1986) and hunted species (elk, mule deer and bighorn sheep). The status of species in these two groups is summarized in the following section, but they have been addressed in more detail in previous sections on Big Game, Threatened and Endangered Species and Sensitive Species.

Pileated Woodpecker (Old-Growth Dependent Group)

Biological Considerations

Habitat Use and Population Status

The pileated woodpecker (*Dryocopus pileatus*) serves as an indicator of the health and availability of old-growth forests because of its need to nest in large diameter snags that occur most frequently in old-growth stands (Bull and Holthausen 1993). As well, it is often described as a “keystone species” because of the disproportionate effect it has on its environment, in spite of its inevitably low population density. Pileated woodpeckers create numerous large excavations in dead trees that are then used by a variety of secondary cavity dwellers; they enlarge cavities in living trees providing unique habitat for other species; they hasten the decay process in the live trees they excavate and in the logs they break apart while foraging (Bull and Jackson 1995). This “ecosystem engineering” alters the physical structure of the environment in

ways that influence habitat opportunity for other species and general ecosystem processes (Aubry and Raley 2002).

In the Northern Rockies, pileated woodpeckers inhabit mixed conifer stands of various configurations, focusing on western larch and ponderosa pine as the key tree species. They also nest and feed in black cottonwood bottoms when they are available (McClelland and McClelland 1999; Hutto 1995). While pileated woodpeckers are most often found in mature and old forests, they frequently forage in immature forest stands with large residual trees, logs and stumps left by previous disturbance (logging, burning) [see review in Bonar 2001, p. 3]. While the woodpeckers seem to prefer "closed" stands, Bull *et al.* (2007, p. 325-326) found that loss of considerable canopy closure due to high natural tree mortality did not appear to be detrimental to the birds as long as large dead or live trees and logs were abundant.

For nesting and roosting, pileated woodpeckers require large standing dead trees [typically greater than 30 inches diameter-at-breast-height]. The availability of night-time roosting sites, provided most frequently by large hollow trees, has been hypothesized to be even more of a limiting factor than the presence of potential nest sites (Aubry and Raley 2002). Foraging sites are provided by standing trees (dead and alive) and by large logs and stumps, where the woodpeckers feed on a variety of wood-boring insects, preferably carpenter ants (Bull 1987; Bull *et al.* 1997). The pileated woodpecker is powerful enough to excavate deep foraging cavities in undecayed living conifers (Bull and Jackson 1995), which opens up a wider range of feeding possibilities than is immediately available to other local woodpeckers.

Pileated woodpeckers are very mobile and are considered a large-patch-size species. Their home ranges are extensive and require a generous percentage of unlogged or partially logged forest with a reasonable distribution of large trees. The average size of 27 home ranges (sometimes referred to as "territories") in good quality habitat in the Pacific Northwest has been calculated at 1,234 acres (just under two square miles) (Bull and Holthausen 1993; Mellen *et al.* 1992). This translates to relatively low population density even in optimal habitat. Pileated woodpeckers have seldom been studied in more marginal habitats that characterize much of the east slope of the northern Rockies in Montana (including the Divide landscape), but field observation suggests that population densities are appreciably lower in these environments. One study in Alberta in the eastern foothills of the Rockies found a strong correlation between habitat quality and territory/home range size. Pileated woodpeckers had much larger territories where potential foraging substrates and cavity trees were more sparse. The larger territories, however, did not result in reduced fitness, productivity and survival were actually higher than those reported for prime habitat in the Pacific Northwest (Bonar 2001, p. 66).

Influence of Roads

Construction of new Forest roads imposes a direct effect on pileated woodpeckers in that it removes trees from long, narrow corridors of forest habitat (typically 12 to 20 feet wide) that the birds might otherwise put to use. To date, however, research has not documented any instances where habitat alteration in this configuration and on this scale has diluted the ability of an area to support resident pileated woodpeckers.

Most of the meaningful impact of roads is indirect. Large dead trees in the road corridor are consistently lost to firewood cutting or to Forest operations designed to remove hazard trees from along the roads. This represents an inevitable loss of key habitat components within open road corridors that are considerably broader than the roadbed itself (generally, a zone out to 300 feet on each side of the road). This loss affects local pileated woodpecker habitat

opportunity as well as that for numerous other dead tree associated species. In the average Divide landscape road corridor, however, dead trees large enough to serve as nesting or roosting sites for pileated woodpeckers are few and far between. So, even considering a 600 feet wide roadside zone for dead tree removal, it is highly unlikely that the total area involved will be large enough to measurably alter local population viability in eastside forests of the Northern Rockies.

Field research and prodigious observation have revealed that, as with the other woodpeckers reviewed in this report, human presence does little to alter the birds' normal regimen of foraging, excavating cavities, roosting and attending to young in a nest (Hamann *et al.* 1999). Possible exceptions are sites adjacent to open roads that support regular motor traffic and other human activity. While the woodpeckers are unlikely to discontinue foraging in these areas, they may avoid them as nesting and roosting sites. This behavior pattern has not been documented by research and in any event, its significance as a limiting factor for pileated woodpecker populations appears dubious.

Area Use

Pileated woodpecker habitat has been modeled for the Forest based on the USFS Region 1 (R1) protocols identified above in the Methodologies and Assumptions Section. Based on this model, the Divide Travel Plan Area supports approximately 59,264 acres of suitable habitat.

Roughly 147 miles of open road traverse this habitat, providing firewood cutters with opportunities for removing dead trees. If the maximum corridor available to snag removal is delineated at 300 feet on either side of the road, then approximately 10,691 acres (18.0 percent of pileated woodpecker habitat) is vulnerable to snag loss. Actually, this is a substantial over-estimate, since in most cases, steep, irregular terrain and other habitat features make the firewood corridor narrower than 600 feet. As well, few snags in the corridor are large enough (in the 30 inch diameter-at-breast-height range) to provide nesting or roosting sites for pileated woodpeckers; and as a result, only a minimal amount of this component would the lost. Many smaller trees on which the woodpeckers might feed, however, are likely to be removed.

Data on the occurrence of pileated woodpeckers in the Divide landscape has come from systematic surveys by the Northern Region Landbird Program, observations during general wildlife surveys since 1992 and reports from a variety of biologists and forest users. Pileated woodpeckers, while low in numbers, are relatively easy to detect because of their large size, striking color pattern, loud distinctive calls and highly visible and unique tree excavations.

Pileated woodpeckers in the Divide landscape are near the eastern reaches of their geographic range and population densities are low (Hutto and Young 1999, p. 24). Suitable habitat is widely distributed but of lower quality than that found in Forests further west (in the Bitterroot, Lolo and Flathead NFs). Habitats in the Divide landscape are drier; large trees less common; and two key habitat components, western larch and black cottonwood, are not present. The most robust pileated woodpecker populations on the Helena NF occur on the Lincoln RD, where habitat is more akin to that in the west-side Forests. Since the supply of big trees cannot be expanded in the short-term in order to increase habitat opportunity, Helena NF management strategy has been to retain as many large diameter conifers as possible, regardless of the forest configurations in which they occur. This, coupled with management of enough mature forest to provide for the future supply of large trees, should ensure the stability of these woodpecker populations on the landscape, albeit at characteristically low densities.

Northern Goshawk (Old-Growth Dependent Group)

Biological Considerations

Habitat Use and Population Status

The northern goshawk (*Accipiter gentilis*) is the only large diurnal raptor adapted to interior forest environments in the northern Rockies. While some large forest owls (great horned, great gray) occasionally move about and hunt during daylight hours, these birds are primarily nocturnal. Key elements of goshawk habitat are extensive blocks of older forest with tight groups of mature nesting trees, abundant prey (squirrels, hares, larger songbirds, grouse) and mid-level flyways. In the northern Rockies, optimal habitat for goshawks is provided by old-growth Douglas-fir and ponderosa pine forest and for that reason, the goshawk was chosen as a management indicator for those habitats in the Forest Plan (and in those of most other Region 1 Forests). Since the 1980s, copious field research and survey work have shown that goshawks are more versatile in their use of habitat than was believed when the Forest Plans were written. Goshawks have specific requirements for nesting and post-fledging habitat (closed-canopied mature forest) but otherwise have been shown to be forest generalists and not particularly useful as Douglas-fir old-growth indicators (Braun *et al.* 1996; Reynolds *et al.* 1992; Clough 2000; McGrath *et al.* 2003).

Surveys over the past 15 years on the Helena, Beaverhead-Deerlodge, Lewis and Clark and Medicine Bow National Forests have found that goshawks will nest and forage in stands of mature lodgepole pine as long as the basic structural attributes they need are in place and prey is adequate (Lemke 1993; Squires and Ruggiero 1996; Clough 2000). In the more fragmented forest environments east of the Continental Divide where mountains and plains intermingle, goshawks often occupy mosaics of forest and grassland or a mixture of different forest seral stages. They are drawn also to aspen stands because of the robust populations of potential prey these habitats support (grouse, cottontails, snowshoe hares, ground squirrels, mourning doves, flickers, small owls and numerous large songbirds and woodpeckers). They are capable of foraging through open parks and woodlands and along forest edges. In certain circumstances, they do so on a regular basis (Younk and Bechard 1994). But regardless of the structural diversity of foraging habitat and of goshawk ranges in general, nesting and post-fledging habitat inevitably requires solid blocks of mature interior forest.

Extensive survey work over the past 15 years has demonstrated that goshawks are widespread across the Helena Forest. They maintain large home ranges (estimated at 5,820 acres per pair) (Reynolds *et al.* 1992; Clough 2000) and population densities are naturally low, even where suitable habitat is abundant. In areas with high prey populations and optimal habitat structure, home ranges may be smaller or overlap. The optimal size of a goshawk nesting stand is estimated to be about 15 to 30 acres; optimal post-fledging areas (PFAs) are about 620 acres (and contain several potential nest stands). Nest stands and substantial portions of PFAs need to be densely forested with mature trees so as to provide effective nesting sites, suitable microclimate, abundant prey and security from open-forest predators. The rest of the home range consists of foraging habitat and inclusions of unsuitable habitat. Foraging habitat, while predominantly mature forest, often includes a variety of tree densities and age classes and an array of forest openings (Reynolds *et al.* 1992). Goshawks can make use of such environments as long as prey is adequate.

Loss of habitat to clearcut logging and stand-replacing fire are primary threats. Goshawks are sensitive to human disturbance of nest sites and can be very aggressive in defending the nest

and the larger area within which newly fledged young are operating (post-fledging area) [personal observation, Helena and Beaverhead-Deerlodge National Forests 1987 to 2010]. They may occupy the same nest stand in consecutive years but rarely the same nest (although they may return to an old nest two or three years later). Just as often, they move to a new stand elsewhere in the home range. Because of their large home ranges and their natural tendency to cycle among different nest sites between years, they are capable of adapting to many environmental changes (such as fire and timber harvest) by moving to adjacent undisturbed sites.

Influence of Roads

Construction of new Forest road into nest stands and post-fledging areas can make life difficult for resident goshawks by introducing regular human disturbance into sites that the birds feel obligated to defend. As well, it can eliminate key habitat components (nest trees, perch sites, snags and logs used by prey species). Habitual human activity near an active nest may cause goshawks to abandon the site (Reynolds *et al.* 1992). But most often, while not abandoning the nest, goshawks will exert much more energy defending it (and defending the fledglings, once out of the nest) than they would under normal circumstances. This diversion of time and energy can negatively impact their ability to successfully raise and fledge young (Morrison *et al.* 2011). The presence of a road may also eliminate the stand as suitable nesting habitat in the future. Since high-quality nesting habitat is often a primary limiting factor for goshawks, new road systems that push into these areas can erode the overall habitat quality of a goshawk home range. Reopening closed roads or trails to motorized use can have a similar impact.

A recent analysis in the Lake Tahoe Basin of California suggests that goshawks avoid placing nests near roads, based on the intensity of traffic that they experience in a previous year (Morrison *et al.* 2011). Fieldwork on the Helena NF, however, has shown that goshawks will establish nests relatively close (within a few hundred feet) to existing roads (Sweeney Creek, Jimtown, Kelly Gulch, Cottonwood Gulch, Spring Gulch, South Fork Quartz Creek, Elliston Creek, Minnehaha Creek) or trails as long as most human activity predictably remains in the road or trail corridor. While foraging goshawks spend most of their time in mature forest environments, they frequently cross open roads and may use a road corridor as a convenient flyway when the forest presses in closely on either side and traffic is infrequent.

Area Use

In spite of the fact that goshawks maintain naturally low population densities (active nests on the Helena NF are typically two to three miles apart), they are fortuitously observed and reported on a regular basis across the Divide landscape each year. As well, the Helena NF has actively surveyed for goshawks each year since 1995. Because of the rarity of stand replacing fire in recent decades, the Divide Travel Plan Area has been dominated by mature forests that provide widespread opportunities for goshawk occupancy. The most recent Helena NF modeling effort (USFS 2009) estimates approximately 116,695 acres of goshawk foraging habitat and 1,920 acres of optimal nesting habitat in the Planning Area. The character of much of this habitat is changing as large numbers of lodgepole and ponderosa pine trees die and forest canopies open up as a result of ongoing bark beetle infestation. In the short-term, this phenomenon is likely to improve goshawk foraging opportunity, but eventually it will measurably reduce the suitability of numerous nesting stands, as well as foraging habitat.

While survey efforts have not been complete enough to provide precise population estimates in any given year, they do suggest that virtually every potential goshawk home range in the Divide

landscape (5,000 to 6,000 acres of predominantly forested habitat) is occupied sooner or later. At any given time, some ranges will be unoccupied because of the ongoing process of ranges being vacated through natural mortality and the mechanics involved with new birds locating and establishing new home ranges.

Hairy Woodpecker (Snag-Dependent Species Group)

Biological Considerations

Habitat Use

The hairy woodpecker (*Picoides villosus*) is a management indicator for species dependent on snags. Snags provide the essential substrate for excavating cavity nests and the primary food source in the form of wood-boring and bark-dwelling insects. Hairy woodpeckers inhabit a wide spectrum of habitats ranging from open snag fields created by stand replacing fire to interior forests with a smattering of snags and other insect-prone trees (Hutto and Young 1999). Hairy woodpeckers are year-round residents in the northern Rockies and primary cavity nesters. The cavities that they excavate are eventually available to a myriad of other small birds and mammals.

The woodpeckers require dead or decaying trees at least 10 inches in diameter for nesting (Thomas *et al.* 1979), but they may forage on smaller trees. They feed on insects, wood borers, bark beetles, ants and grubs, as well as on fruits, berries and sometimes, seeds. These resources are gleaned from variety of substrates: dead and dying trees, live trees, logs, stumps, the ground, anything with a supply of appropriate insects or other suitable food.

The primary habitat component on which hairy woodpeckers depend is ephemeral, more so than key habitat features required by most non cavity-dependent species. While fire killed trees may remain standing for up to several decades and continue to supply a potential base for nest cavities, their ability to support the insects on which the woodpeckers depend for food deteriorates quickly (typically, within five to eight years). Trees killed by insects or disease may remain upright for only two to three years after becoming suitable for cavity excavation. As the supply of dead trees waxes and wanes in a given area, the hairy woodpecker population follows.

The woodpeckers reach their highest population densities in new burns and in stands beset with disease or insect irruptions (such as the current pine beetle outbreak), responding to the increased food source (Sousa 1997). In these cases, they may be the most common woodpecker present. As the abundance of wood-boring insects in a recently afflicted forested area begins to decline, the population density of hairy woodpeckers also drops and home ranges expand. Covert-Bratland *et al.* (2006) measured a six fold decrease in population density and more than a tenfold increase in home range size between the second and nineth year following a stand replacing fire in Arizona. Hairy woodpeckers are also capable of inhabiting healthy mature forests as long as a few snags or living trees with a ready supply of insects are scattered through the stand. Their population densities in these cases are relatively low, however. Given the range of habitats and food supplies that hairy woodpeckers are capable of exploiting, their population densities and their home range sizes can vary dramatically. Typical home ranges run from around 2.5 miles to more than 37 square miles depending on habitat quality and food abundance.

Influence of Roads

As with the other woodpeckers reviewed in this report, hairy woodpeckers appear to suffer no meaningful effects from the presence of open roads and motor trails in their home ranges. Human presence, motorized or otherwise, does little to alter the birds' normal habitat use patterns (Hamann *et al.* 1999).

Other indirect effects are more substantive: Virtually any accessible solid dead tree (pole-sized and up) in the road corridor (estimated at 300 feet on either side of the road) will inevitably be removed by firewood cutters or, less often, by Helena NF personnel as roadside hazard trees. This represents an unfortunate but predictable loss of potential habitat components within open road corridors for hairy woodpeckers and other dead tree dependent species for which they serve as an indicator. Because hairy woodpeckers are mobile and range widely, loss of key components within road corridors may amount to little. The relative significance of the loss depends on the availability of snags in areas outside the road corridor. In current circumstances, the proliferation of beetle-killed pine trees across the landscape renders snag loss in the road corridor inconsequential.

Area Use

Hairy woodpeckers can be found with regularity in any forest habitat with a modicum of dead trees for nesting and enough insect-prone trees to provide feeding substrate (Hutto and Young 1999, p. 22). In the Divide landscape, hairy woodpeckers have been observed at similar frequencies in mature lodgepole pine, spruce/subalpine fir, Douglas-fir, ponderosa pine, mixed conifer and aspen stands; in young forest and cutting units (including clearcuts) with residual snags and older trees; and in wetland and riparian shrub associations. They are very common in the MacDonald Pass burn, the only recently created post-fire environment of any size in the Divide landscape.

Hairy woodpecker habitat has been modeled for the Helena NF based on the USFS Region 1 protocols identified above under *Methodologies and Assumptions*. The model employs a narrow definition of suitable hairy woodpecker habitat, focusing on certain densities of dead trees as would occur in older forest stands. Post-fire habitats, which would normally supply the best hairy woodpecker habitat, have been extremely rare in the Divide landscape in recent decades. So, the model falls back on older mature stands and old-growth stands as the next best habitat. But this habitat is also limited in the Divide landscape, because of intense timber harvest and large fires in the late 19th and early 20th centuries. The upshot is that the Region 1 model identifies only 16,050 acres of habitat in the Divide Travel Plan Area. Given the wide distribution of hairy woodpeckers across the Divide landscape, the 16,050 acres identified as suitable habitat by the Region 1 model has to be considered a minimal estimate of optimal nesting habitat. The woodpeckers actually occur in forest habitats exceeding 100,000 acres in this landscape.

We have no population density estimates for hairy woodpeckers in the Divide Travel Plan Area. But, extensive wildlife surveys by Helena NF biologists and numerous point-count surveys by the Northern Region Landbird Survey Program over the past 15 years indicate that the hairy woodpecker is common in the Divide landscape and on the Helena NF as a whole. It is a rare session in the field that does not produce hairy woodpecker observations. The Birds and Burns study (2002 to 2006) in the northern Elkhorn Range just east of the Divide landscape found that in healthy mature ponderosa pine dominated stands, the hairy woodpecker was the 17th most common of 44 bird species detected on regular point-count surveys (Russell and Saab 2004,

2005). The study also intensively investigated nesting patterns and productivity of cavity dependent birds and found that when conifer snags were uncommon in healthy forests, hairy woodpeckers, along with most other primary cavity nesters, found nesting opportunities in scattered aspen stands (Saab *et al.* 2007).

With the ongoing proliferation of beetle-killed pine trees over several hundred thousand acres across the Helena NF, nesting and foraging opportunities for hairy woodpeckers and other cavity dependent species are now increasing dramatically and their populations can be expected to do likewise over the next few years.

American Marten (Mature Forest Dependent Species Group)

Biological Requirements

Habitat Use

While the Helena Forest Plan uses the American marten (*Martes americana*) as an indicator for the integrity of large blocks of mature forest cover in general, marten appear to be dependent primarily on a certain kind of mature forest, namely that with a relative abundance of large woody debris and an adequate distribution of standing snags. While marten will travel through forest habitats with "clean" understories, they need logs, stumps and snags for resting, denning, protection from the elements and as habitat for prey. This is particularly important in winter, when marten live in a subnivean (under-snow) environment where woody debris provide needed structure and shelter (Thompson and Colgan 1994; Coffin *et al.* 2002, p. 7, 13-14). The upshot is that research now indicates marten are not an accurate management indicator for all mature forests.

Stumps and logs provide critical habitat structure for foraging, resting and denning (Spencer 1987; Coffin 1994) and marten dependence on mature forests in the Rockies seems to be linked to the availability of coarse woody debris that provides resting sites and thermal cover (Buskirk *et al.* 1989). Chapin *et al.* (1997) found that vertical and horizontal structure of forest stands was more important than age or species composition.

Marten population densities and trends are notoriously difficult to evaluate; long-term data sets are rare and populations often fluctuate dramatically over short periods of time, in large part because of variable trapping pressure. Where reasonably accurate data have been obtained, population densities have been very low compared to most other mammals, generally in the range of 0.4 to 2.4 marten per square kilometer (Buskirk and Ruggiero 1994, p. 14-15). Marten home ranges are large by mammalian standards, although they tend to be smaller in areas of high prey density (Buskirk and Ruggiero 1994, p. 27) and larger in areas of fragmented habitat (Coffin *et al.* 2002, p. 6). Recent studies in southwest Montana have calculated winter-spring home ranges of marten between 2.5 and 66.1 square kilometer, with female home ranges substantially smaller than those of males (Coffin *et al.* 2002, p. 6). Large home ranges, in this case, are a correlate of naturally low population densities (Buskirk and Ruggiero 1994, p. 15, 28).

Fragmentation of coniferous cover by logging has reduced habitat suitability. Marten appear sensitive to patch size and usually avoid clearcuts because these areas don't provide functional subnivean zones or offer protection from predators, although they will cross (as quickly as possible) open areas up to 91 meters wide. Thompson (1994) concluded that higher marten densities in unlogged forests might be due to lower predation rates.

Influence of Roads

Marten do not like to cross broad open areas and when they do, they move very quickly (C. Fager, personal communication 1991). However, they show little reluctance to cross Forest roads, groomed snowmobile trails, or paved highways (Coffin *et al.* 2002, p. 7). As with wolverines and fishers, marten are not averse to crossing roads and motor trails or using them as travel routes in winter as long as they are associated with a reasonable degree of mature forest cover. Overall, research has revealed no obvious relationship, positive or negative, between marten habitat use and open road density. High-traffic roads that run through mature forests with abundant deadfall may reduce the attractiveness of otherwise suitable sites for birthing and raising young but probably do not prohibit their use as hunting and resting areas.

As is the case with lynx, wolverines and fishers, one of the primary threats that open roads pose to marten comes from their role as snowmobile routes used by trappers in winter. Marten are the most common target of trappers (Buskirk and Ruggiero 1994). Trapping intensity waxes and wanes with the trajectory of fur prices and trapping mortality is periodically a more important determinant of marten population density than is habitat availability. Trapping can be a significant source of mortality where snowmobile routes pass through riparian bottoms, old-growth stands and other complex forested habitats (Buskirk and Ruggiero 1994).

Snag removal by firewood cutters working the road corridors represents a loss of habitat components important to marten. The abundance of standing and downed dead trees is one of the key factors allowing marten to occupy a forest stand.

Area Use

Marten are found throughout the Divide landscape wherever suitable habitat occurs, primarily in mid-high elevation forests with a strong component of subalpine fir, Engelmann spruce and lodgepole pine with pockets of coarse woody debris. Marten are rare in lower elevation ponderosa pine and dry Douglas-fir forests (Buskirk and Ruggiero 1994, p. 22), although these habitats sometimes provide linkage between forests suitable for long-term occupancy.

Marten habitat has been modeled for the Helena Forest based on the Region 1 Protocols (identified above in the *Methodologies and Assumptions* Section). The model identifies some 145,655 acres of potential marten habitat in the Travel Plan Area. In fact, much of this habitat consists of travel/linkage zones and somewhat marginal foraging habitat. Core habitat patches with in appropriate habitat types with sufficient numbers of snags and accumulations of woody debris account for much less of it.

The current pine beetle epidemic is changing potential habitat patterns for marten in the Divide landscape wherever lodgepole pine is a predominant component. On the one hand, the bounty of large snags and logs is highly beneficial to marten. On the other hand, the natural thinning and in some cases, outright loss of the forest canopy as trees fall creates a less favorable environment for them. The proliferation of dead trees in ponderosa pine stands is of much less importance to marten since they seldom inhabit these relatively dry lower elevation forests.

Evidence for the presence of marten throughout the landscape has come from regular winter tracking surveys south of Highway 12 by MFWP, from more recent tracking surveys in the little Blackfoot watershed by Wild Things Unlimited (Gehman 2006 to 2010) and from observations during general wildlife surveys over the last 18 years (HELENA NATIONAL FOREST wildlife observation files). These observations are insufficient to derive population parameters but they give a general picture of marten distribution and habitat use and show that marten population

densities are low throughout much of the landscape. This is probably a function of a number of factors: past trapping; a relative abundance of naturally unsuitable habitat (dry ponderosa pine and Douglas-fir forest, dry grassland); a predominance of mature and pole-sized forest not yet old enough to provide prolific large woody debris (a function of historic fire patterns and past timber harvest); natural and human-induced fragmentation of optimal habitat sites; and inherently low population densities regardless of habitat conditions.

Be that as it may, MFWP, relying on trapping data and snow course surveys, feels that marten population levels are sufficient to allow continued trapping in the Divide landscape (which is split by Trapping District 4, east of the Divide and District 2 on the west side). There are no quotas set for marten in Montana and trapping pressure is usually driven by fur prices. In Lewis-and-Clark and Powell counties, which cover the Divide landscape (along with portions of the Lewis-and-Clark and Beaverhead-Deerlodge NFs), trapping pressure in recent years has been relatively light and few marten have been caught. Since 1996, an average of 5.2 marten per year have been reported trapped in Powell County (range: 0 to 19 animals). None were reported from Lewis and Clark County. MFWP has recorded an average of three trappers taking marten in these areas since 1996 [FWP trapping website].

The Montana Natural Heritage database provides relative estimates of marten distribution based on the number of observations reported in different latilong blocks across the state. For the Divide landscape, the database shows the highest number of observations in the greater Telegraph Creek drainage (15 to 20) and lowest number in the lower Little Blackfoot/ Spotted Dog/ Elliston Creek area (one to seven). The rest of the landscape has produced an average of eight to 14 observations.

Elk, Mule Deer, Bighorn Sheep (Commonly Hunted Species)

The Helena Forest Plan designates elk, mule deer and bighorn sheep as indicators of commonly hunted species populations and by extension, of the habitats available to them on the National Forest. This designation is somewhat problematic for the Helena NF in that population density, structure and distribution of these species are often less a function of available habitat on the National Forest than of State hunting regulations and local hunting pressure. This is equivalent to the situation with the marten, whose populations in some areas may be controlled more by trapping pressure than by habitat availability. An additional factor for bighorn sheep is the proclivity of robust populations in good habitat to succumb to disease carried by domestic sheep. In any case, maintenance of abundant suitable habitat is not enough by itself to govern the population size and composition of hunted species.

Elk and mule deer are present throughout the Travel Plan Area and the surrounding region at population levels well above those needed to maintain viability. Multiple annual field surveys by MFWP attest to the fact that while local numbers fluctuate from year to year, overall populations of these species have been basically stable for several decades. Helena NF and MFWP habitat surveys indicate that the National Forest and surrounding lands are capable of supporting greater numbers of elk and mule deer than are normally present. Current population levels are set primarily by State hunting quotas designed to provide for public recreational hunting and to keep numbers low enough to limit game damage on private lands, while maintaining biologically healthy populations. In recent decades, debate about elk and mule deer has had little to do with population viability. It has focused primarily on the size and composition of the population surplus available to hunters and the degree to which agricultural and other private resources need to be protected from local population pulses. This is true in the Divide landscape as well as on the Helena NF as a whole.

Bighorn sheep were extirpated from most of the Helena NF in the late 19th and early 20th centuries by subsistence hunting and disease brought into the country with domestic sheep. Bighorns have been reintroduced to parts of the Forest and adjacent public lands in recent years, in particular, the northern Big Belt range and the central Elkhorn range. Populations have waxed and waned in these areas, largely in response to disease outbreaks. Habitat in both areas appears capable of sustaining viable local populations, as long as some separation between wild and domestic sheep can be maintained. Historic documents and occasional discovery of crumbling skulls in the field attest to the former presence of bighorn sheep in the Divide landscape (apparently more than 100 years ago). With rare (and temporary) exception, no sheep have migrated into this area from adjacent regions (the Elkhorns, the Blackfoot/north Divide) in recent times. Key habitat, while fragmented, is available in several locations across the Divide landscape. In addition, the demise of domestic sheep allotments on this part of the National Forest in recent years has removed a primary limiting factor for bighorn sheep. Nonetheless, MFWP has no plans to artificially re-introduce bighorns to the area and neighboring wild populations (at least at current levels) are not sufficiently robust to push natural migrants in this direction.

ENVIRONMENTAL CONSEQUENCES

This chapter discloses the environmental consequences of going forward with the Proposed Action or any of the four action alternatives in terms of expected effects on the wildlife resource.

Open Route Miles under Different Alternatives

The basic road and trail data summarized in Table 98 and Table 99 underlie much of the ensuing assessment of the relative effects of different alternatives on wildlife. Data is for the 278 mi² Travel Plan Area.

Table 98 - Miles of Road and Trail open to Wheeled Vehicles

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
HNF Roads Open Yearlong	286	284	262	265	159
HNF Roads Open Seasonally	31	27	10	16	3
County roads within HNF Boundaries	19	19	19	19	19
Private Roads within HNF Boundaries	75	75	75	75	75
U.S. Highway 12 within HNF Boundaries	4	4	4	4	4
HNF Authorized Motor Trails	19	26	0	4	64
Non-System Motor Trails/ 4wd Tracks	16	10	9	10	0
Total Open Roads	415	409	370	379	260
Total Open Motor Trails	35	36	9	14	64
Total Open Motor Routes	450	445	379	393	324

Table 99 - Miles of Over-Snow Routes

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
HNF Roads *Specifically Designated* for Snowmobile Use by the Travel Plan	69	139	164	153	170
HNF Motor Trails *Specifically Designated* for snowmobile Use in the Travel Plan	12	1	0	0	14
Other HNF and County roads on which Snowmobiles are *Allowed* by the Travel Plan	239	223	218	217	214
User-made Routes on which Snowmobiles are *Allowed*	21	15	14	15	5
Total Snowmobile Routes that are Regularly Used and Approved under the Travel Plan	341	378	396	385	403
Regularly-Used Snowmobile Routes on (or adjacent to) Roads that the Travel Plan identifies as "Closed to Motorized Vehicles Yearlong"	77	16	20	19	0
Grand Total of Roads and Trails that Regularly Serve as Snowmobile Routes	418	394	416	404	403

It should be noted that some of the mileages shown in Table 98 vary slightly from those presented in Chapter 2 of the *EIS.* In particular, "Non-System Motor Trails/four-wheel-drive Tracks" in alternative 1 have either been eliminated or converted to designated Helena NF System routes in alternatives 2, 3, 4 and 5. In Table 98, the converted routes have been added to the appropriate System categories. In the *EIS,* however, these routes continue to be shown as "non-system" roads and trails in all five alternatives (so as to facilitate tracking their fate).

In Table 99, mileages in the first row, "Helena NF Roads Specifically Designated for snowmobile Use by the Travel Plan", are identical to those in Chapter 2 of the *EIS.* The remaining categories, however, were tallied specifically for this analysis (particularly for the Lynx analysis), using the map of Snowmobile Routes on the Helena National Forest (Helena Snow Drifters 2003), the Helena National Forest Visitor Map, USGS quad maps, information in the Helena NF recreation files and field observations by Helena NF recreation personnel and members of the Helena Snowdrifters Snowmobile Club.

Mitigation Common to All Alternatives

The following mitigation is common to all alternatives:

- All road closures will have yearlong or seasonal designations that accurately reflect the needs of the local wildlife species upon which the restrictions are based.
- Firewood retrieval will be addressed via the firewood permit process.
- Road closure effectiveness will be monitored annually and local adjustments to closure methods and enforcement made as necessary to protect wildlife resources.
- Effects of the 300-feet off-road camping rule will be monitored in areas where key habitat components for wildlife are at issue and local restrictions will be applied in the future if needed.

General Habitat

General Habitat: Common Effects of Travel Management

Disturbance

Roads can lead to concentrations of human activity in wildlife habitat and affect the way animals use an area. Human activities impact wildlife and wildlife habitat through four primary means: exploitation (mortality), disturbance (displacement), habitat modification and pollution (via chemicals or sediment). Wildlife behavior takes the form of avoidance, habituation, or attraction (Knight and Cole 1995). Some animals avoid roads and the risks associated with them and as a result, have less habitat to work with across the landscape. Species attracted to roads or habituated to them have a more extensive array of habitat choices open to them but may suffer higher rates of human-caused mortality as a consequence.

Human disturbances associated with roads and trails vary in intensity, duration and reach and thus produce different reactions among wildlife species. Motorized activities such as ATV travel and snowmobiling are of short-duration, high-intensity and large geographic scope (50 miles or more per day). Non-motorized activities such as hiking, horseback riding, mountain biking and cross-country skiing generally are of longer duration at any given site but of low-intensity and small to moderate geographic scope (five to 20 miles per day). The range of wildlife response to these variable levels of disturbance varies among species and sometimes among individuals within species. Motorized and non-motorized human presence may cause wildlife species to abandon nests or dens, change movement patterns and alter foraging behaviors (Knight and Cole 1995). While some species are quite tolerant of humans, a majority react negatively to one degree or another.

Since 1986, the Helena National Forest has closed many miles of roads to motorized use (see Affected Environment for Recreation). However, the remaining open roads still present impacts to wildlife species sensitive to the disturbance associated with human activity. Road density standards have been developed through research and are recommended for many species. These analyses are used where appropriate and are discussed below under the respective species. In many cases the traffic levels along Forest roads are consistently minimal, in other cases substantial and in others periodic (sparse during the week, higher on weekends; low in summer, high in hunting season). As a result, most analyses use weighted road densities to account for varying levels of public use. Typically, primary arterial and collector roads are given the most weight, local and primitive roads less and closed and private roads very little, if any. This approach emphasizes the fact that the primary influence of most Forest roads on wildlife stems not so much from their physical impact on habitat as from the degree to which they funnel human activity into the landscape.

Habitat Loss

Construction of new roads creates a direct loss of habitat. Often, this represents a permanent loss of natural substrate and native vegetation if the road surface is formidable enough (graded gravel roads). Small animals are vulnerable to this local habitat loss, particularly in interior forest environments.

Since none of the Divide Travel Plan alternatives proposes new road construction, direct habitat loss will not be a factor in this case. Different alternatives, however, would close different combinations of road and motor trail, thus allowing for different levels of route surface slowly reverting to more natural habitat formations. This would happen more quickly on primitive dirt roads, particularly those that are eventually reconditioned or recontoured. It would be a much slower process on harder-surfaced Capital Investment roads, some of which may be retained as gated routes for administrative use (fire protection, weed spraying, silvicultural improvements and so on).

Fragmentation

Fragmentation has two components: reduction of total available habitat and apportionment of remaining habitat into smaller, more isolated patches (Meffe and Carroll 1994). Roads generally have less fragmentation effect on species with large home ranges and great mobility (mountain lions, elk, goshawks). Species with small home ranges and limited mobility (deer mice, ground squirrels, muskrats, pocket gophers, toads) generally are more susceptible to the barriers and subsequent fragmentation created by roads (Meffe and Carroll 1994).

As discussed earlier, the main mechanism by which most Forest roads "fragment" habitat in the Divide landscape is by serving as conduits for human activity, as expedited by motor vehicles. Because many species are wary of vehicle corridors, the roads tend to repel regular use by these species, confining the bulk of their activity to non-motorized islands. This is fragmentation of wildlife use more than it is than of habitat and the degree to which it acts on local wildlife populations depends upon the level of vehicle traffic on various roads at different times of year, as well as the sensitivity of the species to it.

For smaller animals of limited mobility, the dirt/gravel roads themselves may serve to alter local habitat use patterns, but they seldom prevent animals from crossing back and forth on a regular basis, though such crossings are sometimes lethal. To one degree or another, habitat opportunities are diminished.

Edge Effects

Linear strips of forest/grassland edge are features of National Forest road corridors that benefit some wildlife species and create problems for others (Forman *et al.* 2003). Road edges increase soil erosion and decrease soil moisture; they are zones where human activity is more likely; and they allow for elevated levels of noise, evapotranspiration, temperature, incident solar radiation and exotic species introductions, (Trombulak and Frissell 2000; Forman *et al.* 2003). On the other hand, some species benefit from the additional habitat created by road corridors (Forman *et al.* 2003). For example, raptors (kestrels, Swainson's hawks, harriers, rough-legged hawks and so on) sometimes use roadsides more than adjacent habitat because of greater availability of perch sites coupled with better viewing and the presence of roadside prey.

The effects of edge on the adjacent forest depend on how much of the original canopy and understory remains. Edge zones tend to be drier and less shady than interior forests and they often favor shade-intolerant plants (Trombulak and Frissell 2000). As a result, interior forest wildlife species are negatively impacted (Reed *et al*. 1996). Road edge habitat is different from natural edges or those created by clearcuts: non-road edges become less distinct over time while road edges tend to remain relatively sharp over the long-term (Reed *et al.* 1996) [Figure 15, Figure 16 and Figure 52].

Since edge effects occur, to one degree or another, along all road corridors, regardless of whether the roads are open or closed, the affected area is more or less the same for all five alternatives: about 785 miles of open and closed road and motor trail in the Divide landscape as a whole. This is a very rough index of potential effects, since some roads exhibit little contrasting edge, such as narrow, closed-in forested roads [Figure 13, Figure 47, Figure 48, Figure 59] or those passing through grassland [Figure 14, Figure 40, Figure 42, Figure 43]. Also, some effectively closed forest roads that receive no motorized use would gradually lose edge contrast as conifers colonize the roadbeds. While some of the wider motor trails may also generate edge effects, trail mileage is not included in the above summary.

General Habitat: Comparison of Alternatives

Effects of Alternative 1 (Existing Condition)

Direct Effects

There are no direct effects on forested habitat or old growth habitat since no new road or trail construction is a part of this alternative.

Indirect Effects

Indirect effects on general forested habitat and old growth would continue to be generated by human activity along 450 miles of existing open roads and motor trails. This activity will wax and wane periodically due to factors unrelated to travel planning.

Effects of Alternative 2

Direct Effects

Alternative 2 would generate no new direct effects on grassland or forest habitat (including old-growth) since no new road or trail routes would be constructed. This alternative would retain five fewer miles of open road and motor trail than the current system, affording the potential for return of some of these corridors to more natural condition.

Indirect Effects

Indirect effects on forest and grassland habitat would continue to be generated by human activity along 445 miles of open roads and motor trails. Disturbance levels would decrease in some areas and increase in others. Motorized activity will vary in time and place due to factors unrelated to travel planning. Changes in motorized disturbance from the existing condition would be insufficient to generate measurable differences in survivorship and viability of wildlife populations. However, differences in local disturbance levels would be noticeable at several sites in the form of shifts in wildlife behavior and local habitat use patterns.

Effects of Alternative 3

Direct Effects

Alternative 3 would not add to direct effects on forest or grassland habitat since no new roads or trails are proposed. This alternative retains 71 fewer miles of open road and motor trail than the current system, affording the opportunity for some of these corridors to return to more natural condition.

Indirect Effects

Indirect effects on forest and grassland habitat generated by human activity would continue along 379 miles of existing roads. Redistribution of motorized disturbance to new areas would be minimal under alternative 3. Decrease in motorized disturbance from the existing condition, though substantial, would be insufficient to generate measurable improvement in survivorship and viability of wildlife populations. However, decrease in local disturbance levels would be noticeable at several sites as shifts in wildlife behavior and local habitat use patterns.

Effects of Alternative 4

Direct Effects

Alternative 4 would not add to direct effects on forest or grassland habitat since no new road or trail routes would be constructed. This alternative retains 57 fewer miles of open road and

motor trail than the current system but 13 miles more than alternative 3. Still, this affords the opportunity for several route corridors to return to more natural condition.

Indirect Effects

Indirect effects on forest and grassland habitat would continue to come from human activity along 393 miles of existing roads. Redistribution of motorized disturbance to new areas would be less than under alternatives 1 and 2, but somewhat greater than alternative 3. Decrease in motorized disturbance from the existing condition, though substantial, would be insufficient to generate measurable improvement in survivorship and viability of wildlife populations. However, decrease in local disturbance levels would be noticeable at several sites as shifts in wildlife behavior and local habitat use patterns.

Effects of Alternative 5

Direct Effects

Alternative 5 would not add to direct effects on forest or grassland habitat since no new road or trail routes would be constructed. This alternative retains 126 fewer miles of open road and motor trail than the current system, affording the widest opportunity of any alternative for some of these corridors to return to more natural condition.

Indirect Effects

Indirect effects on forest and grassland habitat generated by human activity would continue along 324 miles of existing roads. Redistribution of motorized disturbance to new areas would be minimal under alternative 5. Decrease in motorized disturbance from the existing condition, though the most substantial of any altarnative, would be insufficient to generate measurable improvement in survivorship and viability of wildlife populations. Decrease in local disturbance levels would be noticeable at many sites in terms of shifts in wildlife behavior and local habitat use patterns.

Cumulative Effects

This summary of cumulative effects is based on the detailed matrix in *appendix B*, which identifies past, present and reasonably foreseeable projects and activities, in addition to proposed Travel Management, that may affect general forest, old-growth and grassland habitat. The scope of the analysis includes the Divide landscape (Helena NF land with non-Forest inholdings) and immediately surrounding lands (private, State, County, Municipal and BLM).

Forest Service Past and Ongoing Activities

Several past and ongoing activities on the National Forest add to the direct effect of the road system on forest and grassland habitats. These include activities that remove or alter wildlife habitat such as timber sales, prescribed burning, harvest of dead trees, small mining operations, noxious weed spraying and cattle grazing. A number of projects designed to deal with the bark beetle outbreak are underway, some already completed. These include the Cromwell Dixon campground, Park Lake campground, Kading campground, Moose Creek picnic area, MacDonald Pass Ski Trails and Forestwide roadside hazard tree removal projects. Also nearing completion is the Clancy-Unionville vegetation project, an extensive operation originally designed to thin mature green forest, but now primarily a dead-tree harvest. In addition, the MacDonald Pass carbaryl spraying project is designed to fend off additional beetle kill at

developed recreation sites. Road access to upper Tenmile Creek is currently blocked by an Environmental Protection Agency (EPA) operation to deal with toxic mine wastes.

Adjacent Private and Other, Past and Ongoing Actions

Vegetation management on private lands, particularly ongoing harvest of beetle-killed trees, increases fragmentation and edge effects and may result in habitat loss for some species. Large projects include expansion of developed recreation facilities (Great Divide ski area), expansion of mining operations (Montana Tunnels), roadside tree cutting along Highway 12 and reconstructing the Marysville Road.

Forest Service Reasonably Foreseeable Actions

Reasonably foreseeable activities that may directly affect forest and grassland habitat include revision of management plans for several grazing allotments, more projects designed to deal with the aftermath of the mountain pine beetle epidemic; timber harvest projects (the Telegraph, Red Mountain Flume and Tenmile south Helena vegetation projects); post and pole harvest; ongoing firewood cutting; rerouting of some sections of the Continental Divide trail; and the Rimini Road improvement project. These activities may positively or negatively affect forest or grassland vegetation structure (including fragmentation and edge effect), some substantially, others to a minor degree.

Adjacent Private and Other, Reasonably Foreseeable Actions

Numerous small developments and activities will continue to affect forest and grassland habitats. Development of private land would continue to diminish wildlife habitat, increase edge effects and fragment habitat. Removal of beetle-killed trees will continue to modify habitat adjacent to the Forest.

Summary and Conclusions

All alternatives are in compliance with the Helena Forest Plan and with other appropriate legal mandates with regard to direct and indirect effects of roads and motor trails on forest and grassland habitat.

Disturbance

Alternative 1 would retain potential for motorized disturbance of wildlife along 450 miles of roads and trails. Alternative 2 would decrease motorized disturbance in some areas and increase it in others, but overall would reduce the motor route system to 445 miles. Under Alternative 3, redistribution of motorized disturbance to new areas would be minimal and the system would decrease to 370 miles. Alternative 4 is similar to alternative 3 but with 379 miles of open routes. Alternative 5 is the most distinctive of the action alternatives in that it retains substantially less open road (260 miles) while authorizing appreciably more motor trails (64 miles) than other options. Differences in motorized disturbance among alternatives would be insufficient to generate measurable differences in survivorship and viability of wildlife populations. Differences in wildlife habitat use patterns would be noticeable in local areas: alternatives 1 and 2 would generate the most local disturbance, alternative 5 the least.

Habitat Loss

There would be no new road building and thus, no new habitat loss under any of the five alternatives.

Edge Effects

Because, in the short-term, edge would remain the same along both open and closed roads, there would be no differences in edge effects among the five alternatives. Over the long term, edge will become less distinct along many closed roads as surrounding vegetation moves into the road corridors. Areawide implications for wildlife are minor.

Riparian Habitats

Riparian Habitat: Common Effects of Travel Management

Riparian zones occupy relatively small areas, but they incur a disproportionate amount of human activity (Hutto and Young 1999; Thomas 1979). Roads in riparian zones reduce habitat effectiveness for many wildlife species through vegetation alteration and disturbance associated with human presence (USFS 1996a). Many riparian zones are paralleled by roads, which often host dispersed camping sites near the water. While this may enhance recreation opportunity for camping, angling and wildlife viewing, it decreases habitat effectiveness of the riparian area for many species. Recreation and firewood retrieval are the main activities facilitated by roads in and adjacent to riparian areas.

The Divide Travel Plan Area currently supports about 93 miles of roads and motorized trails within riparian habitat conservation areas (RHCAs), 83 miles of which are open to motorized use. Table 100 summarizes mileage of motorized routes in riparian habitat conservation areas under each of the five alternatives. Total open road miles are shown for comparison. Since in many of these areas recreationists are allowed to drive up to 300 feet off the road to camp, the zone of influence associated with these routes can be substantial.

Table 100 - Miles of Roads and Trails in Riparian Habitat Conservation Areas

Alternative	Miles of Open Motorized Routes in the Travel Plan Area	Miles of Open Motorized Routes in RHCAs	Miles of Closed Motorized Routes in RHCAs
Alternative 1	450	96	29
Alternative 2	445	90	35
Alternative 3	379	74	50
Alternative 4	393	78	48
Alternative 5	324	67	58

Riparian Habitat: Comparison of Alternatives

Effects of Alternative 1

Current direction for off-road use in riparian areas is based on the Off-Highway Vehicle EIS (2001). This allows for motorized travel up to 300 feet off designated routes to reach dispersed campsites. Under Alternative 1, current levels of vegetation alteration and disturbance associated with dispersed camping would continue. The potential for widespread degradation is unlikely because the off-route use is restricted to dispersed camping. Vehicles are not permitted in the off-route corridor for activities other than camping (firewood cutting, picnicking, game retrieval, off-route recreational riding and so on). Periodic displacement of wildlife and localized degradation of habitat components (vegetation, woody debris) would continue at current levels. Impacts may be largely eliminated by suspension of the “300 feet rule” in certain sensitive riparian areas where off-road vehicle is likely to cause environmental damage.

Effects of Alternative 2

Alternative 2 would reduce the reach of open roads and motor trails in Riparian Habitat Conservation Areas by six miles. This would result in a proportional decline in the impacts summarized above in this section and in the previous section under *"Affected Environment".*

Effects of Alternative 3

Alternative 3 would reduce open roads and motor trails in riparian habitat conservation areas by 22 miles, resulting in a consequent decline in the impacts summarized previously.

Effects of Alternative 4

Alternative 4 would reduce open roads and motor trails in riparian habitat conservation areas by 18 miles compared to current conditions, not quite as much as the reduction under Alternative 3. Still, this would measurably reduce local impacts in riparian sites.

Effects of Alternative 5

Alternative 5 would reduce open roads and motor trails in riparian habitat conservation areas by 29 miles, the most of any alternative. About one mile of currently open road in Slate Creek and upper Tenmile Creek would be converted to motor trail. Overall, this would decrease riparian impacts discussed previously.

Riparian Habitat: Cumulative Effects

This summary of cumulative effects is based on the detailed matrix in *appendix B*, which identifies past, present and reasonably foreseeable projects and other activities, in addition to proposed travel management, that may affect riparian habitats. The scope of the analysis includes the Divide landscape (Helena NF land with non-Forest inholdings) and immediately surrounding lands.

Forest Service Past and Ongoing Activities

Several recent and ongoing activities on the National Forest have implications for riparian habitat, some positive. These include revision of grazing allotment permits that incorporate riparian fencing and other means of limiting cattle access to productive wet habitats (MacDonald Pass, Empire, Clancy); mine reclamation designed to limit seepage of toxic waste into steams and riparian sites (Charter Oak, Frohner, Rimini); implementation of the Helena NF Weed EIS, which will improve the functioning of vegetation associations in some in some riparian sites; relocation of heavily-used recreational trails upslope out of riparian bottoms; and closure of roads that have degraded riparian habitats. Some activities may reduce riparian habitat effectiveness. These include scattered small mining operations (under the 1872 Mining Act), cattle grazing in riparian sites on many allotments and retention of roads in riparian areas that slowly slough sediment into streams. A number of recently completed and ongoing vegetation projects have some potential to increase stream sedimentation and thus affect the quality of the riparian environment, although most potential impacts have been reduced, eliminated, or mitigated via the standard project NEPA process. Projects include the Clancy-Unionville vegetation project; MacDonald Pass CDNST trailhead, Kading campground, Park Lake campground, Moose Creek picnic area, MacDonald Pass Ski Trails and Cromwell Dixon campground hazard tree removal.

Adjacent Private and Other, Past and Ongoing Actions

Private land development continues to impact productive wet sites in some riparian areas. This is occurring near the Forest boundary on both sides of the Divide, as well as on private inholdings within the Forest. Timber harvest on private, State, BLM and Helena City lands may also have implications for wildlife habitat in riparian areas, some positive, some negative. Mining operations near the Forest have compromised the integrity of riparian function in the past and continue to do so in some areas. The recently completed Marysville Road project has influenced, if only marginally, the functioning of a drainage originating on the National Forest, though long-term reduction of sediment is a benefit.

Forest Service Reasonably Foreseeable Actions

Foreseeable activities that may affect riparian habitats to one degree or another include the upgrading of the Rimini Road, which closely parallels Tenmile Creek and reauthorization of grazing in some of the Divide allotments, which inevitably involves riparian area monitoring and improvement of problem sites. Larger vegetation projects likely to influence some riparian areas include the Red Mountain Flume-Chessman Reservoir, Telegraph and Tenmile South Helena projects.

Adjacent Private and Other, Reasonably Foreseeable Actions

Activity on non-Forest land expected to continue and add to the effects of travel management in riparian areas includes: settlement and development of private lands (including road building) that encompass riparian sites; timber harvest and removal of beetle-killed trees in and around riparian areas; continued mining operations that alter stream courses and add to stream sedimentation; continued ATV and other motorized activity in riparian areas on private, BLM and State lands; continued livestock grazing on adjacent private and BLM lands; continued diversion and impoundment of streams flowing off the National Forest for agricultural purposes and in Tenmile Creek, for municipal water supply.

Riparian Habitat: Summary and Conclusions

All five alternatives would comply with Helena Forest Plan direction as to the effects of roads on riparian and wetland wildlife habitat, primarily with regard to summer elk habitat in the Montana Elk-Logging Study (*HFP*, Appendix C).

Alternative 1 would retain 96 miles of open roads and motor trails in riparian habitat conservation areas (RHCAs). Alternative 2 would close roads/ motor trails in some riparian habitat conservation areas and allow new motorized use in others, reducing overall presence to 90 miles. Alternative 3 would not introduce any new motorized use into currently restricted riparian habitat conservation areas and would reduce overall road/ motor trail presence to 74 miles in these habitats. Alternative 4 would close nearly as many roads/ motor trails in riparian habitat conservation areas (78 miles) as Alternative 3, but would sanction ongoing unauthorized use at two sites (Spotted Dog Creek, Bison/ Ontario Creeks), a total distance of about one mile. Alternative 5 would retain the fewest riparian habitat conservation areas roads of any alternative, 67 miles. It would convert about one mile of existing open road in riparian habitat conservation areas to motor trail.

In most cases, direct impact on riparian wildlife habitats from use of these roads and trails would be minor (from erosion and sedimentation). Most effects would be indirect: disturbance

of wildlife in these focal habitats and soil/vegetation damage from off-route riding. These effects would be local and would not be measurable in terms of areawide population viability.

Connectivity and Fragmentation

Connectivity is important because it allows animals to move between habitats to meet daily and lifetime needs (Forman *et al.* 2003). It also allows repopulation of unoccupied areas. Restricted movement results in habitats where some species are absent, others are present in numbers well below carrying capacity and diversity is depressed. This increases the risk of isolation, decreased gene flow and local extinction (Forman *et al.* 2003; Noss *et al.* 1996).

Roads vary widely in their role as agents of fragmentation. Some highways act as true barriers for large numbers of species, substantially altering the way animals are able to move through the landscape [Figure 16, Figure 17]. Many Forest roads, on the other hand, are so nondescript and little used that they exert virtually no influence at all on wildlife movement patterns [Figure 13 to Figure 15, Figure 40, Figure 58].

Roads are not necessarily negative factors and some species are attracted to them (Knight and Kawashima 1993; Knight *et al.* 1995). Ravens are more abundant along roadsides than elsewhere because of food produced by road-kills. Many birds do not perceive roads as any more of a deterrent to normal activity than natural features of the landscape (St. Clair 2003). Lynx cross roads at frequencies that do not differ from random expectations (Ruggiero *et al.* 2000). Deer may be drawn to the forage provided by roadside vegetation, especially in spring. Carnivores, such as wolves, bears, coyotes and bobcats use roads with low levels of human activity as travelways, often at night, but sometimes during the day. This use may be greater in winter when some roads become hard-packed snowmobile routes.

Connectivity: Common Effects of Travel Management

In the following assessment, effects on connectivity are described in terms of the ability of the landscape to provide dispersal, migration and travel opportunities between suitable habitat patches. The focus is on regional dispersal of large and mid-sized mammals through the Continental Divide linkage zone, but the assessment is also applicable to more localized movement zones. We assume that the primary human-generated complication for these landscape functions is the density and dispersion of open roads (and in some cases, motorized trails) and we use this as the basis for two indices to compare alternatives: (1) open road density and (2) large non-motorized habitat patches.

Paved Roads and Highways

Most of the field studies and literature reviews that have found roads to be “barriers” impeding wildlife movement and “fragmenting” habitat have dealt with paved roads and highways that carry a recurrent flow of fast-moving traffic. These roads are hard-surfaced, wide, elevated and often flanked by cleared corridors, fences and other impediments. They can be formidable hostile environments, especially for small mammals, amphibians, reptiles and low-flying birds (Mader 1984; Swihart and Slade 1984). Traffic speed and volume on some of these highways make crossing them a challenge for humans, to say nothing of foxes, bears, rabbits, squirrels, grouse, owls and other animals not entirely aware of the hazard they face. Some larger animals may avoid crossing paved roads and consequently extend and convolute their movement patterns to compensate (Trombulak and Frissell 2000). For some species, the mere presence of a highway acts as a barrier. For others, the width of the road, associated clearing and the presence of roadside barriers (typically fences) may be the deciding factors (Oxley, *et al*. 1974).

The only paved highway in the Travel Plan Area is U.S. Highway 12, a well-traveled four-lane thoroughfare that runs through Helena NF lands for about four miles on its way over MacDonald Pass, an area where numerous wildlife species are killed by vehicles each year [Figure 16]. The Highway also runs close enough to the National Forest for another 15 to 16 miles on both sides of the pass that it influences animals crossing from one part of the National Forest to another over private, State and BLM lands. No Travel Plan alternative proposes any changes that directly or indirectly alter the impact of Highway 12.

Forest Roads

With the exception of the Orofino Gulch Road, the Marysville Road and the lower segment of the Little Blackfoot River Road, all Forest/County roads in or near the Travel Plan Area are unpaved routes that range from regularly graded, well-traveled gravel roads [Figure 17] to rough, narrow four-wheel-drive tracks that may see vehicles pass only two or three times a week [Figure 13, Figure 59]. Most Forest roads fall somewhere in between these extremes Figure 14, Figure 15, Figure 44, Figure 48]. The implications of this type of road system for wildlife have been discussed earlier; but, in essence, most of these routes do not physically impede movement by most animals. Rather, they serve as conduits for human activity that causes some species to avoid the road corridors or to seek out alternate travelways, complicating their ability to move through the landscape in an efficient manner. Crossing these roads can be lethal in that it puts big game animals at risk from hunters in the fall and certain carnivores at risk from general shooting any time of the year. The roads also provide access for trappers on snowmobiles in the winter.

Regularly traveled routes, such as the Sweeney Creek, Rimini and Little Blackfoot River roads, are more formidable barriers to movement than the narrow, lightly traveled roads characteristic of much of the Plan Area. Vehicle speeds may be high enough on sections of these roads that animals are hit and killed [Figure 17]. The summary below in Table 101 shows unweighted densities of open roads and motor trails in the Divide landscape (within Helena NF administrative boundaries). Overall route densities range from 1.55 mi/mi² at present to 1.20 mi/mi² under alternative 5. Because this computation gives equal weight, in terms of human disturbance, to primitive, little-used routes and major Forest thoroughfares, it tends to exaggerate the impact of the travel network. An earlier, but more limited version of this analysis that weighted roads by estimated use level [*Draft Wildlife Background Report,* 2013] produced weighted road densities in the range of 0.71 to 0.84 mi/mi². These estimates were considerably less precise than those shown in Table 101, but they probably more accurately portray the general level of impact perceived by animals attempting to navigate the landscape.

Table 101 - Unweighted Open Route Density

Area	Unweighted Open Route Density (mi/mi²)				
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
North of Highway 12	2.07	1.84	1.71	1.69	1.34
South of Highway 12	1.27	1.34	1.14	1.20	1.13
Total Divide Landscape	1.55	1.52	1.34	1.37	1.20

Alternative 2 would eliminate only five miles of open road and motor trail in the Travel Plan Area [Table 98], resulting in minimal change in road density in the landscape as a whole. Alternatives 3 and 4 would eliminate 57 to 71 miles of road and motor trail and would produce a more appreciable drop in open route density. Alternative 5 would close a net total of 126 miles

of road and trail to motorized use and would produce the most obvious decline in open route density. In general, the decline in open routes would be more substantial in the area north of Highway 12 than in the area to the south.

Table 102 summarizes the occurrence of non-motorized habitat patches larger than 1,500 acres throughout the Travel Plan Area. Unlike elk security areas and grizzly bear core areas, which are buffered from motor routes by unroaded zones of 0.3 and 0.5 miles, the non-motorized patches delineated for connectivity purposes begin at the edge of the road/trail corridor, the corridor being defined as a 300 foot zone on either side of an open road and a 150 foot zone on either side of a motor trail. These habitat blocks provide sanctuaries in which animals wary of road activity should be able to operate with minimal disturbance from humans. All things being equal, fewer, larger patches translate to better habitat integrity and connectivity for these animals. It should be noted that most of these habitat patches abut additional unroaded country in adjacent travel plan areas, ranger districts and blocks of non Forest land and are thus larger than than the acreages shown in Table 102.

Table 102 - Habitat Patches Over 1,500 Acres

Area Identification/Location	Patch Size (acres)				
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Area North of U.S. Highway 12					
Black Mountain West	4,645	12,725	12,725	12,585	13,150
Black Mountain East	2,955				
Upper Deadman Creek	4,985				
Right Hand Jerusha Gulch	1,575	1,575	1,575	1,575	< 1,500
Esmeralda Hill–Clarks Canyon	< 1,500	1,860	1,860	1,860	4,235
Upper Snowshoe–Ophir Creeks	3,725	3,725	3,725	3,725	3,075
Greenhorn Mountain	2,690	2,780	2,780	2,780	7,015
Sweeney–Austin Creeks	4,590	6,355	7,870	7,870	8,605
Priest Pass–Austin Creek	1,585				
Little Porcupine Creek	3,120	3,635	3,635	3,365	5,535
LaSalle–American Gulches	< 1,500	< 1,500	< 1,500	< 1,500	2,060
Area South of U.S. Highway 12					
Lazyman Gulch Roadless	14,405	14,405	14,405	14,405	14,405
Jericho Creek	3,265	3,690	3,690	3,690	13,455
Jericho Mountain Roadless	8,935	8,970	9,050	9,050	
Lee Mountain	2,905	2,905	2,905	2,905	3,140
Red Mountain	3,540	3,540	3,540	3,540	3,695
Spotted Dog–Trout Creeks	3,485	3,485	3,485	3,485	4,455
Upper Elliston Creek–Slate Lake	5,860	8,835	48,900	40,125	8,790
Kading–Hat Creek	4,315				
Spotted Dog Creek South	< 1,500	< 1,500			29,525
Electric Peak Roadless	29,730	24,950			
Treasure Mtn–Ontario Creek		3,550		6,210	4,860
Spotted Dog Creek North	2,985	2,985		2,985	3,095
Negro Mountain North	2,010	< 1,500	1,560	< 1,500	1,560
Totals					

Area Identification/Location	Patch Size (acres)				
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Non-Motorized Patch Acres North of Highway 12	29,870	32,655	34,170	33,760	43,765
Non-Motorized Patch Acres South of Highway 12	81,435	77,315	87,535	86,395	86,980
Total Large Non-Motorized Patch Acres	111,305	109,970	121,705	120,155	130,745

The data in Table 102 are summarized in Table 103 in terms of the number of large unroaded patches, average patch size and percent of the Plan Area occupied by such habitat. North of Highway 12 all four action alternatives enlarge average patch size and reduce the number of patches (compared to now) by lumping unroaded areas between Sweeney and Austin Creeks and in the Black Mountain–Deadman Creek area. As discussed earlier, an array of larger patches (even if unconnected) appears to provide greater habitat opportunity than a collection of numerous small patches connected by narrow corridors.

South of Highway 12, alternative 2 consolidates patches in the Slate Lake–Hat Creek area but splits an unroaded block in Ontario–Bison Creek with a motor trail. Alternative 3, on the other hand, combines three separate unroaded patches in the Slate Lake–Hat Creek–Spotted Dog area and enlarges the Bison Creek–Ontario Creek, Electric Peak block. Alternatives 4 and 5, like alternative 2, splits the Bison-Ontario Creek block and the Hat Creek-Spotted Dog block with motorized routes; but the resulting unroaded blocks are larger than in alternative 2. Overall, alternative 5 provides the most land in large non-motorized patches, increasing such habitat from 63 percent to 74 percent of the Travel Plan Area. Looking at the landscape as a whole, average patch size under all alternatives is larger than indicated here, since several of these habitat blocks connect with other non-motorized areas outside the Plan Area.

Table 103 - Large Non-Motorized Habitat Patches

Area Identification / Location	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Area North of U.S. Hwy 12					
Number of Patches	9	7	7	7	7
Average Patch Size (acres)	3,319	4,465	4,881	4,823	6,252
Percent of North Plan Area in Large Non-Motorized Patches	46%	50%	52%	52%	67%
Area South of U.S. Hwy 12					
Number of Patches	11	10	8	9	10
Average Patch Size (acres)	7,403	7,732	10,942	9,599	8,698
Percent of South Plan Area in Large Non-Motorized Patches	73%	69%	78%	77%	77%
Total Plan Area					
Number of Patches	20	17	15	16	17
Average Patch Size (acres)	5,565	6,469	8,114	7,510	7,691
Total Acreage in Plan Area in Large Non-Motorized Patches	111,305	109,970	121,705	120,155	130,745
Percent of Total Plan Area in Large Non-Motorized Patches	63%	62%	68%	68%	74%

The benefits of establishing and maintaining corridors between suitable habitat patches versus enlarging patches in which various species can survive over time has been analyzed by Falcy and Estades (2007). They conclude that enlarging viable habitat patches is a more productive strategy than trying to maintain corridor connections between smaller patches. Rosenberg *et al.* (1997) reached a similar conclusion. In the case of the Divide landscape, none of the patches are truly isolated from any other (although Highway 12 does present a formidable barrier for some species). So, alternatives that consolidate and enlarge effective living space would be the most beneficial for local wildlife. This pattern of larger unroaded patches would also facilitate movement through the Divide landscape linkage zone. In this regard, Alternative 2 is somewhat more effective than the current condition (alternative 1) and alternatives 3, 4 and 5 are substantially more so.

None of the alternatives would influence the more prominent roads that retard or alter efficient wildlife movement through the Divide landscape. These include U.S. Highway 12, the Rimini road (Powell County Road #495), the Little Blackfoot River road (Forest Road #227), the Mullan Pass–Austin Creek road (Forest Road #1805), the Sweeney Creek–Priest Pass road (Forest Road #335), the Orofino Gulch road (Lewis & Clark County Road #454) and the Grizzly Gulch road (County Road #753).

Connectivity: Comparison of Alternatives

Effects of Alternative 1 (Existing Condition)

Alternative 1 would preserve the existing condition, maintaining 20 non-motorized habitat blocks larger than 1,500 acres in the Travel Plan Area. The nine patches north of U.S. Highway 12 average 3,319 acres in size, the 11 patches south of the highway average 7,403 acres. Patch size south of the highway is influenced by the three inventoried Roadless Areas in that part of the Plan Area. Overall patch size averages 5,565 acres. Roughly 63 percent of Helena NF land is in large non-motorized patches with Alternative 1.

Effects of Alternative 2

Alternative 2 would reduce the number of large non-motorized habitat patches from 20 to 17 by consolidating unroaded areas between Sweeney and Austin Creeks and in the Black Mountain–Deadman Creek area. As a result, average size of these habitat blocks north of Highway 12 would increase from 3,319 acres to 4,465 acres. This would benefit a number of resident wildlife species and would make movement through the linkage zone less problematic. The alternative would consolidate non-motorized patches in the Slate Lake–Hat Creek area but would split a non-motorized habitat block in the Ontario–Bison Creek area with a motor trail (on now-closed Roads #4104-A1 and #4104-A2). The average size of non-motorized blocks south of the highway would increase from 7,403 acres to 7,732 acres. In the Planning Area as a whole, patch size would increase from 5,564 acres to 6,391 acres.

While increasing average patch size, Alternative 2 would slightly reduce the total amount of land in large non-motorized patches compared to the existing condition. In the Slate Lake–Hat Creek area, for example, the proposal combines two non-motorized patches, but at the same time, it shaves the size of the Slate Lake portion by designating a new motorized trail in a currently restricted area. On balance, the improvement in non-motorized patch size would be favorable to wildlife movement through the area, more than making up for the slight overall loss of non-motorized acreage.

Effects of Alternative 3

Alternative 3 would reduce the number of large non-motorized habitat blocks from 20 to 15 by combining unroaded areas north of Highway 12 between Sweeney and Austin Creeks and in the Black Mountain–Deadman Creek area. It is similar to Alternative 2 in this regard, but by eliminating additional motorized routes toward the periphery of the consolidated patches, it would produce larger non-motorized blocks than Alternative 2. Average patch size north of Highway 12 would increase from 3,319 acres to 4,881 acres.

South of Highway 12, Alternative 3 would merge five separate non-motorized patches north of, east of and including the Electric Peak Roadless Area into a single non-motorized habitat block of 48,900 acres. Unlike Alternative 2, it would retain the integrity of the Bison–Ontario Creek habitat area and would eliminate motor travel in the Baldy ridge area. In sum, Alternative 3 would increase acreage in large non-motorized habitat blocks in the Plan Area from 111,305 acres to 121,705 acres. It would increase the average non-motorized patch size from 5,565 acres to 8,114 acres. Key areas that would see improvement in facilitating wildlife movement through the area would be (1) Black Mountain–upper Deadman Creek, (2) Austin Creek–Sweeney Creek–Priest Pass, (3) Bison Creek–Ontario Creek and (3) Slate Lake–Hat Creek–Spotted Dog Creek.

Effects of Alternative 4

Alternative 4 is similar to Alternative 3, but it provides for three more motorized routes in strategic locations, resulting in slightly less acreage in large non-motorized patches (120,155 acres in alternative 4 as opposed to 121,705 acres in Alternative 3) and smaller average patch size (7,510 acres in Alternative 4; 8,114 acres in Alternative 3). The increase in patch size is achieved by consolidation of adjacent areas, thus reducing the total number of large non-motorized habitat patches from the current 20 to 16 (one more than Alternative 3, by virtue of its splitting off the Treasure Mountain and Slate Lake–Hat Creek areas from the central Electric Peak Roadless Area with motorized routes).

Three routes would fragment or reduce the size of non-motorized patches: (1) a motor trail north of Meyers Hill (#136-007), (2) a motor trail following Roads #4104-A1 and #4104-A2 along upper Ontario and Bison Creeks and (3) Road #314 in upper Spotted Dog Creek. Effects would be felt primarily in the Bison-Ontario and upper Spotted Dog areas as a result of motorized intrusion into high-country summer ranges. The Meyers Hill route would be less problematic. Be that as it may, Alternative 4, while somewhat more disruptive of local wildlife than Alternative 3, would be a substantial improvement over Alternatives 1 and 2 in this regard.

Effects of Alternative 5

Alternative 5 would provide the most non-motorized habitat of any alternative: 130,745 acres, 74 percent of the Travel Plan Area. This represents an increase of 19,440 acres (or 11 percent) over the existing condition in Alternative 1. The increase is particularly notable in the area north of Highway 12, where substantial increases in non-motorized habitat would occur around Black Mountain–Deadman Creek, Esmeralda Hill–Clarks Canyon, Greenhorn Mountain, Sweeney Creek– Austin Creek and Little Porcupine Creek. In total, large non-motorized habitat patches would increase from 29,870 acres to 43,765 north of the highway (up 47 percent). This is substantially more than any other alternative.

South of Highway 12, increases would be considerably less, seven percent over current conditions. Some non-motorized blocks would decrease in size or would be fragmented into two smaller patches. This follows from the sanctioning of a number of new motor trails

throughout the area. In some cases, the new trails would be converted from existing open roads, but in others, they would be established on currently closed roads, sometimes with newly built connector routes. Those likely to generate the most problems for wildlife are in the area between Negro Mountain and upper Telegraph Creek (the #1857-1859 road system), in upper Ontario Creek (road #4104-A1, as in Alternatives 2 and 4) and particularly, in the Slate Lake area (the #1871 road system), where illegal ORV use has damaged the wet meadow system in the past [see the later section on *"Local Effects in Key Areas"*].

Connectivity: Cumulative Effects

This summary of cumulative effects is based on the matrix in *appendix B*, which identifies all past, present and reasonably foreseeable actions and circumstances, in addition to proposed Travel Management, that may affect connectivity. The scope of the analysis includes the Divide landscape (Helena NF land with non-Forest inholdings), adjacent National Forest lands (on the Lincoln Ranger District and the Beaverhead-Deerlodge NF) and neighboring non-Forest lands (private, State, County, municipal and BLM). This summary is common to all alternatives.

Forest Service Past and Ongoing Activities

Several recent and ongoing activities on the Forest may affect habitat connectivity and the way animals move through the landscape. Actions that have improved connectivity and habitat quality in the Divide linkage zone include: implementation of the Statewide OHV Plan (USFS, USFWS 2001), which prohibits riding off established motor routes; a variety of trail relocation projects that have removed trails from sensitive wildlife areas likely to serve as local movement corridors to upslope locations; mine reclamation projects that have improved the functioning of riparian habitats likely to attract animals moving through a linkage zone; grazing allotment revisions that have generally reduced cattle numbers and improved habitat condition; and road and motor trail closures associated with timber harvest projects (Clancy-Unionville, Sound Wood, Mullan Pass, Lava Mountain, Treasure Mountain).

Activities that have reduced effectiveness of connectivity or had a mixed impact (negative for some species, positive for others) include: timber harvest that has created large clearcuts (Bison Creek, Mike Renig-Hahn Creek, Deadman Creek, Slate Creek, Ophir Creek-Cave Gulch, Lump Gulch, Lava Mountain, Mullan Pass); road permits allowing access across Helena NF land to private holdings; retention of recreational residences on Helena NF land (as at MacDonald Pass); small mining operations (under the 1872 Mining Act); construction and maintenance of power lines and communications sites; Forest road improvement projects that have widened road corridors; and fencing associated with grazing allotments that can impede movement by some animals.

Recently, harvest of snags from the mountain pine beetle outbreak have created "clean" openings in the forest, whereas natural processes eventually would have produced openings full of large woody debris. Most of these projects have been along roads and at developed recreation and administrative sites and so have had little impact on unroaded habitat. Most recently, the Red Mountain Flume-Chessman Reservoir project, on both National Forest and private land, has been removing dead trees from a broad corridor along the flume and around the Reservoir in the upper Tenmile drainage. The project has been mostly completed on private lands, but is ongoing on the Helena NF.

Adjacent Private and Other, Past and Ongoing Actions

Private land development (esp. rural home building) continues to create sites that make it more difficult for animals to move through the landscape. Problems also come from new and upgraded roads, mining operations, ATV-trail bike riding areas, private timber harvest, clearing of vegetative cover from riparian sites and widening and paving of the Marysville road.

Forest Service Reasonably Foreseeable Actions

Reasonably foreseeable activities on Helena NF land that may affect connectivity to one degree or another include improvement of the Rimini Road and projects designed reduce fuel accumulations and salvage dead trees created by the on-going bark beetle outbreak, in particular the Telegraph and Tenmile South Helena projects.

Adjacent Private and Other, Reasonably Foreseeable Actions

Activity on non-Forest land within the cumulative effects area that is expected to continue in the future and that may affect connectivity includes: settlement and associated development of private lands (including road building); timber harvest and removal of beetle-killed dead trees; continued mining operations that usurp habitat and create disturbance zones (most notably, the Montana Tunnels mine expansion); continued ATV and other motorized activity.

Connectivity: Summary and Conclusions

All alternatives would comply with mandates and management direction as to the impacts of roads and motor trails on connectivity and fragmentation. The Helena Forest Plan has no standards or guidelines that deal directly with the issue, although some of those dealing with big game and grizzly bear habitat are relevant.

Alternative 1 would retain current unweighted open route density of 1.55 mi/mi². Acreage of large non-motorized habitat patches would remain unchanged at 111,305 acres (63 percent of all land in the Plan Area). Under Alternative 2, open route density would decline slightly to 1.52 mi/mi². The area occupied by large non-motorized habitat patches would decrease slightly to 109,970 acres (62 percent of all land ownership). Alternative 3 would lower open route density to 1.34 mi/mi² and increase the total of large non-motorized habitat blocks to 121,705 acres (68 percent of lands in the Plan Area). Alternative 4 would allow for a slightly higher open route density than Alternative 3, 1.37 mi/mi², but less than Alternatives 1 and 2. The area covered by large non-motorized blocks would increase over current acreage to 120,155 acres, a bit less than Alternative 3, but more than Alternatives 1 and 2. With Alternative 5, open route density would decrease to 1.20 mi/mi², substantially lower than at present; non-motorized habitat patches would total 130,745 acres (74 percent of the Plan Area), the most of any alternative.

Dirt/gravel Forest roads and motor trails would not physically “fragment” the environment in ways meaningful to most wildlife species [exceptions being some small mammals and amphibians]. Differences between alternatives would arise from the degree to which they provide refuges free from human activity along open roads and motor trails. In this regard, Alternatives 1 and 2 would be similar. Alternatives 3, 4 and 5, on the other hand, would provide a number of new opportunities for wildlife use of non-motorized habitat patches, although each would provide these patches in different patterns.

Snags and Woody Debris

Snags and Woody Debris: Common Effects of Travel Management

Direct Effects

Direct effects of Forest roads on snags and coarse woody debris stem from initial clearing of the road corridor, leading to conversion of suitable habitat to non-habitat for the long-term (Hann *et al.* 1997, Reed *et al.* 1996, Trombulak and Frissell 2000). The same is true for motor trails, though to a lesser degree since most trail corridors are relatively narrow. As none of the Divide Travel Plan alternatives propose any new road or trail construction, no direct effects follow.

Indirect Effects

Indirectly, roads negatively impact snags and logs by providing access for firewood retrieval (Hann *et al.* 1997; Hamann *et al.* 1999; Bate and Wisdom 2002a, 2002b). Traditionally, effects were limited to the distance a person could cut and carry firewood to a vehicle. Now, retrieval is aided by technology, such as cable systems and by increased access through off-road driving (Bate and Wisdom 2002a). Most recently, the ability of firewood cutters to drive further off-road than in the past has been facilitated by the mountain pine beetle outbreak, which has opened up the forest and provided new access routes. Formal studies that quantify the indirect impacts of roads on snags and logs have been lacking until recent studies in Montana and Oregon (Bate and Wisdom 2002a, 2002b; Wisdom and Bate 2008).

Standing Dead Trees

Wisdom and Bate (2008) found that on the Flathead NF in Montana, mean snag density was 40 percent lower in forested areas within 50 meters (164 feet) of an open road compared to areas beyond that distance. This was true of 88 percent of the unharvested forest stands that they sampled. In the zone 50 to 100 meters (164 to 328 feet) from the road, 48 percent of the stands showed signs of snag removal; and in the region beyond 100 meters, 22 percent of the stands were found to have been cut.

Table 104 estimates how much habitat in the Travel Plan Area may be susceptible to roadside snag removal under different alternatives. I have used data from the marten habitat model to estimate potential large snag habitat, since this is a summation of most of the mature forest habitat in the Plan Area (where most of the large snags occur). Estimates of the potential firewood retrieval area are shown for distances of 70, 150 and 300 feet from the road (140, 300 and 600 foot corridors).

Recently, the average number of large dead trees (greater than seven inch diameter-at-breast-height) in these areas has been a fluid quantity because of the increasing numbers of new snags made available by the mountain pine beetle infestation between 2006 and 2012. Snag numbers will be high in mature stands dominated by ponderosa pine and especially, by lodgepole pine (Figure 18, Figure 47, Figure 48) and usually much lower in stands dominated by other conifer species. For snag-associated wildlife, loss of standing dead trees means loss of nesting, roosting and foraging habitat, as well as hiding and thermal cover. [See also the black-backed, pileated and hairy woodpecker analyses and marten analysis below for additional discussion of the effects of snag removal on wildlife].

In aAlternatives 2, 3 and 4, the “300-foot rule” would allow off-road vehicle use for dispersed camping in a 600-foot road corridor. Alternative 5 would reduce the off-road driving distance to 30 feet, with dispersed camping allowed out to 70 feet (a 140-foot off-road corridor). These off-

road driving zones are intended to apply only to dispersed camping, not firewood cutting. It is likely, however, that many firewood gatherers will continue to drive off-road a certain distance to load firewood (as is common practice now). Also, under the 300 foot rule, it would be permissible to cut firewood from an occupied dispersed camp site up to 300 feet off the road. Firewood cutters will be drawn further into the forest in areas where the Roadside Hazard Tree Project has already removed dead trees from the first 50 to 150 feet adjacent to the road. The potential loss of snags to firewood cutting in any given section of road corridor is mediated by topography natural impediments (steep slopes, streams, rock outcrops).

Table 104 - Snag Removal Zones

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
miles of open road in mature forest habitat	294	260	233	235	168
maximum acres in the 140-ft snag removal corridor	4,990	4,410	3,955	3,990	2,850
maximum acres in the 300-ft snag removal corridor	10,650	9,450	8,485	8,545	6,110
maximum acres in the 600-ft snag removal corridor	21,300	18,900	16,970	17,090	12,220
percent of Plan Area mature forest in the 600-ft corridor	12%	11%	10%	10%	7%

Coarse Woody Debris

Effects on logs in the road corridor are a direct result of snag attrition and removal for firewood. Bate and Wisdom (2002b) found that log densities along open roads were significantly lower than those along closed roads. The areas vulnerable to large log attrition are thus the same as those for snags. In general, roadside corridors are likely to have more remaining large logs than snags. Some snags will fall before they are taken for firewood and if not solid, will be left in place by firewood gatherers. This will be the case most often with the more punky ponderosa pine logs than with lodgepole pine. Because of the large volume of dead timber now available and the relatively short time span that beetle-killed trees remain standing, downed trees will be providing an increasing proportion of the roadside firewood resource over the next few years. As with standing snags, steep slopes, rough terrain and otherwise difficult ground will limit the extent of the roadside zone from which logs are taken. On a steep downward slope, for example, 25 to 50 feet may be all the distance most firewood cutters are willing to venture off the road to retrieve a fallen snag.

The loss of logs and other coarse woody debris represents a diminution of foraging, denning, nesting and resting sites, as well as cover and refuge for a variety of wildlife species (Rose *et al*. 2000). Other indirect effects associated with removal of large logs include influence on basic ecosystem processes, soil development and productivity, nutrient immobilization and mineralization and nitrogen fixation (Rose *et al.* 2000).

Snags and Woody Debris: Comparison of Alternatives

Effects of Alternative 1 (Existing Condition)

Direct Effects

There would be no direct effects on snags and coarse woody debris beyond what has occurred during past road and trail construction. No new construction is a part of Alternative 1.

Indirect Effects

Alternative 1 would preserve the existing condition in which roughly 10,650 acres of roadside forest (about six percent of the resource) are open to removal by firewood cutters in the 300-feet road corridor and 21,300 acres (nearly 12 percent of the resource) are open in the 600-feet corridor.

Effects of Alternative 2

Direct Effects

There would be no direct effects on snags and coarse woody debris beyond what has occurred during past road and trail construction. No new construction is a part of Alternative 2.

Indirect Effects

Alternative 2 would reduce the area available to firewood cutting to about 9,450 acres in the 300-feet road corridor and to about 18,900 acres in the 600-feet corridor. This is a reduction of about 2,400 acres vulnerable to snag and log loss in the 600-foot corridor compared to current circumstances.

Effects of Alternative 3

Direct Effects

There would be no direct effects on snags and coarse woody debris beyond what has occurred during past road and trail construction. No new construction is a part of Alternative 3.

Indirect Effects

Alternative 3 would reduce the area available to firewood cutting to about 8,485 acres in the 300-feet road corridor and to about 16,970 acres in the 600-feet corridor. This is a reduction of about 4,330 acres vulnerable to snag and log loss in the 600-foot corridor compared to current circumstances.

Effects of Alternative 4

Direct Effects

There would be no direct effects on snags and coarse woody debris beyond what has occurred during past road and trail construction. No new construction is a part of Alternative 4.

Indirect Effects

Alternative 4 would reduce the area potentially available to firewood cutting from around 10,650 to 8,550 acres in the 300-feet road corridor and from around 21,300 to 17,100 acres in the 600-feet corridor, slightly more available acres than in Alternative 3. This is a reduction of about 4,210 acres vulnerable to snag and log loss in the 600-foot corridor compared to current circumstances.

Effects of Alternative 5

Direct Effects

There would be no direct effects on snags and coarse woody debris beyond what has occurred during past road and trail construction. No new construction is a part of Alternative 4.

Indirect Effects

Alternative 5 would reduce the area potentially available to firewood cutting from around 4,990 acres to 2,850 in the 140-foot road corridor, from around 10,650 to 8,550 acres in the 300-feet corridor and from around 21,300 to 17,100 acres in the 600-feet corridor. The gain in areas beyond the reach of most firewood cutters would be the most of any alternative.

Snags and Woody Debris: Cumulative Effects

This summary of cumulative effects is based on the detailed matrix in *appendix B*, which identifies all past, present and reasonably foreseeable projects and other activities, in addition to proposed Travel Management, that may affect large snags and coarse woody debris habitat. The scope of the analysis includes the Divide landscape (Helena NF land, non-Forest inholdings) and immediately surrounding lands (private, State, County, Municipal and BLM).

Forest Service Past and Ongoing Activities

Activities that have cumulatively reduced snags or the potential for snag creation include a number of past timber sales that have created large clearcuts with minimal residual snags or replacement snags (Bison, Ontario, Upper Telegraph, Mike Renig-Hahn Creek, Slate Creek, Lump Gulch-Strawberry, Ophir Creek-Cave Gulch, Deadman, Cellar Gulch). Some projects (Mike Renig, Upper Telegraph, Hope-Snowshoe) were specifically designed to remove dead, dying and decadent trees. The ongoing Clancy-Unionville project in the upper Lump Gulch and Quartz Creek drainages, originally designed to harvest green trees, is now focused primarily on removing dead trees. Also ongoing is the Red Mountain Flume Chessman Resevoir Project, which is removing snags from 490 acres of beetle-impacted forest in the upper Tenmile Creek drainage. Recent Carbaryl spraying of campgrounds and other administrative sites (Cromwell Dixon campground, MacDonald Pass trailhead) has been intended to prevent large trees from dying in areas of concentrated public use. This enterprise has met with limited success and thus has not been a major factor in suppressing snag creation.

The ongoing policy of allowing public firewood cutting on the National Forest is the primary factor driving the removal of most large snags from Forest road corridors. Ongoing efforts by the Helena NF to limit the potential safety hazard posed by large numbers of dead trees in areas frequented by the public have accelerated the process of snag loss in road corridors and other accessible sites. These actions have also reduced the number of snags available to firewood cutters. Hazard tree removal projects have recently been completed or are going forward at a number of campgrounds (Cromwell Dixon, Moose Creek, Kading, Park Lake), day-use areas (Moose Creek, MacDonald Pass), trailheads (MacDonald Pass CDNST), administrative sites (Moose Creek ranger station, Kading cabin), as well as along the MacDonald Pass Cross-country ski trails and most conspicuously, along many miles of open Forest roads (an on-going operation).

Recent and ongoing activities on the National Forest that have improved prospects for snags are the road closures associated with a number of timber harvest projects (Clancy-Unionville, Sound Wood, Mullan Pass, Treasure Mountain, Lava Mountain), which limit roadside firewood cutting. These projects have all adhered to Forest Plan standards for retaining snags and replacement snags. In some cases, decisions not to pursue potential salvage opportunities (Jericho Mountain, Snowshoe Creek, MacDonald Pass burn) have resulted in retention of large blocks of snags.

Adjacent Private and Other, Past and Ongoing Actions

Numerous dead-tree salvage operations on private land within and adjacent to Forest boundaries are eliminating many of the snags being created by the current bark beetle infestation. As well, private land development is slowly eroding snag presence on many local sites. Many thinning and snag removal projects on private, City and State land have been driven by the desire to reduce the potential for catastrophic fire and in some cases, to remove hazards to public safety.

Forest Service Reasonably Foreseeable Actions

Reasonably foreseeable activities on Helena NF land that may affect snag density and distribution on the National Forest include proposals to deal with the effects of the ongoing bark beetle epidemic: the Telegraph Creek Fuels Reduction and the Tenmile South Helena Projects, both of which would remove snags and coarse woody debris over extensive areas in the southern Divide landscape.

Adjacent Private and Other, Reasonably Foreseeable Actions

Activity on non-Forest land within the cumulative effects area that is expected to continue in the future and that may affect snags includes the continuation of land development, thinning for fire prevention and dead tree salvage.

Snags and Woody Debris: Summary and Conclusions

All alternatives would comply with appropriate snag standards and guidelines in the Helena Forest Plan and with guidance in the Northern Region Snag Management Protocol (USFS 2000) and Estimates of Snag Densities for Eastside Forests in the Northern Region (Bollenbacher *et al.* 2008).

Alternative 1 would retain approximately 294 miles of open road corridor available to firewood cutters in mature forest habitats. Within a 600 foot road corridor, this represents 12 percent of mature forest in the Travel Plan Area. Under Alternative 2, road corridor open to firewood cutters would decline to 260 miles in mature forest. Assuming a 600 foot road corridor, this amounts to 11 percent of mature forest habitat in the Travel Plan Area. Under Alternative 3, open road corridor available to firewood cutting and snag removal would decline to 233 miles in mature forest. With a 600 foot road corridor, this amounts to 10 percent of mature forest habitat in the Travel Plan Area. Alternative 4 is similar to Alternative 3. It would maintain 235 miles of road corridor open to firewood cutting in mature forest. Within a 600 foot road corridor, this also represents 10 percent of mature forest in the Travel Plan Area. Alternative 5 would put the most roadside snag habitat off-limits to firewood cutting, maintaining 168 miles of open road in mature habitat and providing a potential 12,220 acres in the 600 foot road corridor.

Dead trees and increasingly, large logs are prolific on the landscape in the wake of the ongoing bark beetle infestation. Snags in Forest road corridors susceptible to harvest by firewood cutters represent a relatively small proportion of the available resource.

Migratory Landbirds and Shorebirds

Management direction for addressing migratory landbirds and shorebirds in project planning derives from (1) the Forest Service's Landbird Conservation Strategic Plan (2000), (2) Executive Order 13186 (2001) [Fed Reg. Vol 66, No. 11, p. 3853-3856] and (3) a memorandum of

understanding (MOU) between the Forest Service and the U.S. Fish and Wildlife Service (2008). These documents focus on habitat management and its role in protecting and enhancing bird populations. The role of road and trail system management comes into play as it relates to (1) altering, maintaining, or enhancing suitable habitat in the road corridor or (2) funneling human disturbance into sensitive habitat sites.

Migratory Birds: Common Effects of Travel Management

Direct Effects

Direct effects of Forest roads on migratory bird habitat stem from initial clearing and long-term maintenance of the road corridors (generally 12 to 20 feet wide), which results in strips of non-habitat or habitat unsuitable for many species over the long-term (Hann *et al.* 1997, Reed *et al.* 1996, Trombulak and Frissell 2000). These corridors also create edge, an effect most evident in forest and shrub habitats, less so in grasslands [see previous section, *"General Habitat: Common Effects of Travel Management"*]. While some bird species have problems with road corridor habitat and forest edge, others are attracted by these habitat features (Bull and Wales 2001). Similar effects would be generated by motor trails that follow old roadbeds. Those that have been established originally as trails subtract little habitat and create little recognizable edge since in most cases the trail corridors are very narrow and often produce no more recognizable edge than a well-established game trail.

As none of the Divide Travel Plan alternatives propose new road construction, no direct effects beyond those already created by the present road/ trail system would follow in any alternative. Differences between alternatives in terms of the acreage of existing road/road corridor habitat would be negligible in the short-term since this habitat would remain intact whether roads are open or closed. Over the long-term, road corridor habitat and edge would decline under alternatives that close more roads, as obliterated and unmaintained roads would begin to fill with trees and other vegetation.

Indirect Effects

Birds dependent on dead trees are often unable to find suitable habitat in the vicinity of open roads (within 200 to 300 feet) because of ongoing snag loss to firewood cutting and hazard tree removal. An estimate of the acreage potentially affected by these activities under different alternatives can be found in the previous section, *"Snags and Woody Debris"* (Table 104). The overall effect of this snag depletion on local bird populations is relatively small, given the abundance of unaffected habitat away from roads and the proliferation of dead trees across the landscape in the wake of the mountain pine beetle epidemic.

Birds that are sensitive to human activity are unlikely to frequent areas near roads that carry a regular flow of traffic. This is particularly true of nesting raptors and waterfowl, but it applies to some songbirds as well, particularly specialist species. Whereas most generalist songbird species will forage and establish nests near Forest roads and trails, a study in Colorado found that specialist species were less common in a zone within about 250 feet of active trails (Miller *et al.* 1998). A number of other studies have defined considerably wider zones of disturbance around roads; but most of these have been investigating the effects of paved highways, which carry much more traffic than most Forest roads (Hamann *et al.* 1999, p. 3.23-3.24). It is likely that on many roads in theTravel Plan Area, traffic volume is so low that displacement of songbirds and even raptors, is negligible.

It should be noted that the Northern Region Landbird Monitoring Program, which employed Forest roads and trails as transect lines, consistently picked up a wide variety of both specialist and generalist bird species in its surveys on the Helena NF over a 14-year period [see previous discussion in *"Affected Environment: Migratory Songbirds and Landbirds"*].

Migratory Birds: Comparison of Alternatives

Table 105 summarizes potential effects of road management on migratory bird species of concern for each of the five alternatives. Removal of snags from the 300-foot wide corridors flanking each side of open roads is a primary influence for snag users. Species listed as "averse to nesting near open roads" would choose nesting sites in other areas, although in the Divide Travel Plan Area, few of the nesting components used by these species are available in road corridors to begin with. Golden eagles and prairie falcons, for example, generally nest in high cliffs. Great blue herons establish nest colonies in groves of cottonwood trees adjacent to rivers and lakes.

Each of the four action alternatives would decrease the acreage of roadside habitat open to the impacts listed in Table 105. Species that make use of habitats or of habitat components little influenced by the road system are shown as sustaining "no effect", that is, no effect that measurably alters their distribution or habitat use patterns within their home ranges.

Table 105 - Potential Effects of Alternatives on Migratory Birds

Bird Species	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Swainson's Hawk	averse to nesting near open roads	averse to nesting near open roads	averse to nesting near open roads	averse to nesting near open roads	averse to nesting near open roads
Golden Eagle	averse to nesting near open roads	averse to nesting near open roads	averse to nesting near open roads	averse to nesting near open roads	averse to nesting near open roads
Peregrine Falcon	averse to nesting near open roads	averse to nesting near open roads	averse to nesting near open roads	averse to nesting near open roads	averse to nesting near open roads
Northern Goshawk *	Potential for human presence & snag loss in foraging habitat along 4 miles of open road	Potential for human presence & snag loss in foraging habitat along 4 miles of open road	Potential for human presence & snag loss in foraging habitat along 4 miles of open road	Potential for human presence & snag loss in foraging habitat along 4 miles of open road	Potential for human presence & snag loss in foraging habitat along 3 miles of open road
Great Gray Owl	Potential for human presence & potential snag loss in mature forest along 294 miles open road	Potential for human presence & snag loss in mature forest along 260 mi of open road	Potential for human presence & snag loss in mature forest along 233 mi of open road	Potential for human presence & snag loss in mature forest along 235 mi of open road	Potential for human presence & snag loss in mature forest along 168 mi of open road
Boreal Owl	Potential for human presence & snag loss in mature forest along 294 miles of open road	Potential for human presence & snag loss in mature forest along 260 mi of open road	Potential for human presence &l snag loss in mature forest along 233 mi of open road	Potential for human presence & snag loss in mature forest along 235 mi of open road	Potential for human presence & snag loss in mature forest along 168 mi of open road

Bird Species	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Flammulated Owl *	Potential for human presence & snag loss in suitable habitat along 49 miles open road	Potential for human presence & snag loss in suitable habitat along 44 mi of open road	Potential for human presence & snag loss in suitable habitat along 40 mi of open road	Potential for human presence & snag loss in suitable habitat along 40 mi of open road	Potential for human presence & snag loss in suitable habitat along 29 mi of open road
Great Blue Heron	averse to nesting near open roads	averse to nesting near open roads	averse to nesting near open roads	averse to nesting near open roads	averse to nesting near open roads
Lewis's Woodpecker	Potential snag loss in mature forest along 294 mi of open road	Potential snag loss in mature forest along 260 mi of open road	Potential snag loss in mature forest along 233 mi of open road	Potential snag loss in mature forest along 235 mi of open road	Potential snag loss in mature forest along 168 mi of open road
Black-backed Woodpecker *	minimal effect	minimal effect	minimal effect	minimal effect	minimal effect
Willow Flycatcher	no effect	no effect	no effect	no effect	no effect
Olive-sided Flycatcher	Potential snag loss in mature forest along 294 mi of open road	Potential snag loss in mature forest along 260 mi of open road	Potential snag loss in mature forest along 233 mi of open road	Potential snag loss in mature forest along 235 mi of open road	Potential snag loss in mature forest along 168 mi of open road
Clark's Nutcracker	no effect	no effect	no effect	no effect	no effect
Rufous Hummingbird	no effect	no effect	no effect	no effect	no effect
Brown Creeper	Potential snag loss in mature forest along 294 mi of open road	Potential snag loss in mature forest along 260 mi of open road	Potential snag loss in mature forest along 233 mi of open road	Potential snag loss in mature forest along 235 mi of open road	Potential snag loss in mature forest along 168 mi of open road
Veery	no effect	no effect	no effect	no effect	no effect
Green-tailed Towhee	no effect	no effect	no effect	no effect	no effect
Evening Grosbeak	no effect	no effect	no effect	no effect	no effect
Cassin's Finch	no effect	no effect	no effect	no effect	no effect

As indicated in Table 86[*"Affected Environment: Migratory Songbirdes and Landbirds"*], Forest roads have not been determined to be a limiting factor for any of the Species of Concern listed in that table or in Table 105 above. None of the effects generated by any of the Divide Travel Plan alternatives would be substantial enough to limit population potential for any of the migratory bird species considered here.

Effects of Alternative 1 (Existing Condition)

Alternative 1 proposes no new road or trail construction. Consequently, there would be no direct effect on migratory bird habitat beyond that from past road/trail construction. The alternative would maintain 450 miles of existing open road and motor trail with varying degrees of human disturbance and edge effect. It would maintain 294 miles of open road in mature forest habitat capable of producing snags useful to some of the species listed in Table 105.

Assuming a 300 foot wide firewood removal zone on each side of the road, this would amount to 21,300 acres, 12 percent of such habitat in the Travel Plan Area. These effects would not be sufficient to measurably depress populations of any bird species of concern.

Effects of Alternative 2

Alternative 2 would reduce open roads and motor trails slightly to 445 miles, thus subtracting five route miles subject to motorized disruption. It would maintain 260 miles of open road in mature forest capable of producing snags useful to some of the species listed in Table 105. This represents a decline of 34 miles from existing condition. Assuming a 300 foot wide firewood removal zone on each side of the road, this would amount to 18,900 acres, 11 percent of such habitat in the Travel Plan Area. These effects would not be sufficient to measurably increase or decrease populations of any bird species of concern.

Effects of Alternative 3

Alternative 3 would reduce open roads and motor trails to 379 miles, a decline of 61 miles in routes with motorized disturbance. Alternative 3 would maintain 233 miles of open road in mature forest habitat capable of producing snags useful to some of the species listed in Table 105. This is a decline of 71 miles from existing condition. Assuming a 300 foot wide firewood removal zone on each side of the road, this would amount to 16,970 acres, 10 percent of such habitat in the Travel Plan Area. The net effect would not be sufficient to measurably alter population potential of any bird species of concern.

Effects of Alternative 4

Alternative 4 would reduce open roads and motor trails to 393 miles, somewhat more than Alternative 3 but 57 miles less than at present. These closed routes would no longer be subject to motorized disturbance. Alternative 4 would maintain 235 miles of open road in mature forest habitat capable of producing snags useful to some of the species listed in Table 105. This is similar to Alternative 3 and 57 miles less than the existing condition. Assuming a 300 foot wide firewood removal zone on each side of the road, this would amount to 16,970 acres, 10 percent of such habitat in the Travel Plan Area. The net effects would not be sufficient to measurably alter population potential of any bird species of concern.

Effects of Alternative 5

Alternative 5 would reduce open roads and motor trails to 325 miles. This is 126 miles less than at present and represents the largest decine of any alternative in routes no longer susceptible to motorized disturbance. Alternative 5 would maintain 168 miles of open road in mature forest habitat capable of producing snags useful to some of the species listed in Table 105. This represents a substantial decrease, 126 miles, from existing condition. Assuming a 300-foot wide firewood removal zone on each side of the road, this would amount to 16,970 acres, only seven percent of such habitat in the Travel Plan Area. The net effects of these changes would not be large enough to measurably increase population potential of any bird species of concern.

Migratory Birds: Cumulative Effects

This summary of cumulative effects is based on the detailed matrix in *appendix B*, which identifies all past, present and reasonably foreseeable projects and other activities, in addition to proposed Travel Management, that may affect large snags and coarse woody debris habitat. The scope of the analysis includes the Divide landscape (Helena NF land, non-Forest inholdings) and immediately surrounding lands (private, State, County, Municipal and BLM).

Forest Service Past and Ongoing Activities

Activities that have cumulatively altered habitat for migratory birds by reducing snags or shifting the balance between mature and early-seral forest include a number of past timber sales: Bison, Ontario, Upper Telegraph, Mike Renig-Hahn Creek, Slate Creek, Lump Gulch-Strawberry, Ophir Creek-Cave Gulch, Deadman and Cellar Gulch. Some projects (Mike Renig, Upper Telegraph, Hope-Snowshoe) were specifically designed to remove dead, dying and decadent trees. The recently completed Clancy-Unionville project in the upper Lump Gulch and Quartz Creek drainages, originally designed to harvest green trees, ended up focusing primarily on removing dead trees created by the bark beetle outbreak. Prominent among ongoing habitat-alterning projects is the the Red Mountain Flume Chessman Resevoir Project, which is removing snags from 490 acres of beetle-impacted forest in the upper Tenmile Creek drainage. Recent Carbaryl spraying of campgrounds and other administrative sites (Cromwell Dixon campground, MacDonald Pass trailhead) has been intended to prevent large trees from dying in areas of concentrated public use. This enterprise has met with limited success and thus has not been a major factor in suppressing snag creation.

The policy of allowing public firewood cutting on the National Forest is a primary factor driving the removal of most large snags from Forest road corridors. Ongoing efforts by the Helena NF to limit the potential safety hazard posed by large numbers of dead trees in areas frequented by the public have accelerated the process of snag loss in road corridors and other accessible sites. These actions have also transformed forest habitat dominated by mature trees to open early-seral environments. These changes subsantially shift the compositon of local migratory bird associations. Hazard tree removal projects have recently been completed or are going forward at a number of campgrounds (Cromwell Dixon, Moose Creek, Kading, Park Lake), day-use areas (Moose Creek, MacDonald Pass), trailheads (MacDonald Pass CDNST), administrative sites (Moose Creek ranger station, Kading cabin), as well as along the MacDonald Pass Cross-country ski trails and most conspicuously, along many miles of open Forest roads (an on-going operation).

Recent and ongoing activities on the National Forest that have improved prospects for snags and dependent bird species are the road closures associated with a number of timber harvest projects (Clancy-Unionville, Sound Wood, Mullan Pass, Treasure Mountain, Lava Mountain), which limit roadside firewood cutting. These projects have all adhered to Forest Plan standards for retaining snags and replacement snags. In some cases, decisions not to pursue potential salvage opportunities (Jericho Mountain, Snowshoe Creek, MacDonald Pass burn) have resulted in retention of large blocks of snags.

Adjacent Private and Other, Past and Ongoing Actions

Numerous dead-tree salvage operations on private land within and adjacent to Forest boundaries are eliminating many of the snags being created by the current bark beetle infestation and created wide open early-seral habitat with variable conifer regeneration. Local bird communities have shifted accordingly. As well, private land development is slowly eroding snag presence on many local sites. Many thinning and snag removal projects on private, City and State land have been driven by the desire to reduce the potential for catastrophic fire and in some cases, to remove hazards to public safety.

Forest Service Reasonably Foreseeable Actions

Reasonably foreseeable activities on Helena NF land that may affect snag density and distribution on the National Forest include proposals to deal with the effects of the ongoing bark beetle epidemic: the Telegraph Creek Fuels Reduction and the Tenmile South Helena Projects, both of which would remove snags and coarse woody debris over extensive areas in the southern Divide landscape. Harvested areas with relatively "clean" ground-level environments would provide different habitat opportunity for birds than sites left with accummulated coarse woody debris.

Adjacent Private and Other, Reasonably Foreseeable Actions

Activity on non-Forest land within the cumulative effects area that is expected to continue in the future and that may affect snags includes the continuation of land development, thinning for fire prevention and dead tree salvage.

Migratory Birds: Summary and Conclusions

None of the effects generated by project alternatives would be sufficient to measurably depress populations of any migratory bird species of concern.

Alternative 1 would retain approximately 294 miles of open road corridor available to firewood cutters in mature forest habitats, a zone with few habitat components for snag dependent bird species. It would retain 450 miles of open road and motor trail, some of which would unsuitable for nesting birds sensitive to human activity.

Under Alternative 2, road corridor open to firewood cutters would decline to 260 miles in mature forest. It would retain 445 miles of open road and motor trail.

Under Alternative 3, open road corridor available to firewood cutting and snag removal would decline to 233 miles in mature forest. Open road and motor trail would drop to 379miles.

Alternative 4 would maintain 235 miles of road corridor open to firewood cutting in mature forest and would retain 393 miles of open road and motor trail.

Alternative 5 would put the most roadside snag habitat off-limits to firewood cutting, maintaining 168 miles of open road in mature habitat. It would reduce open road and motor tail to 324 miles.

Big Game: Elk

Effects of travel management on elk are discussed in terms of (1) habitat effectiveness (as measured by open road density) on summer range, (2) human disturbance on winter range and (3) elk security during the hunting season. Implications for compliance with current Helena Forest Plan standards are discussed with regard to (1) hiding cover and calving sites on summer range, (2) thermal cover and human disturbance on winter range and (3) open road density/ hiding cover ratios on fall range. Also discussed are compliance with (1) the proposed amendment for determining elk security and (2) recommendations of the Montana Cooperative Elk-Logging Study 1970-1985 (Lyon *et al.* 1985). Results of management are assessed via elk population data furnished by Montana Fish, Wildlife and Parks.

Elk: Common Effects of Travel Management

Big Game Summer Range

Rationale for Management

Energetic demands of elk, growth, development, lactation, are high during the summer as animals are simultaneously recovering from weight lost the previous winter, supporting young of the year through lactation and building fat reserves for the coming winter. Motorized activities impact elk through direct disturbance and potentially, displacement from high-quality habitats, resulting in lowered reproductive performance. As well, new road construction and cross-country ORV use can degrade or eliminate segments of productive summer elk habitat, in particular, local wet habitats (subirrigated meadows, streamside habitat, drainage-head basins), thus reducing habitat potential on summer range (Grover and Thompson 1986; Hamilton 1997; Rowland *et al.* 2003; Ward and Cupal 1979).

Wisdom *et al.* (2004) indicate that off-road recreation, motorized and non-motorized, increases movement rates and flight responses of elk. Elk react more to ATV and mountain bike riding than to horseback and hiking activities (though mule deer may respond more to hikers). Elk energy reserves may deteriorate as a cost of fleeing from off-road activity on a regular basis because of increased movement and displacement from foraging habitat.

Summer Range: Forest Plan Standards

The Helena Forest Plan uses hiding cover as the primary indicator of summer range quality. The rationale is that "[t]he total amount of hiding cover on summer habitat is an important part of the overall elk habitat capability" (USFS 1983]. Big game standard 3 specifies that hiding cover is to be maintained at or above 35 percent (as per the USFS definition) or 50 percent (as per the MFWP definition) of the elk/deer summer range within each elk herd unit or equivalent analysis area (*HFP,* p. II/18). Standard 5 then specifies that in order to be tallied as part of this "*Forest Plan* hiding cover" the cover must occur in blocks of 40 acres or more (*HFP,* p. II/19). In this analysis, we use the MFWP definition of hiding cover (in which greater than or equal to 40 percent canopy closure is used as a surrogate for actual hiding cover as measured on the ground) and we thus aim for greater than or equal to 50 percent canopy closure on elk summer range.

The Divide Travel Plan would have no effect on the status of Forest Plan hiding cover and any ongoing and future changes in hiding cover generated by other factors (most notably, losses due to mountain pine beetle infestation) would be the same for all alternatives [see Table 106 and Table 108 in the following section, "*Comparison of Alternatives"*]. Application of this Forest Plan indicator thus leads to the conclusion that summer habitat quality would be identical under all alternatives, a result that is problematic, given the different road and motor trail configurations in elk summer range under the different alternatives.

Summer Range: Habitat Effectiveness

Because roads have long been known to influence how elk are able to use summer habitat (see Lyon 1979, 1982; Lyon *et al.* 1985), we have employed "habitat effectiveness", which is based on open road density, as an additional means of detecting potential differences in how alternatives impact elk summer range. As it turns out, overall elk habitat effectiveness (HE) for the Travel Plan Area, as measured by weighted open road density from late spring through early fall, is roughly the same among the five alternatives (72 percent to 74 percent). The alternatives vary more, however, in the habitat effectiveness they provide in some individual herd units. All six herd units are well above the minimum 50 percent level recommended for elk summer range (Christensen *et al.* 1993) under each of the five alternatives. The current range of HE values

runs from 65 percent in the Little Prickly Pear–Ophir EHU to 87 percent in the Black Mountain–Brooklyn Bridge EHU [see Table 107].

Calf production and survival in local hunting districts, as indicated by cow/calf ratios are in line with MFWP objectives for this area, 35 to 40 calves/100 cows (MT Elk Management Plan 2004), which is a good indication of suitable habitat effectiveness on summer range. The status of summer range in local elk herd units and hunting districts has been discussed in detail in the "*Affected Environment"* segment of this report. Specific instances of how different alternatives may funnel human activity into or away from elk calving areas are provided toward the end of this report in the section dealing with "*Local Effects in Key Areas"*. That analysis provides information relevant to *HFP* big game standard 4b, which seeks to minimize motorized disturbance in these key habitat areas (*HFP,* p. II/18).

Big Game Security during the Hunting Season

Rationale for Management

In the Divide landscape (as on much of the Helena NF), elk security/vulnerability during the hunting season is a primary determinant of elk abundance and population structure. While the ability of elk to survive the hunting season is influenced by a number of environmental circumstances, the status of the local Forest road system is often the key factor. Several studies have documented the effect of roads on elk security, population structure and hunter success (Edge and Marcum 1991; Leptich and Zager 1991; Unsworth and Kuck 1991; Gratson and Whitman 2000). While most studies demonstrate that open roads influence elk distribution during the hunting season and that road closures can lower the kill rate in a given area, at least one study indicates that in certain circumstances road closures do not alter hunter success (Burbridge and Neff 1976 cited in Gratson and Whitman 2000). In an increasing number of cases, displacement of elk from roaded public land into more remote terrain or to inaccessible private land early in the fall can depress hunter success rate throughout the remainder of the season.

Big Game Security: Current Forest Plan Standard

The current *Helena Forest Plan* (1986) standard for measuring elk vulnerability during the hunting season is based on an index that combines open road density and hiding cover (*HFP,* pp. II/17 – II/18: standard 4a). Hiding cover will change over time, decreasing with losses to fire, insects and disease, commercial timber harvest, thinning and stand aging. It will increase as conifer regeneration fills in forest openings and the understories of mature stands. However, in this case, hiding cover changes will be the same for all five Travel Plan alternatives. Thus, the variable that separates alternatives is open road density. [See *"Affected Environment* for *Elk"* for a discussion as to how the Helena NF determines compliance with the standard]. Table 108 shows that only three of the six Divide EHUs comply with standard 4a under all five alternatives. A fourth EHU (Little Prickly Pear–Ophir) comes into compliance with Alternative 5. Although open road density declines under all action alternatives, sometimes substantially, the only change in status that the standard recognizes is the shift in the Little Prickly Pear–Ophir EHU in Alternative 5. Likewise, the standard provides no indication as to how much elk may benefit from declining open road densities in the three EHUs that are in compliance.

Big Game Security: Amended Forest Plan Standard

The Helena NF is proposing to replace the current *Forest Plan* big game security index (standard 4a) with a new standard that is less dependent on "open road density" *per se* than it is on the *pattern* of open roads and motor trails on the landscape [see the previous discussion in

"Affected Environment"]. While recognizing that cover can be an important component of security, the new standard does not require a specific percentage of hiding cover relative to open road density. This approach is based in large part on "*U.S. Forest Service and Montana Department of Fish, Wildlife and Parks Collaborative Overview and Recommendations for Elk Habitat Management on the Custer, Gallatin, Helena and Lewis and Clark National Forests"* [FS/MFWP Big Game Working Group (USFS and MFWP 2013)] and is detailed in the *Forest Plan Programmatic Amendment for Big Game Security for the Divide Travel Plan.* Application of this "elk security" approach to the Divide Travel Plan and to future projects in the Travel Plan Area is summarized as follows:

Definitions.

Elk security is a measure of the degree to which habitat conditions (both natural and human-generated) enable elk to survive the hunting season. On the Helena NF, this is considered to be primarily a function of hunter access and in particular, motorized hunter access. Elk security is expressed as the percentage of hunting season home range within Helena NF administrative boundaries occupied by effective elk security areas.

Elk security areas capable of holding elk through the hunting season are defined in terms of parameters developed by Hillis *et al.* (1991) modified for "eastside" environments: security areas are non-linear, predominantly forested blocks of habitat at least 1,000 acres in size with all borders ½ mile from open roads and motor trails.

Intermittent Refuge Areas are unroaded areas 250 to 999 acres in size with all borders ½ mile from open motor routes. While generally not large enough or diverse enough toserve as "full-service" security areas, they provide important escape areas for elk during the hunting season and need to be preserved as such.

Hiding cover (coniferous vegetation capable of hiding 90 percent of a standing elk at 200 feet) is recognized as an important habitat component to be preserved and developed within security and refuge areas. There is, however, no specified percentage of a security area that needs to be maintained as hiding cover under the new standard. ***Screening cover*** (forest more open than hiding cover but capable of blocking clear sightlines) and low-level ***concealment cover*** (provided by deadfall, shrubs, young conifers, boulders, etc.) are also recognized as useful habitat elements to be nurtured within security and refuge areas.

Herd units are fixed analysis areas that do not shift with variable movement patterns of individual elk herd groups or from one project to another. Elk security is determined for the portions of individual *elk herd units* (or other equivalent elk analysis units) that lie within Helena NF administrative boundaries (regardless of ownership).

Percent elk security for is based on the combined acreage of full security areas (greater than or equal to 1,000 acres) within a given herd unit. Intermitent refuge area acres are not added into the total for purposes of determining compliance with the standard.

The big game *hunting season* is defined as extending from September 1 through December 1, thus including both the archery season and the general rifle season.

Amended Standard.

Road management will be implemented to maintain or improve big game security and hunting opportunity. Road management will also be implemented to maintain or improve big game intermittent refuge areas. The standard applies only to the National Forest System lands within

those portions of an elk herd unit that are within the Helena Ranger District, Helena National Forest administrative boundary.

The standard specifies the minimum security level (the percentage of each elk herd unit occupied by security areas and intermittent refuge areas) that needs to maintained under each Divide Travel Plan alternative. These security levels are shown in Table 109, which follows in the *"Comparison of Alternatives"* section. The values shown in the table represent baseline security levels that, at present (Alternative 1), are providing sufficient protection for local elk populations so as to allow MFWP to meet management goals [Table 92 and Table 93], which has been the rationale for using them as the baseline. As long as future projects or circumstances do not depress these percentages, the elk herd units remain in compliance with the standard. But since all herd units are well below the optimal goal of 50 percent elk security, it is desireable to increase security area acreage. As can be seen in Table 109, the general trend under all action alternatives is increasing acreage in elk security areas.

Currently, only 19 percent of the Divide landscape is occupied by bona fide elk security areas (greater than or equal to 1,000 acres). The total contribution of security areas increases by about 1,650 acres in Alternative 2, but the overall rounded percentage remains at 19 percent. The percentage progresses to 23 percent in Alternative 4, 24 percent in Alternative 3 and 27 percent in Alternative 5 [see Table 109].

For individual EHUs at present, only two support security areas occupying more than 20 percent of the unit: Little Prickly Pear–Ophir (23 percent) and Spotted Dog–Little Blackfoot (30 percent). One herd unit (Quartz) contains no security areas, although it does include two intermittent refuge areas. Under Alternative 2, two units would increase in security area acreage, one (Spotted Dog–Little Blackfoot) would decrease and three would remain unchanged. Only two units would be above 20 percent security and none would surpass 30 percent. Under Alternatives 3, 4 and 5, four herd would increase in percent security and two would remain unchanged. Under Alternative 5, three herd units would be near or above 30 percent security.

Although security area acreage increases under all action alternatives, particularly alternatives 3, 4 and 5, the overall acreage in intermittent refuge areas remains relatively constant at two to three percent of the landscape under all alternatives (Table 110). The classification of these small areas actually changes appreciably between alternatives, as new new refuges are created and others enlarge into full security areas as road patterns shift [Figure 34 through Figure 38]. Refuge area acreage is not added into the security total for the different herd units, but we felt that the importance of these areas to elk needed to be recognized and that they should be delineated as areas not to be compromised by resource management activity.

All herd units in all alternatives would comply with the amended *Forest Plan* security standard. Although in a couple cases, security area acreages would decline from current levels, each alternative is independent of the others in terms of defining the compliance baseline. Once an alternative is selected and implemented, then the given security levels for that alternative cannot decline in any herd unit if it is to remain in compliance with the standard.

For the most part, these levels of elk security have been yielding elk populations that exceed MFWP objectives for total elk numbers in the Granite Butte and Deerlodge Elk Management Units (EMUs) (Montana Elk Management Plan 2004). Bull/cow ratios in those portions of the EMUs that overlap the Divide landscape are at or slightly above objectives (currently around 12 to 14 bulls/100 cows). Given the unregulated mature bull hunt allowed in these areas, this ratio is a good indicator of the adequacy of elk security throughout the Divide landscape.

The nature of elk security and vulnerability in local hunting districts, elk management units and elk herd units has been discussed in detail earlier under "*Affected Environment".*

Winter Range

Rationale for Management

Winter range can be a key limiting factor for elk (and all ungulates). Wintering areas with little human activity and adequate forage will help minimize energetic costs associated with over-winter survival. As discussed earlier, much of the elk winter range in the Divide landscape is on private, State and BLM lands outside the Helena NF boundary and beyond the reach of the Forest winter road and trail system. In many cases, elk choose to spend much of the winter on private ranch and agricultural lands, rather than on Forest grasslands in the foothills, even when they are readily available and stocked with abundant palatable forage.

While winter recreationists on foot (cross-country skiers, snowshoers) can disturb elk on winter habitat, few local winter ranges see this kind of activity (most of which occurs at higher elevation). Winter ranges for Helena NF elk are subject primarily to disturbance from snowmobiles, wheeled vehicles (ATVs, four-wheel-drive rigs, cars and trucks on roads) and a variety of activities associated with ranching operations and in some cases, subdivisions. Depending on the intensity, frequency and predictability of the disturbance, elk reactions could involve an increase in general alertness, slow retreating movement, or outright flight (Canfield *et. al.* 1999). A steady stream of disturbance, particularly in severe winters, has potential to increase mortality on winter and spring ranges and to lower reproductive success (Skovlin *et al.* 2002).

Helena Forest Plan Winter Range Standards

The *Helena Forest Plan* aims to limit vehicle use on winter range to established routes that provide access to other parts of the Forest or to adjacent private lands (big game standard 4c). These travel restrictions are intended to prevent disturbance and harassment of elk and other big game animals during a period when physical stress is already high. Most, though not all, existing routes on winter range meet this standard. Alternatives 2, 3, 4 and 5 propose new restrictions for motorized recreation on winter range via new snowmobile area closures and seasonal closure of some motorized recreational trails. None of the Travel Plan alternatives would allow new motor routes on elk winter range. In a number of cases, the classification of snowmobile routes would change, not to allow a new use, but to more accurately describe existing snowmobile routes where no conflicts with wildlife or other resources have arisen. In cases where a winter range conflict has become apparent (lower Sweeney Creek, Mike Renig Gulch), action alternatives propose closing existing snowmobile access.

The *Forest Plan* standard to maintain at least 25 percent of winter range in thermal cover (big game standard 3) is not now being met on any of the five Divide elk herd units with winter range. In the Divide landscape, most of the winter range used by elk in all but the mildest of winters is on private and public land beyond the National Forest boundary. Field observation across this off-Forest region, along with perusal of aerial photos, reveals that thermal cover is well below 25 percent on these winter ranges as well. Be that as it may, recent MFWP surveys of winter ranges in the Divide landscape and adjacent foothills and valley lands suggest that elk and deer populations are suffering no ill effects from the dearth of classic thermal cover. Both species make frequent use of mature/pole timber on winter range, although most of these stands are not dense enough to provide the 70 percent canopy closure required of true thermal cover.

In the end, this is a moot point for Divide Travel Plan proposals since no alternative would have any effect on big game thermal cover: its status would be the same in all herd units under all alternatives.

Elk: Comparison of Alternatives

Summer Range

Forest Plan Big Game Standard 3: Hiding Cover

Forest Plan big game standard 3 stipulates that 35 percent of summer range in each elk herd unit should be maintained as *Forest Plan* hiding cover. When hiding cover is measured indirectly via crown closure, 50 percent of the range needs to be maintained at 40 percent crown closure (MDFWP hiding cover). Hiding cover acres in Table 106 are based on pre-beetle-kill crown closure estimates (from 2011 R1 Vmap satellite imagery). Given that some elk now remain on low and mid elevation off-Forest lands yearlong, this analysis considers all lands, public and private, within the elk herd units to be potential summer range. This includes the 1.5 mile extension of herd unit boundaries onto private and other non-Forest lands.

At present, based on the 2011 data, all six elk herd units are above the MDFWP 50 percent threshold to one degree or another. No Travel Plan alternative would affect *Forest Plan* hiding cover and any changes in cover generated by other factors (most notably, losses to mountain pine beetle) would be the same for all alternatives. This standard is thus not useful in differentiating between Travel Plan alternatives in terms of their effects on elk summer range.

Table 106 - Status of Elk Herd Units per Forest Plan Standard 3

Elk Herd Units	*Forest Plan* Hiding Cover Acres	Percent Hiding Cover	Complies with Standard 3?
Little Prickly Pear–Ophir Crk	52,754	61%	yes
Greenhorn Mtn *	16,727	55%	yes
Spotted Dog–Little Blackfoot	53,149	65%	yes
Jericho Mtn	25,810	73%	yes
Black Mtn–Brooklyn Bridge	30,608	57%	yes
Quartz Creek	20,849	57%	yes

*Summer range has been delineated to occupy only 54 percent of the Greenhorn EHU based on elk radio-telemetry data provided by MFWP.

Habitat Effectiveness on Summer Range

Habitat effectiveness is not a *Forest Plan* standard, but because it is based on open road density, it relates more directly to travel planning proposals than measures based on hiding cover.

Table 107 summarizes open road density and habitat effectiveness (HE) on summer range for the five alternatives. Habitat effectiveness percentages estimate how much of the potential summer range is free from motorized disturbance throughout the season. Percentages are derived from an index developed by Lyon (1983) and employed by Christensen *et al.* (1993), who recommended habitat effectiveness levels of at least 50 percent on elk summer range as a whole and 70 percent in areas of key habitat (productive sites where elk consistently concentrate). For the sake of consistency, habitat effectiveness is calculated for the same areas as is *Forest Plan* hiding cover for big game standard 3: that is, entire elk herd units, including the 1.5 mile off-Forest extension zone. While elk do use low/mid-elevation non-Forest habitat in some summers, most summer use occurs in higher elevation habitats on the National Forest.

So the delineation of summer range used in these analyses takes in virtually all areas that elk may inhabit under a wide range of summer conditions.

As can be seen in Table 107, all elk herd units in the Travel Plan Area are currently above the recommended 50 percent habitat effectiveness level and all of them would remain above that level under all action alternatives. This comports with USFS field observations as to summer habitat availability and condition and with MFWP asessments as to the general health of the elk population, which lead to the conclusion that summer range in general is not a limiting factor for elk in the Divide landscape.

Table 107 - Elk Habitat Effectiveness

	mi/mi² open road*					% habitat effectiveness				
elk herd unit	alt. 1	alt. 2	alt. 3	alt. 4	alt. 5	alt. 1	alt. 2	alt. 3	alt. 4	alt. 5
Little Prickly Pear–Ophir Crk	1.49	1.39	1.38	1.37	1.14	54%	55%	55%	55%	57%
Greenhorn Mtn	1.38	1.17	1.03	1.00	0.89	55%	57%	60%	60%	62%
Spotted Dog–Little Blackfoot	1.25	1.35	1.03	1.14	1.10	56%	55%	60%	57%	58%
Jericho Mtn	1.27	1.23	1.23	1.23	1.07	56%	56%	56%	56%	59%
Black Mtn - Brooklyn Bridge	0.82	0.82	0.82	0.82	0.82	65%	65%	65%	65%	65%
Quartz Crk	1.10	1.10	1.10	1.10	1.06	58%	58%	58%	58%	58%
Divide Plan Area	1.25	1.21	1.11	1.13	1.02	56%	56%	58%	58%	60%

While habitat effectiveness in most elk herd units increases over current values under each of the action alternatives, there are no major shifts. All habitat effectiveness values fall within the range of 54 percent to 65 percent. The inference is that, in all cases, elk will have access to enough general summer range free from regular motorized interference to meet their needs. These values are for broad areas of public and private land that elk may use to one degree or another, depending on summer conditions. An earlier analysis for the Travel Plan that looked only at areas within National Forest boundaries and weighted Forest roads according to estimated use levels (primary roads equal 100 percent of length; lightly used local roads equal 25 percent of length) came up with habitat effectiveness values in the range of 65 percent to 88 percent. Actual habitat effectiveness of summer range most often used by elk probably falls somewhere between the results of these two analysis approaches.

The above analyses consider the suitability of elk summer habitat in general, but they do not zero in on the quality and distribution of specific habitat components that elk need regular access to. Table 107 does not calculate the habitat effectiveness of key areas (esp. wet meadows, mesic grasslands and riparian sites) where the 70 percent recommendation would apply. Some of these issues are addressed in the later section, *"Local Effects in Key Areas",* which looks at how individual motorized routes effect habitat sites of particular importance to elk and other big game animals.

Effects of Alternative 1 (Existing Condition)

Alternative 1 maintains the status quo. Under this scenario, all herd units exceed the recommended 50 percent habitat effectiveness for overall summer range. Habitat effectiveness values for five of the herd units are in the 54 to 58 percent range; one unit (Black Mountain-Brooklyn Bridge) is at 65 percent. Habitat effectiveness of this order suggests that open road density is not high enough to regularly prevent elk on summer range from foraging successfully and thus building fat reserves for the upcoming winter. In this case, problems with roads and motor trails are not a function of overall road density, which is within acceptable limits, but with

site-specific intrusion of vehicles into habitats of particular importance to elk, typically riparian areas, wet meadows and other productive sites that focus elk activity. Some of these areas are discussed in *"Local Effects in Key Areas"* toward the end of this report.

In the short run, all six herd units would remain in compliance with *Forest Plan* big game standard 3 (with crown closure greater than or equal to 50 percent and hiding cover thus greater than or equal to 35 percent). But within the next 5 to 10 years, all herd units will probably fall below 35 percent cover due to the loss of standing trees killed by the mountain pine beetles.

Effects of Alternative 2

Alternative 2 would retain the same overall level of habitat effectiveness as Alternative 1 for the Travel Plan Area as a whole (56 percent), but shifts would occur within some herd units. Habitat effectiveness would improve in two units (Little Prickly Pear–Ophir and Greenhorn), decline in one unit (Spotted Dog–Little Blackfoot) and hold steady in three units (Jericho, Quartz, Black Mtn–Brooklyn Bridge) [see *Local Effects in Key Areas* for a discussion of what the changes mean for elk in specific areas]. One area where habitat effectiveness would erode is the Baldy Ridge–upper Spotted Dog region near the south end of the Plan Area. This area holds elk through the summer and into the fall. Along the Continental Divide, habitat effectiveness would improve south of Jericho Mountain and in several sites between Greenhorn Mountain and MacDonald Pass north of Highway 12. Summer range hiding cover would remain the same as in alternative 1.

Effects of Alternative 3

Alternative 3 would see more of an upswing in habitat effectiveness, to 58 percent overall. There would be notable improvement (4 to 5 percent) in the Spotted Dog–Little Blackfoot and Greenhorn EHUs and slight improvement (one percent) in the Little Prickly Pear–Ophir EHU. The Jericho, Quartz and Black Mountain–Brooklyn Bridge EHUs would remain unchanged. All EHUs would continue to achieve the recommended 50 percent habitat effectiveness level. Summer range hiding cover would remain the same as in alternative 1.

Effects of Alternative 4

Alternative 4 would provide habitat effectiveness identical to alternative 3 in five herd units. It would, however, provide only a one percent increase over current conditions in the Spotted Dog–Little Blackfoot EHU (as opposed to four percent in alternative 3), a function of proposed vehicle access to elk summer range (1) in upper Ontario and Bison Creeks and (2) along upper Spotted Creek and adjacent Baldy Ridge. Both areas encompass drainage-head locales with productive summer habitat that holds elk from late spring through mid-fall. All EHUs would continue to achieve the recommended 50 percent habitat effectiveness level. Summer range hiding cover would remain the same as in alternative 1.

Effects of Alternative 5

Alternative 5 would produce the highest habitat effectiveness of any action alternative (60 percent overall). Four EHUs would increase in non-motorized summer range, one of them (Greenhorn Mountain) by seven percent, the others by two to three percent. Two units (Black Mountain–Brooklyn Bridge and Quartz) would remain essentially unchanged. All EHUs would continue to achieve the recommended 50 percent habitat effectiveness level. Summer range hiding cover (*HFP* big game standard 3) would remain the same as in alternative 1.

Big Game Security in the Hunting Season

Road Density/Hiding Cover Security Standard

Hiding cover and open road density are the measures of elk vulnerability/security identified in the *Helena Forest Plan* (1986). Table 108 summarizes each elk herd unit relative to big game standard 4a (*HFP,* p. II/17 - II/18) as described previously under "*Affected Environment*". Canopy closure of 40 percent or greater (as determined by satellite imagery) is used as a surrogate for hiding cover and is correlated with road density via the "MDFWP" formula (*HFP*, p. II-18). Road miles are weighted so that roads on Helena NF land are calculated at 100 percent of length and those on private lands at 25 percent of length. Elk herd units include all lands within Helena NF administrative boundaries plus a 1.5 mile extension beyond the boundary. The assessment is for entire EHUs, not just the portions within the Divide Travel Plan Area.

Table 108 - Effects to Elk Herd Units by Alternative

elk herd unit	hiding cover *	Open Motor Route Density (mi/mi²)					Compliance with Standard 4a?				
		alt 1	alt 2	alt 3	alt 4	alt 5	alt 1	alt 2	alt 3	alt 4	alt 5
Little Prickly Pear–Ophir	60%	1.5	1.4	1.4	1.4	1.1	no	no	no	no	yes
Greenhorn Mtn	41%	1.4	1.1	1.0	1.0	0.8	no	no	no	no	no
Spotted Dog–Little Blackfoot	65%	1.1	1.2	1.0	1.0	0.8	yes	yes	yes	yes	yes
Jericho Mtn	73%	1.3	1.3	1.2	1.2	1.1	yes	yes	yes	yes	yes
Black Mtn–Brooklyn Bridge	57%	0.8	0.8	0.8	0.8	0.8	yes	yes	yes	yes	yes
Quartz Crk	57%	1.1	1.1	1.1	1.1	1.0	no	no	no	no	no

* Standard 4a hiding cover percentages are for *fall range*, entire herd units. They differ from the percentages in Table 106, which are for *summer range* and thus cover only those parts of the herd units within Helena NF administrative boundaries.

As can be seen in Table 108, three herd units (Spotted Dog-Little Blackfoot, Jericho and Black Mountain-Brooklyn Bridge) comply with standard 4a under all five alternatives. Substantial portions of these herd units are taken up by the three Inventoried Roadless Areas located south of Highway 12, Electric Peak, Jericho Mountain and Lazyman Gulch. Two of the remaining herd units (Quartz and Greenhorn) show open road densities (in several alternatives) that are similar to those in the three units that meet the standard; but hiding cover is insufficient to produce compliance, even when road densities drop in alternative 5. The final herd unit (Little Prickly Pear-Ophir) does not comply with the standard under alternatives 1, 2, 3 and 4, but does so under lower road density in alternative 5.

The pattern under standard 4a is that, in spite of shifts in open road density between alternatives, herd units that currently comply with the standard tend to remain in compliance and those that do not comply with the standard tend to remain out of compliance. The only exception is the rise to compliance of the Little Prickly Pear-Ophir EHU under alternative 5, due to the closure of 52 miles of Forest roads combined with ample hiding cover (60 percent).

On the other hand, in the Greenhorn EHU, road closures of 47 miles in alternative 5 are insufficient to bring the herd unit into compliance with standard 4a because of hiding cover that remains at 41 percent. The road density/hiding cover index masks this improvement in fall elk security, simply indicating that the herd unit remains out of compliance. Likewise, the Spotted Dog–Little Blackfoot EHU is simply credited with remaining in compliance with the standard, in spite of 40 miles of road closures in alternative 5. The Black Mountain–Brooklyn Bridge EHU is also credited with remaining in compliance, although it closes no roads at all. This herd unit is

clearly different from the previous two in terms of elk security improvement, but the current *Forest Plan* standard recognizes no difference between them. In sum, the standard does *not* accurately indicate to what degree the changes in road density improve or degrade the habitat situation for elk.

Proposed Elk Security Area Standard

The amended *Forest Plan* standard for gauging the vulnerability of elk to hunting mortality is based on how much of a given management unit (typically, an elk herd unit) is taken up by elk security areas. The rationale for using this measure has been discussed in some detail in the *"Affected Environment"* section and in the preceding section, *"Common Effects of Travel Management"*. In order to comply with the new standard, herd units with more than 50 percent elk security are allowed to lower percent security only if they remain above 50 percent; those with less than 50 percent security are allowed no further decrease [see the previous section on "*Common Effects of Travel Management"* for the exact wording].

Table 109 displays acreage of full-sized elk security areas (greater than or equal to 1,000 acres) and the percentages of each herd unit that they occupy under different project alternatives.

Table 109 - Acres of full elk security areas

Elk herd Units (EHUs)	Acres in Full Elk Security Areas					% of Herd Unit in Security Areas				
	alt. 1	alt. 2	alt. 3	alt. 4	alt.5	alt 1	alt 2	alt 3	alt 4	alt 5
Little Prickly Pear–Ophir Crk	13,863	15,069	15,195	15,069	16,566	23%	25%	26%	25%	28%
Greenhorn Mtn	1,494	2,134	4,892	5,322	6,564	7%	10%	23%	25%	30%
Spotted Dog–Little Blackfoot	18,880	18,645	25,064	21,879	28,019	30%	29%	39%	34%	44%
Jericho Mtn	3,435	3,463	4,790	4,790	5,070	12%	12%	16%	16%	17%
Black Mtn–Brooklyn Bridge	5,781	5,785	5,785	5,785	5,788	16%	16%	16%	16%	16%
Quartz Crk	0	0	0	0	0	0%	0%	0%	0%	0%
North of Highway 12	15,357	17,203	20,087	20,391	23,130	19%	21%	25%	25%	29%
South of Highway 12	28,096	27,893	35,640	32,454	38,877	19%	18%	23%	21%	26%
Landscape Total	43,453	45,096	55,727	52,845	62,007	19%	19%	24%	23%	27%

Security areas in Table 109 are based on the pattern of roads and motor trails open from September 1 through December 1 within Helena NF administrative boundaries. These are the acres and percentages used to determine the degree to which the herd units approach 30 percent and 50 percent security levels: the acres of intermittent security areas in Table 110 are not added in for purposes of determining compliance.

Table 110 displays the acres of intermittent refuge areas and the percent of each elk herd unit that they occupy. While these acreages are not combined with those for elk security areas (Table 109) in determining security status for the herd units, these smaller refuges do contribute to the ability of elk to survive the hunting season. The management guidance with regard to hiding cover, open roads and management activity in full-sized security areas apply to these smaller refuge areas as well.

Table 110 - Intermittent Refuge Areas

elk herd unit	Acres in Intermittent Refuge Areas					% "Security" provided by Intermittent Refuge Areas				
	alt. 1	alt. 2	alt. 3	alt. 4	alt. 5	alt. 1	alt. 2	alt. 3	alt. 4	alt. 5
Little Prickly Pear–Ophir Crk	0	0	0	422	588	0%	0%	0%	1%	1%
Greenhorn Mtn	971	1,474	803	803	308	4%	7%	4%	4%	1%
Spotted Dog–Little Blackfoot	2,400	661	1,396	1,099	1,090	4%	1%	2%	2%	2%
Jericho Mtn	923	886	0	0	0	3%	3%	0%	0%	0%
Black Mtn–Brooklyn Bridge	1,738	1,738	1,738	1,738	1,738	5%	5%	5%	5%	5%
Quartz Crk	1,124	1,124	1,124	1,124	1,395	5%	5%	5%	5%	6%
North of Highway 12	971	1,474	803	1,225	896	1%	2%	1%	2%	1%
South of Highway 12	6,185	4,409	2,862	3,961	4,223	4%	3%	2%	3%	3%
Landscape Total	7,156	5,883	3,665	5,186	5,119	3%	3%	2%	2%	2%

Hillis *et al.* have recommended that at least 30 percent of the fall range in each analysis area, such as a herd unit or larger management area, be maintained as elk security areas if elk vulnerability is to be effectively tempered during the hunting season. The new *HFP* elk security amendment sets the objective for the Divide landscape at 50 percent. This follows from the objective already in place for the adjacent Blackfoot landscape just to the north. While that objective is realistically attainable in most of the herd units in that landscape (much of which is in or near the Scapegoat Wilderness Area), it is highly unlikely to be attainable in all but one or two herd units in the Divide landscape and then, only with draconian road closures detrimental to the most basic kind of Forest access. Nonetheless, we have advanced that as the ideal security area percentage, attainable or not.

Effects of Alternative 1 (Existing Condition)

Alternative 1 is the no-action scenario and it would retain the existing condition. As to the current big game security index (*HFP* standard 4a), only three of the six Divide elk herd units comply with the standard (Table 108). As to the amended security area standard, only one of the six EHUs (Spotted Dog-Little Blackfoot) reaches the 30 percent security level recommended by Hillis *et al.* (1991) and none approach the 50 percent level proposed by the amended standard. One herd unit, the Quartz EHU, supports no full-sized security areas at all, only two intermittent refuge areas. All herd units, however, meet the amended standard for the time being because none are declining in percent security.

Currently, MFWP population objectives for elk are being met in three of the hunting districts that cover the Divide landscape (HD 215, HD 335, HD 343). In the 4th district (HD 293), elk objectives are being met in the portion of the district associated with the Divide landscape, while problems in the rest of the district are related to high rates of predation rather than deficiency in security habitat [see the previous discussion of "*Hunting Districts*"].

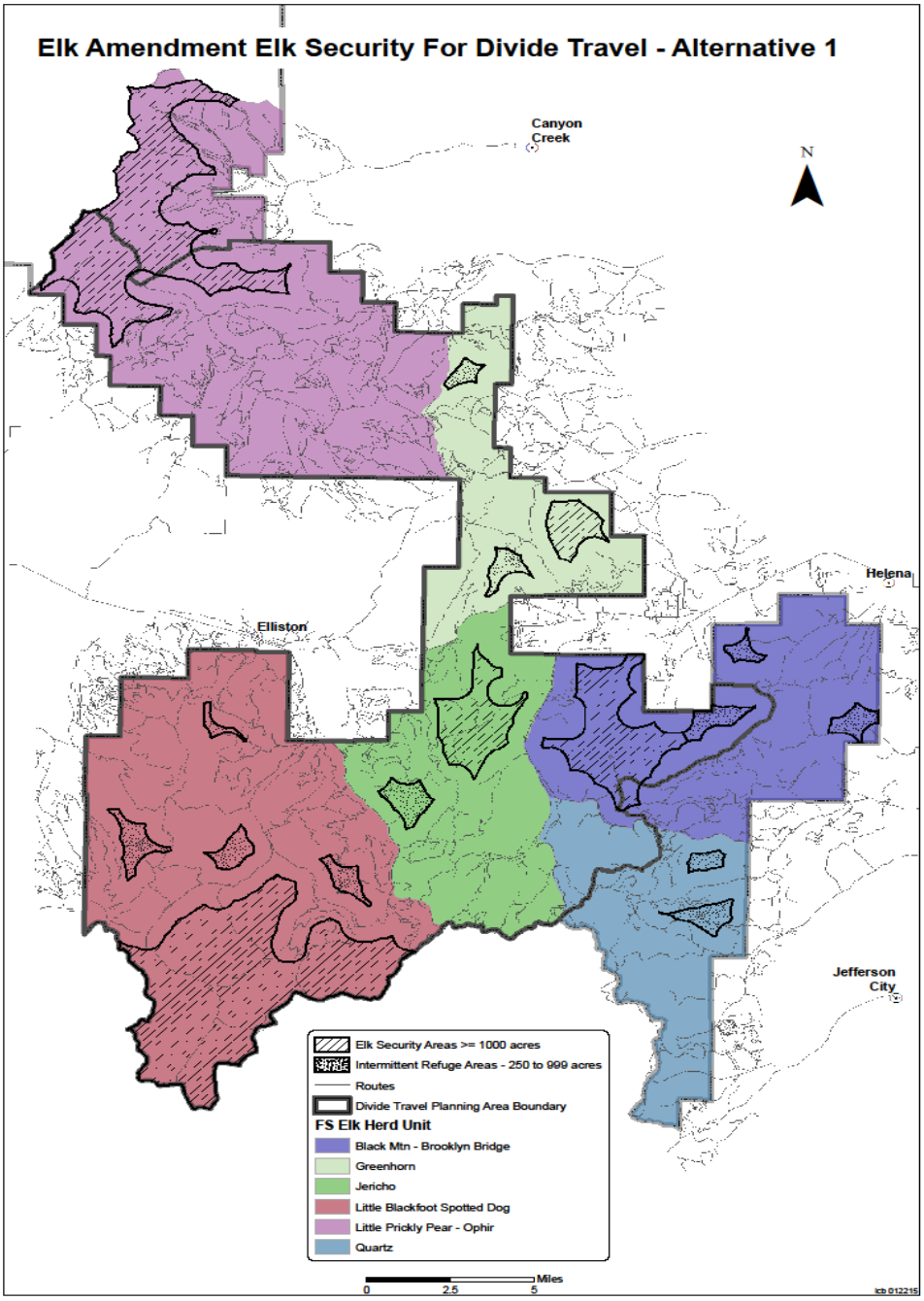

Figure 34 - Elk security and intermittent refuge areas under Alternative 1.

It should be noted that in all EHUs, elk have been able to find refuge on private land beyond the Helena NF boundary where public hunting is not allowed or to which hunting access is very difficult because of land ownership patterns. These opportunities are more limited in some EHUs than others. While private sanctuaries do not qualify as "security areas" under the Hillis criteria, they do in effect serve much the same purpose. And, as a result, elk are usually more secure in these EHUs than the security area percentages in Table 110 suggest. Elk compensate

for the shortage of National Forest security by moving to private-land security zones as the hunting season progresses.

Effects of Alternative 2

Alternative 2 would produce the same pattern of compliance with *Forest Plan* big game standard 4a as alternative 1: three elk herd units would comply, three would not. Two of the herd units that currently do not comply with the standard would see declines in open road density, but their compliance status would not change.

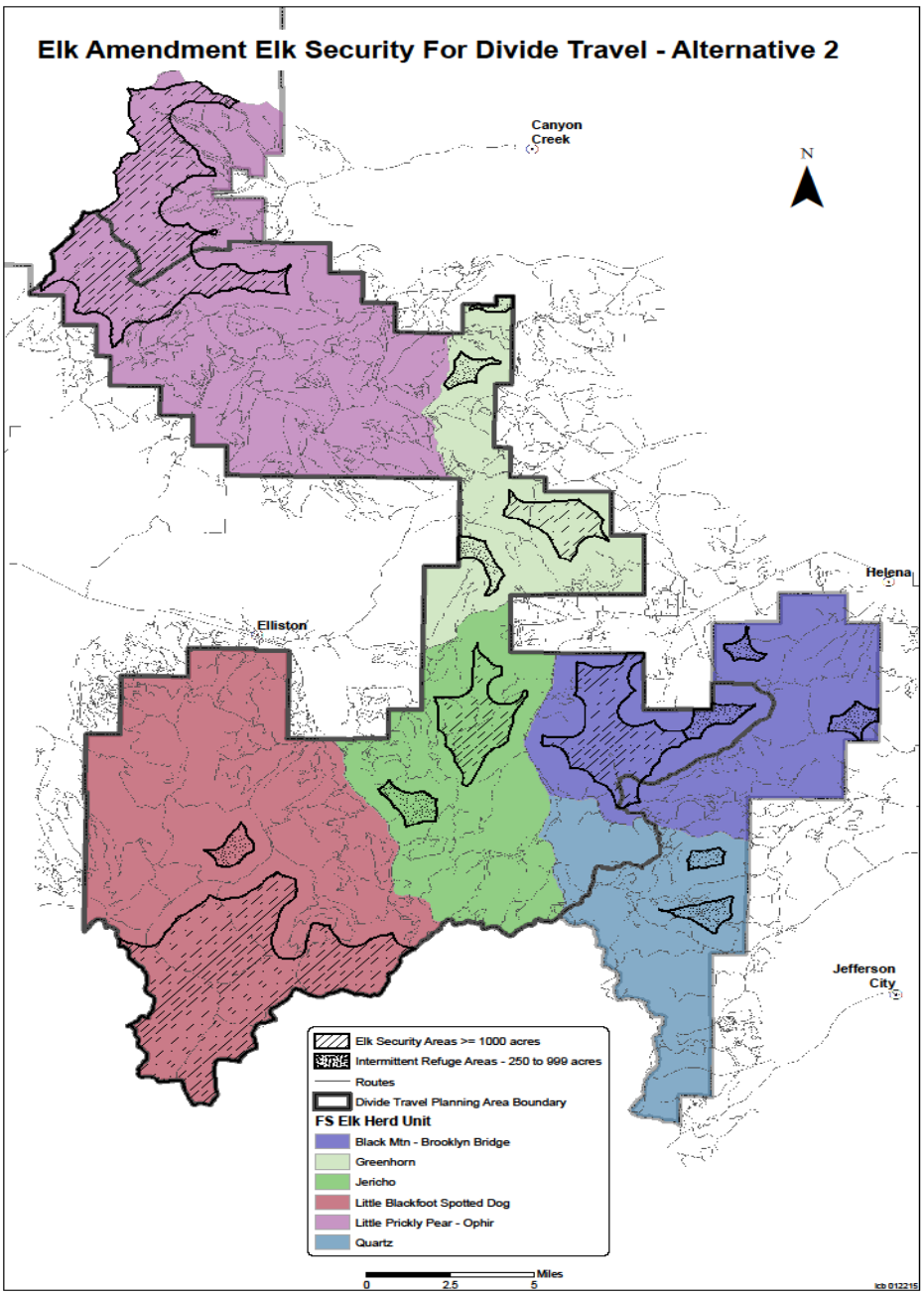

Figure 35 - Elk security and intermittent refuge areas under Alternative 2.

Applying the amended elk security area standard, overall security within Helena NF boundaries would improve north of U.S. Highway 12 (from 19 percent to 21 percent) but decline south of it (from 19 percent to 18 percent). The decline in the southern sector (a loss of 235 security acres) would result from a newly sanctioned motor trail in upper Ontario Creek in the Spottted Dog–Little Blackfoot EHU (Table 109). Nearly 1,750 acres would also be subtracted from intermittent refuge areas in this herd unit as a result of newly opened roads and motor trails (Table 110; Figure 35). North of Highway 12, the large security area around Black Mountain (of the north) would expand with the closure of the Black Mountain Road and the effective closure of the pioneered motor trail off its west end. The security area around Greenhorn Mountain would expand as well, increasing from 1,494 to 2,134 acres with the closure of an unauthorized motor trail and its access road.

The spatial pattern of security and refuge areas in alternative 2 can be seen in Figure 35 above. Overall percent security in the Divide landscape would remain at 19 percent under alternative 2.

Effects of Alternative 3

Alternative 3 would produce the same pattern of *Forest Plan* compliance with the current big game security index (*HFP* standard 4a) as alternatives 1 and 2: three elk herd units (Spotted Dog-Little blackfoot, Jericho and Black Mountain-Brooklyn Bridge) would continue to comply with the standard, the other three would not (Table 108).

Applying the amended security area standard, alternative 3 would provide notably more security than alternatives 1 and 2, expanding security areas from the current 43,453 acres (19 percent of the landscape) to 55,727 acres (24 percent of the landscape). South of Highway 12, the Black Mountain-Brooklyn Bridge and Quartz EHUs, which are in large part unaffected by the Travel Plan, would remain unchanged. Security in the Jericho EHU, however, would rise from 12 percent to 16 percent and in the Spotted Dog–Little Blackfoot EHU it would jump from 29 percent to 39 percent of the herd unit. These changes follow from (1) closure of an OHV route south of Jericho Mountain and (2) a number of road and motor trail closures on Baldy Ridge and in the upper Spotted Dog Creek drainage, allowing the big security area centered on the Electric Peak Roadless Area to expand northward [Figure 36, below]. This latter expansion would be particularly effective since it is contiguous with security habitat on the adjacent Beaverhead-Deerlodge NF, as well as with the Roadless Area. As in all action alternatives, security would remain unchanged in the Black Mountain–Brooklyn Bridge and Quartz EHUs.

North of Highway 12, security in the Little Prickly Pear–Ophir EHU would expand slightly (from 25 percent to 26 percent); but in the Greenhorn EHU, it would jump from 10 percent to 23 percent of the unit as a result of multiple motor trail closures in lower Sweeney Creek and an OHV route atop the Continental Divide south of Priest Pass [see Figure 36].

As under current conditions, MFWP objectives for elk populations would continue to be met in three of the four hunting districts that cover Divide elk herd units (HD 215, HD 335, HD 343). MFWP elk population objectives are also being met in the southern half of HD 293, which covers this herd unit. The northern half of HD 293 in the Big Blackfoot Valley (Lincoln Ranger District) is below population objectives because of predation problems unrelated to security on the National Forest [see previous discussion of "*Hunting Districts*"].

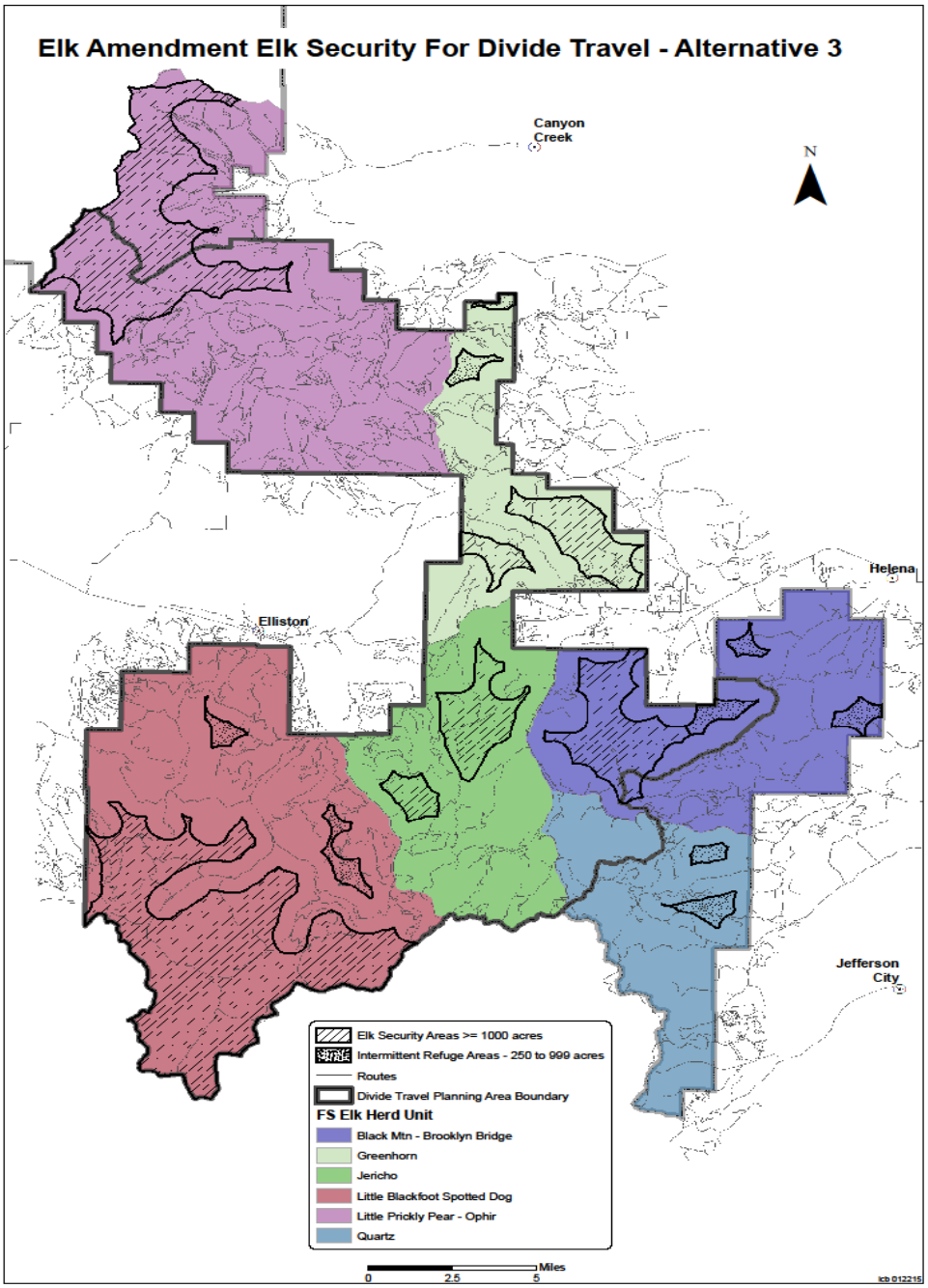

Figure 36 - Elk security and intermittent refuge areas under Alternative 3

Effects of Alternative 4

Alternative 4 would produce the same pattern of *Forest Plan* compliance with the current Big Game security index (*HFP* standard 4a) as alternatives 1, 2 and 3: the same three elk herd units would comply with the standard, the other three would not.

Under the amended elk security area standard, alternative 4 would be much the same as alternative 3. A minor diference would be a slight reduction in security area size in the Little

Prickly Pear–Ophir EHU (110 acres) resulting from a motor trail (#136-007), open yearlong, just north of Meyers Hill. Alternative 4 would add other open roads and motor trails to the alternative 3 scenario, but all would be closed for the big game rifle season and thus would not affect hunting season security for elk (though they would lower habitat effectiveness in summer (Table 107).

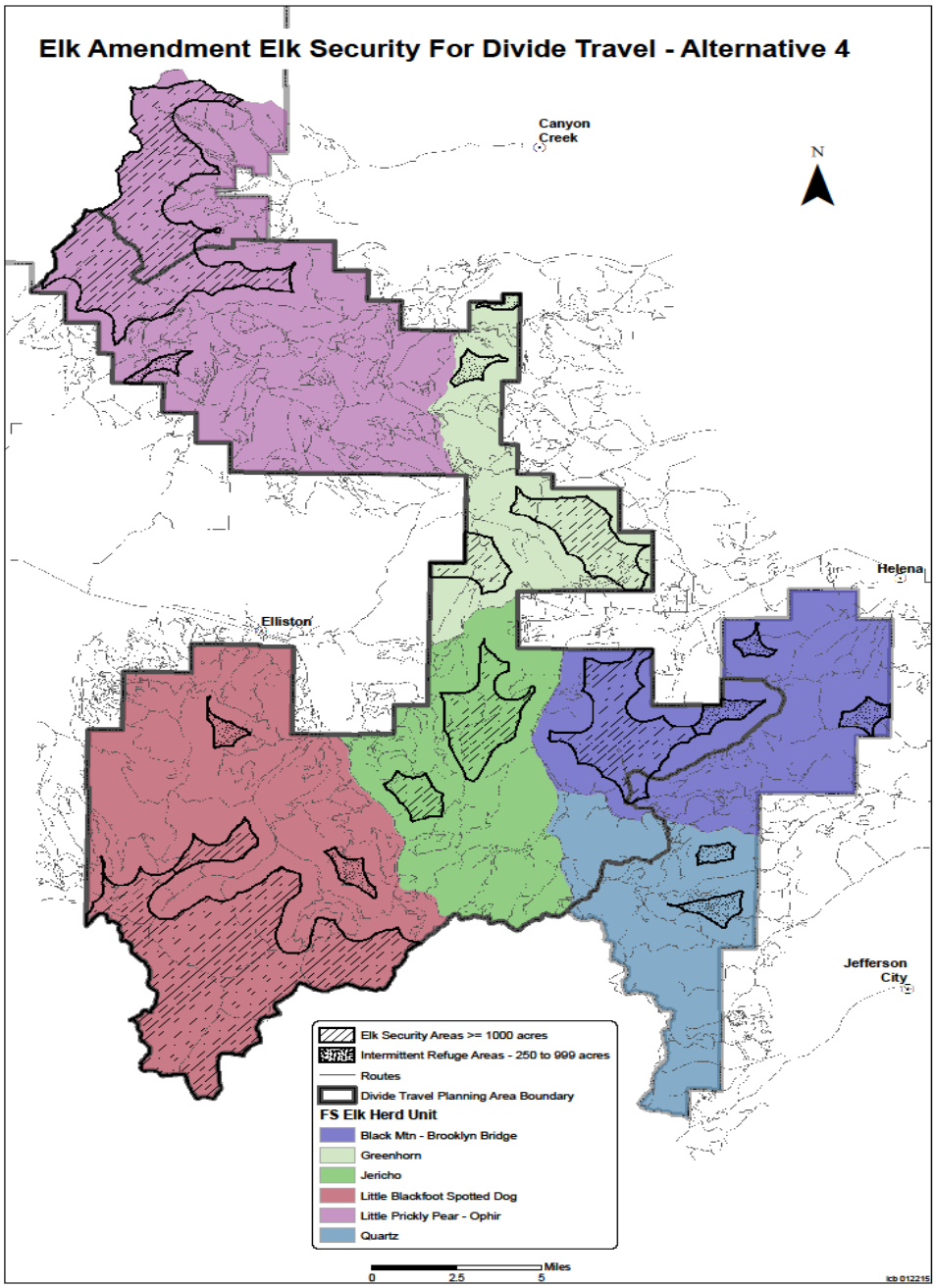

Figure 37 - Elk security and intermittent refuge areas under Alternative 4

Effects of Alternative 5

Under Alternative 5, a fourth herd unit, Little Prickly Pear-Ophir, would come into compliance with the current big game security index (*HFP* standard 4a) following the closure of a number of dead-end, parallel and deteriorating roads, mostly in the greater Dog Creek and upper Snowshoe Creek drainages. The pattern of these closures would not allow expansion of elk security or refuge areas but they would produce a reduction in open route density. Two herd units (Greenhorn and Quartz) would remain out of compliance with the standard in spite of reductions in open road density in those units.

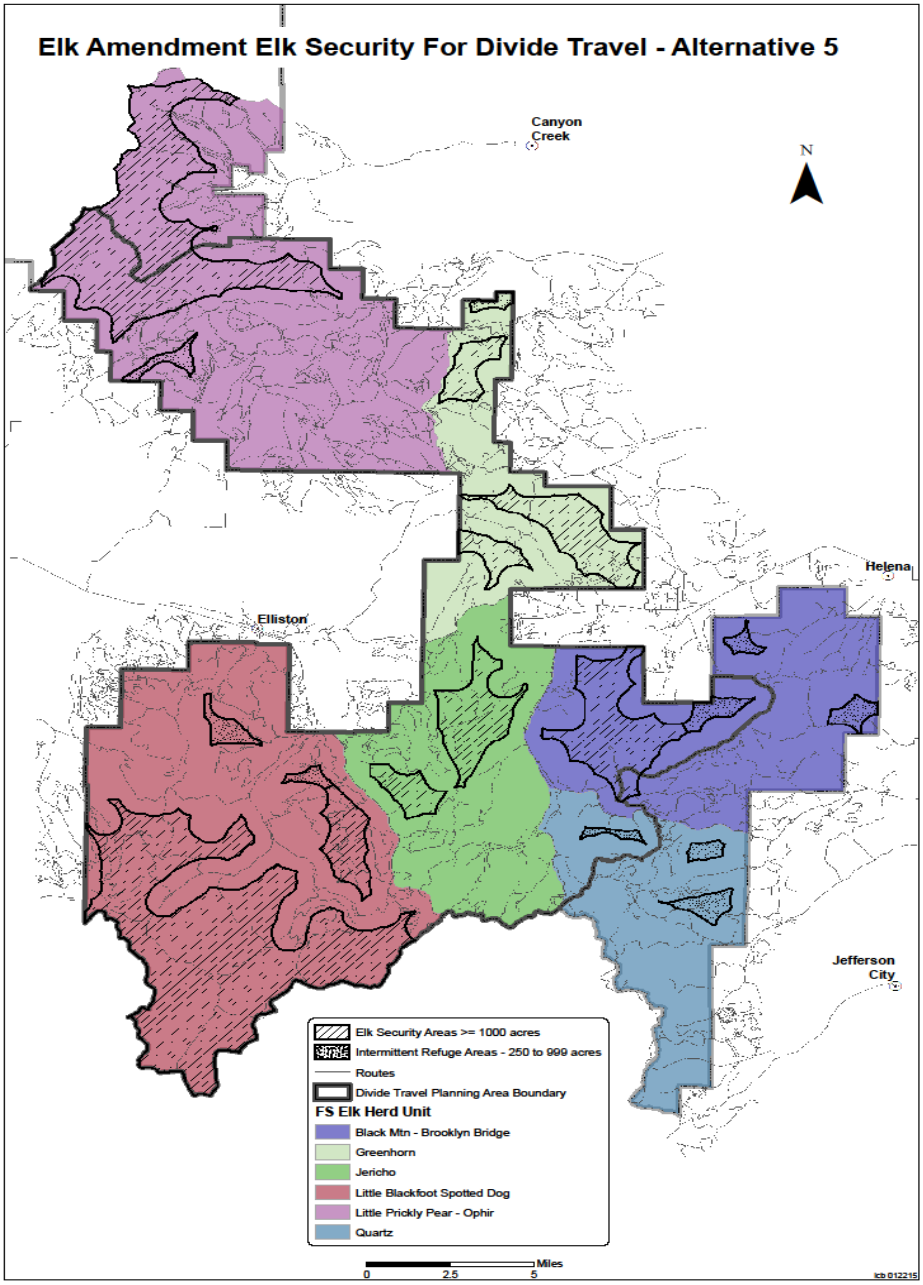

Figure 38 - Elk security and intermittent refuge areas under Alternative 5.

Under the amended elk security area standard, security would rise from the current 19 percent to 27 percent of the Divide landscape, from 43,543 acres to 62,007 acres. These security areas are mapped in Figure 38.

Alternative 5 would develop the designated motor trail system more than other alternatives [Table 98]. While this would prove problematic for summer habitat effectiveness in some areas, it would not erode fall elk security since the trails would be closed to motorized use during the big game hunting season (September 1 to December 1). New increments in elk security and refuge areas (compared to alternatives 3 and 4) would occur both north and south of Highway 12. North of the highway, these include increased security in Sweeney Creek, Ophir Creek, the upper forks of Little Prickly Pear Creek and around Greenhorn Mountain. South of the highway, the principal gain would come from the transformation of an ittermittent refuge area (651 acres in alternative 3) in the Negro Mountain-Treasure Mountain area into a larger security area (2,247 acres in alternative 5) [Figure 36 and Figure 38].

Under alternative 5, three herd units (Little Prickly Pear-Ophir, Greenhorn and Spotted Dog-Little Blackfoot) are near or above 30 percent security. The Spotted Dog-Little Blackfoot herd unit, with 44 percent of its area in elk security areas, would be the only unit that approaches the ultimate goal of 50 percent. Since five herd units would see increases in elk security, some of them substantial and the 6th unit would retain current security levels [Table 109 and Table 110], all would meet the amended standard for elk security. Current levels of security have proven compatibile with MFWP population objectives for elk in local hunting districts and the increment in security proposed in alternative 5 would substantially improve the prospects of continuing to achieve those objectives.

Application of the Security Area Standard

As can be seen in Table 109 and Table 110 and in the security area maps (Figure 34 through Figure 38), elk security areas provide a means of gauging elk vulnerability/ security that is sensitive to changes in open road configuration. This allows a more fine-tuned and realistic assessment as to potential impacts of travel management proposals in different herd units than the 1986 *Forest Plan* standard (the hiding cover/ road density index). The difference between the two methods results largely from eliminating hiding cover as a primary determinant of elk security and focusing on the size and distribution of large habitat blocks to which hunter access is limited. This is particularly appropriate in this case, as Divide Travel Plan alternatives deal with changes in open road patterns and have no impact on *Forest Plan* hiding cover. Forest cover is recognized as an important component of security, but it is not the make-or-break factor that it has become under the current standard (the road density/hiding cover index).

Compliance with the amended elk security standard hinges on whether or not security area acreage within a given elk herd unit is increasing, decreasing, or holding steady, regardless of what the percent security happens to be. While the the ideal situation would be to have 50 percent of each elk herd unit in security areas of 1,000 acres or more, the fact that a given herd unit is below the 50 percent level does not prevent it from complying with the standard.

The rationale is that current security levels are allowing MFWP population objectives for elk to be met in local hunting districts or in those portions of the hunting district subject to influence by Divide herd units. That being the case, the four action alternatives, all of which would improve upon the overall security level, should do likewise. Figure 27 (in the *"Affected Environment"* section) provides a map of the six Divide elk herd units and shows their

relationship to the four hunting districts that encompass the landscape. Table 92 and Table 93 (also in the *"Affected Environment"* section) display the status of the four hunting districts with regard MFWP elk population objectives over the past 15 years.

Table 109 indicates the degree to which security acres and percentages in each herd unit increase or decrease, or whether they remain steady, under different alternatives. Herd units that maintain or increase security, regardless of what the percent security is, may be in compliance with the amended elk security standard. A decrease in security could be an indication of non-compliance. As can be seen in Table 109, security area acreages in two herd units (Quartz Creek and Black Mountain-Brooklyn Bridge) neither decrease nor increase under any alternative (or do so to a trivial degree). So these EHUs initially comply with the standard, even though the Quartz Creek unit supports no bona fide security areas. This herd unit does support intermittent security areas [Table 110] and in fact shows an increase in this acreage under alternative 5; but this does not affect its standing with regard to the standard. Table 109 shows that security area acreages in the remaining four herd units consistently increase over current conditions under all action alternatives, with one exception. The exception is a slight decrease in the Spotted Dog-Little Blackfoot EHU under alternative 2. This unit thus needs to be flagged to see if it is in fact out of compliance with the standard.

Winter Range

The *Helena Forest Plan* measures impacts on elk winter range in terms of (1) the acreage and dispersion of thermal cover and (2) the location of motorized routes. Thermal cover does not figure into the current analysis: None of the Travel Plan alternatives would affect it. But, changes in the classification of snowmobile routes and open roads that can be driven during winter are of interest. The *Forest Plan* allows for designated routes through winter range on Helena NF lands in order to facilitate land management, allow access to private land, or to provide routes to public recreation opportunities (most often, snowmobiling) in other areas (*HFP,* p. II/17-18). The greater the miles of roads, motor trails and snowmobile routes accessible to vehicles on winter range the greater the potential for disturbance and displacement of elk.

In general, *Forest Plan* winter range, as mapped during development of the *Forest Plan* in the 1980s, is quite restrictive, focusing on areas consistently used by most elk in most winters. In the Divide landscape, relatively little of that winter range falls on Helena NF land so as to be affected by the Forest road system. A more expansive mapping of winter range was developed for the *Helena NF Oil and Gas Leasing EIS* in 1995 (USFS, USFWS 1995). The map was based on assessments by MFWP and Helena NF biologists as to what sites big game animals might occupy under a wider variety of winter conditions than contemplated by the *Forest Plan.* As with *Forest Plan* winter range, *Oil and Gas* winter range is mapped only for areas within Helena NF boundaries.

More recently, Montana Fish, Wildlife and Parks (MFWP) [with assistance from the Rocky Mountain Elk Foundation (RMEF)] has constructed a broadscale (Statewide) planning map of elk seasonal ranges that has adopted an even more expansive version of potential winter range, one that incorporates considerably more land on the Helena NF than does the *Oil and Gas* EIS map. The "MFWP map" covers both Helena NF and private land and its winter ranges extend well out into the Helena and Little Blackfoot valleys. The initial version of the map came out in 1999 and a second version (delineating even more winter range) in 2004. A third version, developed by MFWP between 2008 and 2010, has adopted a new definition of winter range ("areas where populations....tend to concentrate during the winter season, commonly

December through April"), eliminated some of the winter range mapped by the previous two editions and omitted mapping of "crucial winter range". As with previous versions, the new maps are "appropriate for general planning purposes or broad landscape review…" The data are "not intended for planning and/or review of site-specific activities" (MFWP 2011). Because of these broadscale objectives, winter range boundaries are drawn along section lines rather than along local topographic or vegetative features and are therefore less precise.

One of the problems with the MFWP map for *Forest Plan* purposes has been the inclusion of broad areas into which small numbers of elk occasionally range during mild winters or through which they pass in late April on their way to summer range. While these sites have been used by elk in this way over the past 30 years, they do not represent areas where populations "tend to concentrate during the winter". The inclusion of these areas of *extended winter range* is useful in that it highlights areas where segments of the elk population may be vulnerable to human interference under mild winter conditions and as they move across transitional range toward summer range late in the season. But it does not contribute to an accurate delineation of true winter range, which is the area addressed by *HFP* standards.

In determining what constitutes elk winter range for purposes of applying *HFP* standards and guidelines, I have proceeded as follows:

On a GIS map of the Divide landscape showing both the *Helena NF Oil and Gas EIS* winter range (1995) and *MFWP extended* winter range (2010), I plotted the location of several thousand "winter" elk locations (December 1 to April 30). Locations were derived both from tracking of radio collared elk (1983 to 1987) and from annual MFWP aerial winter range surveys (2000 to 2010). I then tallied elk locations within Helena NF boundaries for (1) the *Helena NF Oil and Gas* winter range and (2) those found only on *MFWP extended* winter range beyond the *Oil and Gas* range. I confined the comparison to Helena NF lands, since this is the area that would be affected by Travel Plan alternatives.

Results were as follows:

- Total winter elk locations in the sample: 7,856
- Locations within Helena NF administrative boundaries: 1,149
- Helena NF locations on *Oil and Gas EIS* winter range: 1,102 (95.9 percent of NF locations)
- Helena NF locations only on *MFWP extended* winter range: 32 (2.8 percent of NF locations)
- Helena NF locations not on winter range: 15 (1.3 percent of NF locations)

Because *Helena NF Oil and Gas EIS* winter range accounts for nearly 96 percent of the winter elk locations/ observations and includes all of the sites where elk have been observed to concentrate for most of the winter, I have concluded that this delineation is appropriate for assessing potential effects of the Divide Travel Plan on the National Forest. I have, however, eliminated two areas previously designated as winter range in the *Oil and Gas EIS* that have since been determined not to be used by elk in winter: these habitat blocks are located immediately south of Elliston and in the upper Spotted Dog drainage. Elk use these areas as transitional and summer range, but not as winter range.

Even with the *Oil and Gas* delineation, a few problem areas remain with regard to *Forest Plan* standards. These involve snowmobile routes that have been in place for several decades and that, until 1995, were not considered to be on big game winter range. The greatly expanded

delineation of winter range in the *Oil and Gas EIS* brought portions of these trail systems into the area covered by *HFP* standard 4c. This standard states that "all winter range areas will be closed to vehicles between December 1 and May 15," with the exception of access routes to "other lands" (*HFP,* p. II/18).

For the most part, the Helena NF has allowed snowmobiles to continue using these traditional trail networks, the assumption being that as long as the snow base in any given area remains solid enough to support recreational snowmobiling, it will not be suitable for use by grazers, notably elk. Once the snow deteriorates to the point that elk are able to move through it without difficulty and get down to ground forage, it will no longer be suitable for snowmobiles. So, there should be little overlap and minimal conflict between these uses.

Field observation over several decades validates the assumptions as to the temporal separation of elk and snowmobiles on winter range, with a few exceptions. These have occurred in areas where newer model snowmobiles, able to deal with shallow, patchy snow, have been used to access antler hunting grounds in April. These incursions onto occupied winter/transitional ranges involve extensive off-trail riding and most of the areas where these problems have arisen are covered by a variety of snowmobile area closures proposed in different alternatives.

Table 111 - Snowmobile Area Closures

Area	Situated on Winter Range?	Acres Closed to Snowmobiles				
		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Electric Peak Roadless Area	no	19,750	19,750	19,750	19,750	19,750
Bison Crk Addition	no	-	-	-	-	4,980
MacDonald Pass Ski Area	no	820	820	820	820	820
Lazyman Gulch Roadless Area	mostly	15,000	15,000	15,000	15,000	15,000
Hahn Creek–Mike Renig Gulch	entirely	-	1,255	1,255	1,255	1,255
Walker Crk–Bear Gulch Addition	entirely	-	3,940	4,185	4,185	4,185
Mike Renig–Tenmile Connection	no	-	-	2,995	2,995	2,955
Jericho–Minnehaha Crk Addition	no	-	-	-	-	1,690
Sweeney–Blue Cloud Crks	entirely	-	6,065	6,065	6,065	6,065
Priest Pass Addition	partly	-	-	-	-	7,020
Threemile–Ophir–Snowshoe Crks	entirely	-	3,300	3,300	3,300	-
Black Mtn (north) – Deadman Crk	slightly	-	-	-	-	7,585
Total Closures		35,570	50,130	53,370	53,370	71,305

Table 111 tallies acreages of areas closed to snowmobiles under the five Travel Plan alternatives. Cross-country snowmobiling is not permitted in these areas and the only interior access is by occasional, longstanding access routes, such as the Rimini and Sweeney Creek/Priest Pass Roads. Rationale for excluding snowmobiles include minimizing disturbance of big game animals on winter and spring ranges and deterring the use of snowmobiles for hunting. In addition, some closures help minimize disturbance of lynx, protect potential wolverine denning habitat and alleviate conflicts between motorized and non-motorized recreation (primarily cross-country skiing and snowshoeing).

Some of the additional closures in action alternatives are in new areas separated from the three existing closure blocks; others represent expansions of those areas. The three consolidated blocks currently closed to snowmobiles are Baldy Ridge/Electric Peak Roadless Area, Lazyman

Gulch Roadless Area and the MacDonald Pass cross-country ski trail complex. Additional closures in alternative 2 expand the number of separate closure blocks to six. Consolidation of some of these blocks in alternatives 3 and 4, reduces the number to five. Alternative 5 reduces the closure pattern to three large aggregations: Electric Peak/ Bison Creek at the south end of the Plan Area; Black Mountain/Deadman Creek at the north end; and Lazyman/Jericho/Sweeney Creek west and southwest of Helena [refer to alternative maps in the *FEIS*].

Effects of Alternative 1 (Existing Condition)

Of the four current snowmobile area closures (Baldy Ridge, Electric Peak Roadless, Lazyman Roadless and MacDonald Pass), only the Lazyman Roadless Area block incorporates Helena NF (Oil and Gas EIS) elk winter range. This latter closure discourages snowmobile-based antler hunting on late winter and transitional ranges and reduces potential harassment of elk (particularly bulls) in these areas. In addition, it compliments winter range area closures recently established in the adjacent Clancy-Unionville Travel Plan area to the south and east. Snowmobile area closures on big game winter range total about 10,950 acres.

Under alternative 1, 39 miles of regularly-used snowmobile routes impinge on Helena NF winter range, most of them in the upper reaches of the range where snow conditions are most conducive to snowmobile use. Few elk and deer venture into these areas in most winters and no conflicts have been reported on the trail system. Almost 75 percent of winter range snowmobile routes occur on the east side of the Continental Divide north of U.S. Highway 12, that is, in the Sweeney Creek, Austin Creek, Greenhorn Creek and Skelly Gulch drainages. Other areas with trails are along the western Forest boundary in the Threemile-Ophir–Snowshoe Creek area and south of Highway 12 in Hahn Creek and Mike Renig Gulch. Of the existing snowmobile routes, 16 miles are specifically designated as snowmobile trails, 20 miles are on roads open year-round to all vehicles able to navigate them and four miles are on roads technically closed to all vehicles but on which the Helena NF has allowed snowmobile use for several decades. Some of these winter ranges are also traversed by roads leading to areas where resource management, public recreation, or private land require access: vehicle use is thus permitted under *Forest Plan* big game standard 4c (*HFP,* p. II/18).

Effects of Alternative 2

Alternative 2 would appreciably expand snowmobile area closures on winter range. Most significant is the 6,065 acre area immediately northeast of Sweeney Creek, a key wintering area for elk, moose and deer [Figure 56]. This area is now open to all vehicles in winter and while it normally sees little snowmobile use, it is often accessible to ATVs and four-wheel-drive vehicles because of its low elevation and lesser snow accumulation [Figure 56, Figure 57]. Other new closures include the fringe of elk winter range along the Helena NF border in the Threemile, Ophir and Snowshoe Creek drainages; a patch of winter range in upper Mike Renig Gulch and Hahn Creek; and an extension of the Black Mountain–Mount Helena closure westward across the Tenmile drainage and northward into Walker Creek. New snowmobile closures would put an additional 14,315 acres of Helena NF elk winter range off-limits to snowmobiles compared to current conditions.

Alternative 2 would reduce snowmobile trails on elk winter range from about 40 miles to 24 miles. Most of the reduction would come from closing the Sweeney Creek–Blue Cloud Creek area, including the trail system, to all vehicles between October 14 and May 16. The closure is intended to eliminate motorized disturbance on key big game winter range and on late fall and early spring transitional range, as well as during the hunting season. Of the remaining 24 miles

of winter range snowmobile routes, nine miles would be specifically designated for snowmobiles and 15 miles would involve roads open to all vehicles, including snowmobiles (although, with few exceptions, only snowmobiles are able to negotiate these routes in winter). Under alternative 2, the current policy of tolerating snowmobiles on certain roads that are technically closed to them would cease. Alternative 2 would leave open to all vehicles the current array of "crossing routes" that provide winter access to other parts of the Forest.

Effects of Alternative 3

Alternative 3 would close an additional 3,240 acres to cross-country snowmobile use (compared to alternative 2) by consolidating closures in the Hahn Creek, Tenmile Creek and Lazyman Roadless blocks. The new closure would connect areas across the Continental Divide. With regard to snowmobile closures on winter range, alternatives 2 and 3 are nearly identical.

Alternative 3 is the same as alternative 2 in terms of snowmobile routes on winter range. That is, nine miles of designated snowmobile trails; 15 miles of roads open to all vehicles able to negotiate them (in most cases, only snowmobiles); and no sanctioning of snowmobile use on road systems closed to all vehicles year-round. As with alternative 2, the route and area closure in the Sweeney Creek–Blue Cloud Creek area represents the most significant removal of motorized disturbance from actively-used winter range. Other trails remaining open are on higher elevation "winter range" in areas not used by big game animals until after snowmobile use has ceased. "Crossing routes" that allow motor vehicles to pass through winter range to access other parts of the Forest would be the same as in alternatives 1 and 2.

Effects of Alternative 4

Alternative 4 is identical to alternative 3 in terms of (1) Forest roads and trails open to snowmobiles on winter range (24 miles) and (2) "crossing roads" open to wheeled vehicles and snowmobiles on winter range. It also follows alternative 3 in the the acreage of snowmobile closures on elk winter range.

Effects of Alternative 5

Alternative 5 would consolidate and increase the size of snowmobile area closures considerably more than other action alternatives. Closure acres would total 71,305 acres, nearly 18,000 acres more than alternatives 3 and 4. Alternative 5 would (1) create a new closure area in the Black Mountain/Deadman Creek region at the northern tip of the Travel Plan Area (adjacent to the Nevada Mountain Roadless Area), (2) merge separate closures (as proposed in alternatives 2, 3 and 4) west and southwest of Helena into one large block and (3) add much of Bison Creek and part of upper Ontario Creek to the Electric Peak Roadless Area closure. This latter closure would compliment similar snowmobile restrictions on the Beaverhead-Deerlodge NF immediately to the south.

Under alternative 5, big game winter ranges would carry the fewest designated snowmobile routes of any alternative, just over 11 miles. This would be in addition to the standard "crossing routes" used by wheeled vehicles throughout the winter. These are common to all alternatives and include sections of the Rimini Road and U.S. Highway 12. Other routes, such as the Sweeney Creek/Priest Pass Road and the Mullan Pass Road may also be driveable by wheeled vehicles early in most winters.

Alternative 5 would maintain active snowmobile routes at more-or-less the same level as other alternatives: 403 miles, which is within the range of the other four alternatives (394 to 418 miles) [Table 99]. This mileage remains relatively constant in spite of the decline in snowmobile

routes on big game winter range, as these losses are balanced by an increase in designated routes elsewhere. Overall, this shift is a benefit to elk on winter range. Alternative 5 is the only alternative that eliminates the category "regularly-used snowmobile routes that the Travel Plan identifies as 'closed to motorized use yearlong' " [Table 99]. In alternative 5, all snowmobile routes are specified as "designated snowmobile routes" or as routes on which snowmobile use is "allowed". This eliminates the ambiguity of snowmobiles being allowed to use routes that are technically closed to them (by the Travel Plan) because they pass through areas in which off-route use is allowed.

Elk: Cumulative Effects

This summary of cumulative effects is based on the detailed matrix in the *EIS*, which identifies past, present and reasonably foreseeable actions and circumstances that may affect elk and elk habitat. The scope of the analysis includes the Divide landscape (Helena NF land with non-Forest inholdings), adjacent National Forest lands (the Lincoln Ranger District of the Helena NF and the Jefferson Ranger District of the Beaverhead-Deerlodge NF) and neighboring non-Forest lands (private, State, County, municipal and BLM). This summary is common to all alternatives.

Forest Service Past and Ongoing Activities

Recent and continuing activities on the Helena NF that have improved prospects for big game species include: Implementation of the Statewide OHV Plan (USFS, USFWS 2001), which prohibits riding off established motor routes; a variety of trail relocation projects that have removed trails from productive riparian areas to upslope locations; mine reclamation projects that have improved the functioning of riparian habitats likely to attract these animals; grazing allotment revisions that have generally reduced cattle numbers and improved habitat condition; road and motor trail closures associated with timber harvest projects (Clancy-Unionville, Sound Wood, Mullan Pass, Lava Mountain, Treasure Mountain); and ongoing noxious weed treatments.

Other activities have locally displaced elk, reduced the effectiveness of elk habitat, or have had a mixed effect. These include: timber harvest, mostly in the 1970s and 1980s, that has created an abundance of large clearcuts (Bison Creek, Mike Renig-Hahn Creek, Slate Creek, Lump Gulch, Ophir Creek-Cave Gulch, Deadman); numerous road permits allowing access across Helena NF land to private holdings; retention of private recreational residences on Helena NF land (MacDonald Pass, Tenmile Creek); small mining operations (under the 1872 Mining Act); construction and maintenance of communications sites and power lines; Forest road improvement projects that have widened road corridors; and widespread fencing associated with grazing allotments that may complicate movement.

The Forest has also undertaken several vegetation projects unlikely to affect elk because they are highly localized or situated close to human development. These include hazard tree removal in developed recreation sites, at administrative sites and along road corridors. The recent removal of beetle-killed trees in the MacDonald Pass Ski Trail recreation area falls into this category, as do recently completed tree removal projects in Kading, Park Lake, Cromwell Dixon and Moose Creek campgrounds.

Other recent vegetation projects have been large enough to have more impact. The ongoing Forestwide Roadside Hazard Tree Removal Project, which is removing beetle-killed lodgepole and ponderosa pine from roadside corridors ranging in width from a few feet to as much as 150 feet (each side of the road). Often, these corridors have little effect because they are roadside

environments seldom used by elk. In other cases, where they are situated in strategic locations, primarily where elk have traditionally moved along or crossed the road corridors, the more open habitat structure may be altering elk movement patterns and in some cases, putting them more at risk from human generated mortality.

The just-completed Clancy-Unionville Project south of Helena has also opened up extensive areas formerly occupied by closed-canopy forest. Much of the original treatment was proposed as an array of partial cuts designed to create open-canopied stands more resistent to stand-replacing fire. But with the mountain pine beetle outbreak creating entire stands of dead trees, many of these prescriptions were necessarily changed to regeneration cuts, clearcuts with reserve trees, seed-tree cuts and widely spaced thinning. This has improved foraging opportunity for elk but diminished forest cover.

The ongoing Red Mountain Flume-Chesman Reservoir Project is removing dead trees (mostly lodgepole pine) from 490 acres along the flume corridor and around the reservoir. While relatively localized and contiguous, these new openings change areas that elk have used primarily for concealment, escape and resting to those used mostly for foraging.

It should be noted that all of the projects that have removed or are removing dead trees are merely accellerating the rate of cover loss that would have occurred naturally within another five to 10 years as dead trees fall. The difference in the end is that treated areas are characterized by relatively “clean” ground-level environments dominated by grasses, forbs, shrubs and regenerating conifers; untreated sites are cluttered with an abundance of coarse woody debris with a matrix of ground vegetation and young conifers dispersed irregularly throughout. Both of these habitat configurations are useful wildlife environments, although species mix and use patterns vary.

Adjacent Private and Other, Past and Ongoing Actions

Private land development (primarily rural home building) is continuing to create sites that create problems for animals attempting to move through and occupy the landscape. Other endeavors with similar effects include mining operations (Drumlummon mine, Bald Butte mine clean-up), ATV-trail bike riding areas, private timber harvest, clearing vegetative cover from riparian sites and new and upgraded roads (particularly improvements to the Marysville road).

Recent acquisition by the State of Montana of 27,000 acres of private land centered in the Spotted Dog Creek drainage immediately west of the Helena NF boundary has implications for elk security. These holdings were previously off-limits to most public hunting and have, in recent years, served as a refuge for elk during the hunting season. As of 2010, these lands have been open to public hunting and to other uses throughout the rest of the year, mostly hiking, wildlife watching, mountain biking and horseback riding. Motorized access is limited. Other restrictions will be designed to protect elk on winter range, since these formerly private lands have served as primary winter habitat for elk for several decades. Public use of these lands may alter elk movement and use patterns on State, private and adjacent Helena NF lands in the near future, although limited motorized access is likely to ameliorate elk vulnerability to hunting.

Forest Service Reasonably Foreseeable Actions

Reasonably foreseeable activities on Helena NF land that may affect elk to one degree or another include improvement of the Rimini Road, revision of several grazing allotments (MacDonald Pass, Austin, Empire and several others) and large vegetation manipulation projects

(Telegraph salvage and thinning; Tenmile South Helena Vegetation Project). The Telegraph and Tenmile South Helena Projects are extensive vegetation manipulation projects focused on removing beetle killed trees in large blocks through a combination of cutting and prescribed burning. Both would alter habitat opportunity for elk by transforming sites potentially dominated by stacked, coarse woody debris to uncluttered sites with more continuous ground vegetation and regeneration. Proposed salvage would accellerate the loss of current hiding/screening cover by at least five years.

Adjacent Private and Other, Reasonably Foreseeable Actions

Future activity on non-Forest land that may affect elk and other big game species includes: settlement and other development of private lands (including road building); continued timber harvest and removal of beetle-killed dead trees; continued mining operations that usurp habitat and create disturbance zones (notably, the Montana Tunnels mine expansion); continued ATV and other motorized activity.

Elk: Summary and Conclusions

No alternative would create circumstances that would measurably shift elk population size or population structure. The four action alternatives, however, would incrementally alter big game security and habitat effectiveness in local areas, thus altering elk habitat use patterns and hunter opportunity.

Elk Summer Range Habitat Effectiveness

Summer range hiding cover, the *Forest Plan* measure of summer habitat quality, would remain the same in all alternatives. Habitat effectiveness, however, as a function of open road density, would vary.

Alternative 1 would retain summer habitat effectiveness (HE) at 56 percent of the Divide landscape as a whole. Habitat effectiveness would remain above the recommended 50 percent level in all six elk herd units (EHUs).

Under Alternative 2, habitat effectiveness would increase in two EHUs, decrease in one and remain steady in three. Habitat effectiveness in the landscape as a whole would remain at 56 percent.

With Alternative 3, habitat effectiveness would increase in three EHUs and remain steady in the other three. Landscape-wide habitat effectiveness would increase to 58 percent

Habitat effectiveness under Alternative 4 would be identical to that of Alternative 3 in five of the six EHUs. In one unit, however, (the Spotted Dog – Little Blackfoot EHU) habitat effectiveness would be three percent lower than in alternative 3 because of routes in upper Spotted Dog Creek, on Baldy Ridge and in upper Ontario Creek that would be open to wheeled vehicles in summer. Overall, habitat effectiveness would be 58 percent.

Under Alternative 5, habiatat effectiveness would increase in four herd units and remain unchanged in the two units that are mostly outside the influence of the Travel Plan Area (Quartz Creek and Black Mountain-Brooklyn Bridge). Overall habitat effectiveness would be 60 percent.

In sum: Habitat effectiveness would be similar in all five alternatives and the overall availability of summer habitat would not be a limiting factor for elk under any alternative.

Elk Hunting Season Security

Under Alternative 1, elk security areas (greather than or equal to 1,000 acres) would continue to occupy 19 percent of elk herd units (EHUs) within Helena NF administrative boundaries across the Divide landscape as a whole. Intermittent refuge areas would occupy three percent. Only two EHUs would exceed 20 percent security. If this alternative is chosen, these percentages would become the baseline security levels that would need to be maintained or improved within each herd unit. These security levels are, for the time being, allowing MFWP to meet elk population goals in local hunting districts or in those portions of the districts influenced by Divide landscape elk herd units.

Under Alternative 2 , elk security areas would occupy 19 percent of the Divide landscape, the same as alternative 1. Security area configuration would be redistributed, however. Security would rise in two EHUs, decrease in one and remain steady in three. As with alternative 1, only two EHU would exceed 20 percent security. If this alternative is chosen, these percentages would become the baseline security levels that would need to be maintained or increased within each herd unit.

Under Alternative 3, elk security areas would occupy 24 percent of the landscape. Security would increase in four EHUs and remain steady in two. Three EHUs would now exceed 20 percent security on fall range. Security in one unit (Spotted Dog-Little Blackfoot) would increase to 39 percent. Intermittent refuge areas would account for two percent of the landscape. If this alternative is chosen, these percentages would become the baseline security levels that would need to be maintained or improved upon within each herd unit.

Under Alternative 4, elk security areas would occupy 23 percent of the landscape, slightly less than under alternative 3. Overall coverage of intermittent refuge areas would remain in the same range as other alternatives: two percent in this case. As with alternative 3, security would increase in four herd units and remain steady in two others. If this alternative is chosen, these percentages would become the baseline security levels that would need to be maintained within each herd unit.

Alternative 5 would provide the highest security level of any alternative, 27 percent overall. As with alternatives 3 and 4, four herd units would see increased security and two would remain essentially unchanged. Security increases would be more substantial under this alternative, however, with three herd units near or above the 30 percent level. If this alternative is chosen, these percentages would become the baseline security levels that would need to be maintained or improved upon within each herd unit.

Current elk population numbers, bull/cow ratios and calf/cow ratios are at or above MFWP objectives for three of the four hunting districts that cover the Divide landscape (HDs 215, 335, 343). In the 4th district (HD 293), total elk numbers are below MFWP objectives, but elk populations in the portion of the district influenced by the Divide Travel Plan Area are at acceptable levels.

Winter Range

With regard to *Forest Plan* big game standard 3, no alternative would affect thermal cover on winter range. With regard to big game standard 4c, all alternatives would continue to allow the presence of some longstanding snowmobile routes on elk winter range. All four action alternatives would reduce snowmobile and OHV use on big game winter range, most

significantly in the Sweeney–Blue Cloud Creek area. Alternative 5, however, would be much more effective in this regard.

Alternative 1 would retain approximately 10,950 acres of snowmobile area closures on Helena NF (*Oil and Gas EIS*) winter range. It would retain 39 miles of active snowmobile trails on winter range.

Alternative 2 would expand snowmobile area closures to cover approximately 25,490 acres of elk winter range and would reduce winter range snowmobile trails to 24 miles, most located toward the upper edge of winter range where elk seldom venture in winter.

Alternative 3 would provide the same snowmobile area closures and the same mileage of snowmobile trail on elk winter range as alternative 2.

Alternative 4 would provide the same snowmobile area restrictions and the same array of snowmobile trails on elk winter range as alternatives 2 and 3.

Alternative 5 would reduce snowmobile routes on elk wintr range to about 11 miles. Snowmobile area closures would increase to approximately 29,500 acres on winter range.

Threatened and Endangered Species

Grizzly Bear

Roads distribute human activity across the National Forest in ways that are known to diminish utility of otherwise suitable grizzly bear habitat. Travel management obviously has a key role to play in determining occupancy patterns for grizzlies on the landscape. This section describes potential effects in terms of road patterns in the Divide Travel Plan Area. Grizzlies are scarce in the Divide landscape, but they continue to range southward out of solid populations in the Northern Continental Divide Ecosystem Recovery Zone to the north. The presence of non-motorized areas with a good dispersion of productive habitat is key to allowing bears to move through and occupy the landscape, albeit in small numbers.

Common Effects of Travel Management and Alternative Comparison

In this analysis, potential effects of the five alternatives on grizzly bears are gauged in terms of (1) the size of large non-motorized core area equivalents, (2) road density and (3) motorized use in key habitat areas. Effective grizzly habitat requires large core areas free from motorized use during the period when bears are active (April to November) (IGBC 1994). The analysis of large (greater than 1,500 acres) non-motorized habitat blocks in the previous "*Connectivity/Fragmentation"* section provides a basic summary of such areas in the Plan Area. A modified version more specific to grizzlies is displayed below in Table 112, which shows non-motorized areas larger than 2,500 acres and 0.3 miles from open motor routes [USFS 2005, p. 7]. This delineation is based on the parameters used to define "core areas" in and around the Grizzly Bear Recovery Zone in the Northern Continental Divide Ecosystem.

Table 112 - Acreages of Large Refuge Areas for Grizzly Bears

Area Identification / Location	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
North of Highway 12					
Black Mountain – Deadman Creek	10,010	11,330	11,470	11,330	18,875
Austin Creek – Sweeney Creek	-	3,225	4,860	4,860	5,110
South of Highway 12					
Electric Peak Roadless Area	21,345	21,095	27,875	23,310	25,635
Treasure Mountain	-	-	-	-	3,405
Jericho Mountain Roadless Area	4,485	4,495	4,665	4,665	4,805
Lazyman Gulch Roadless Area	6,905	6,910	6,910	6,910	7,150
total acres North of Hwy 12	10,010	14,555	16,330	16,190	23,985
total acres South of Hwy 12	32,735	32,500	39,450	34,885	40,995
total acres in Landscape	42,745	47,055	55,780	51,075	64,980
% of total Plan Area in core areas	24%	26%	31%	29%	37%

The Travel Plan Area currently supports 20 non-motorized habitat patches larger than 1,500 acres, as measured from the edge of the road/motor trail corridor [see Table 102and Table 103]. However, when the the more stringent parameters for grizzly bear core habitat in the Northern Continental Divide Ecosystem Recovery Zone are applied to the Divide Travel Plan Area (177,713 acres), only four of these non-motorized blocks emerge under current conditions. Secure core area characteristics (blocks of contiguous habitat at least 0.3 mile from motorized routes and larger than 2,500 acres) are based on recommendations of the Interagency Grizzly Bear Committee (IGBC 1994) for the Northern Continental Divide Ecosystem Recovery Zone and have been used in a number of recent analyses in that area (see USFS 2005; Servheen *et al.* 2001). The core areas provide habitat that is less impacted by human activity and where grizzly bears are at lower risk of displacement and human-caused mortality (Servheen *et al.* 2001, p. 167).

In delineating non-motorized habitat blocks for grizzlies in this way, I found that several sizable blocks of unroaded habitat dropped below the 2,500 acre threshold when the 0.3 mile buffer was applied. These included non-motorized or lightly roaded areas around Greenhorn Mountain, Little Porcupine Creek, upper Snowshoe Creek, Sweeney Creek, Priest Pass, Red Mountain, Lee Mountain, Treasure Mountain, Slate Lake, Hat Creek, upper Spotted Dog Creek, Jericho Creek and Negro Mountain [see Table 102]. Grizzlies have been reported in some of these areas over the past 20 years.

Some of the smaller blocks are tenuously connected to the larger core areas (listed in Table 112) by narrow corridors of unroaded habitat. The Jericho Creek block (currently 3,265 acres in Table 102), for example, is connected over the Divide to the Jericho Mountain Roadless Area by a 0.3 mile-wide corridor of non-motorized habitat. Likewise, the Upper Elliston Creek and Treasure Mountain patches are both connected to larger core areas to the south by narrow necks of unroaded habitat.

Two of the potential core areas shown in Table 112 connect with large roadless areas outside Planning Area boundaries. The Black Mountain – Deadman Creek area abuts the large Nevada Mountain Roadless Area to the north and reports of grizzly bears have been consistent throughout this country for several years. Likewise, the extensive Electric Peak Roadless area at the southern end of the Plan Area is contiguous with roadless country on the Beaverhead-

Deerlodge NF, a zone within which a majority of grizzly reports from the southern half of the landscape have occurred over the past 20 years.

Under current road and trail patterns, only a single potential grizzly bear core area (Black Mountain – Deadman Creek) is present north of Highway 12. As mentioned, this core area is contiguous with another extensive non-motorized region (roughly 35,000 acres) that abuts the Travel Plan Area on the north, providing the Distribution Zone in the Travel Plan area with an effective linkage to established grizzly populations in the Blackfoot landscape on the Lincoln Ranger District. Under the four action alternatives, a small number of strategic road and motor trail closures in the area between Sweeney and Austin Creeks allow formation of a second large non-motorized block north of Highway 12. This area is a peninsula of non-motorized habitat in an an otherwise settled region of the greater Helena Valley. It does, however, provide a combination of habitat characteristics (rugged terrain, dense conifer forest, aspen stands, productive open foraging areas) that the bears may find useful in moving through the Divide landscape. The Helena NF and MFWP have received rare, but credible, reports of grizzlies in the upper (western) reaches of this area since 1990.

In the new southern extension of the Distribution Zone, the four action alternatives are more conducive to grizzly bears than alternative 1 (the existing condition) in terms of the total acreage within potential core areas and the number of such areas. This is particularly true of alternative 5, which provides a total of six large non-motorized blocks and adds more than 22,000 acres to this habitat compared to alternative 1. Differences relate primarily to effective motorized trail and road closures in the Meyers Hill, Sweeney Creek, Treasure Mountain, Baldy Ridge, Es and areas under alternatives 3 and 4. In alternative 2, core area acreage decreases from current conditions because of new motor routes in upper Ontario Creek and around Treasure Mountain.

The density and distribution of roads and motor trails, public and private, are important in determining core areas and understanding the extent of habitat security for grizzly bears. Mace and Manley (1993) have found that in Montana adult bears use habitat with *open* road densities that exceed 1.0 mi/mi^2 less than would be expected (if habitat use were random). All sex and age classes use habitat with *total* road densities in excess of 2.0 mi/mi^2 less than expected.

Table 113 shows the kinds of open road and motor trail densities that grizzly bears would have to deal with in the Divide landscape under different alternatives. The volume and type of traffic these routes carry and the resulting impact they have on grizzlies, varies widely within categories and I have not attempted to apply any weighting factors to the road mileages.

Table 113 - Unweighted Miles and Density of Roads and Motor Trails

	Open Routes					All Routes Open & Closed
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	
North of Highway 12						
Miles of HNF, County, State Roads	186	155	153	150	87	273
Miles of HNF Motor Trails	12	14	0	1	19	39
Miles of Open Private Roads	66	66	66	66	66	66
Total Route Miles	264	235	219	217	172	378
Total Route Density (mi/mi²)	2.1	1.9	1.7	1.7	1.4	3.0
South of Highway 12						
HNF, County, State Roads	203	216	180	192	134	350
Miles of HNF Motor Trails	8	13	0	3	46	50
Miles of Open Private Roads	88	88	88	88	88	88
Total Route Miles	299	317	268	283	266	488
Total Route Density (mi/mi²)	1.3	1.3	1.1	1.2	1.1	2.1
Total Divide Landscape						
Miles of HNF, State, County Roads	389	371	333	342	221	623
Miles of HNF Motor Trails	20	27	0	4	65	89
Miles of Open Private Roads	154	154	154	154	154	154
Total Route Miles	563	552	487	500	438	866
Total Route Density (mi/mi²)	1.5	1.5	1.3	1.4	1.2	2.4

Currently, in the Divide landscape, *total* road density (including private roads) is about 2.4 mi/mi². Density is around 3.0 mi/mi² in the northern Distribution Zone and 2.1 mi/mi² in the southern Zone [Table 113]. Total road density is appreciably higher in the northern half of the Distribution Zone than in the southern half, a consequence of the large Inventoried Roadless Areas in the region south of Highway 12 outside the zone (Electric Peak, Lazyman Gulch, Jericho). Route densities in the northern Zone are well in excess of Mace and Manley's 2.0 mi/mi² total road benchmark; densities in the southern zone are just short of the threshold. In spite of this, grizzly bears continue to be encountered more frequently in the more heavily roaded northern Zone than in the area to the south, apparently a function of the Zone's proximity to the Northern Continental Divide Ecosystem. *Total* road densities (open and closed) are the same for all alternatives, at least in the short-term. These densities could decline where closed roads are eventually recontoured following action alternatives. *Open* route densities, on the other hand, are different for each alternative (Table 113). Mileages and densities include all routes within the Travel Plan Area open to wheeled vehicles during at least part of the year: Helena NF roads, motor trails, County roads, State highways and open private roads.

Areawide open route densities would be 1.5 mi/mi² in alternatives 1 and 2, 1.3 mi/mi² in alternative 3, 1.4 mi/mi² in alternative 4 and 1.2 mi/mi² in alternative 5. All of these exceed the threshold of 1.0 mi/mi² that Mace and Manley's research suggests is likely to discourage grizzly bear use. Table 113 includes motor trails in addition to open roads, but the contribution of the trails is relatively minor (and in alternative 3, non-existent), so this data is quite comparable to that of Mace and Manley. Action alternatives reduce open route density only slightly in the southern half of the Distribution Zone. Current open route density is 1.3 mi/mi²; action alternatives range from 1.1 to 1.3 mi/mi². In the northern half of the Zone, alternatives 2, 3 and 4 reduce the density from 2.1 mi/mi² to 1.7-1.9 mi/mi². Alternative 5 produces the only notable decline, down to 1.4 mi/mi².

The fact that grizzlies continue to move through and occupy parts of the Travel Plan Area may reflect the rough, primitive condition of many Forest and private roads and the low levels of vehicle use they receive in summer, to the point that bears may often not perceive them as functioning roads. Be that as it may, all road densities under all alternatives exceed levels recommended for and achieved by most Bear Management Subunits in the Northern Continental Divide Ecosystem Recovery Zone on the Lincoln District to the north, areas in which the bears thrive [see USFS 2005].

Open roads and motor trails that penetrate *key* grizzly bear habitats may have an impact well beyond that indicated by unqualified road density and roadless patch size. Productive grizzly foraging sites are typically localized and fragmented and they are often a limiting resource in any given landscape. Motor routes that compromise the functioning of these sites are of particular concern (see USDI 2006, p. 9, 18-19, 35-38; USDI 1993, p. 146).

A number of local areas that are treated differently under each Travel Plan alternative and that may be providing habitat for grizzly bears are discussed in some detail in the section on "*Local Effects in Key Areas"* (which follows toward the end of this report). Five of these areas are of particular interest because they support key grizzly bear habitat components and represent locations in which grizzly bears have been reported in the past five years. One of them, Black Mountain, is inside the original Grizzly Bear Distribution Zone north of Mullan Pass. The other four (Baldy Ridge, upper Telegraph Creek, Slate Lake–Slate Creek and upper Ontario Creek–Bison Creek) are in the new southern extension of the Distribution Zone and south of Highway 12 where grizzly population density is very low.

As to Black Mountain, all four action alternatives eliminate user-made motorized routes into the otherwise unroaded area of forest habitat through which grizzly bears move between the Lincoln and Helena Ranger Districts. South of Highway 12, alternative 2 increases motorized access (over present condition) into all four areas listed above. Alternative 2 increases use into three of them via motorized trails (Baldy Ridge being the exception). Alternatives 3 and 4 maintain the status quo or decrease motorized access, although alternative 4 is less effective as it increases motorized access in upper Ontario Creek and maintains some of the current routes in the upper Spotted Dog–Baldy Ridge area. These areas, while further removed from the Northern Continental Divide Ecosystem, have seen some grizzly bear activity (sparse though it may be) in recent years.

Comparison of Alternatives

Effects of Alternative 1

Alternative 1 is the existing condition. As displayed in Table 113, open route densities in the Travel Plan Area are well beyond the lower limits that research suggests cause grizzly bears to be reticent about using a particular area (greater than 1.0 mi/mi²). Current open road density (unweighted by use) is 2.1 mi/mi² in the region north of Highway 12 and 1.3 mi/mi² to the south.

The average size of the 20 non-motorized patches larger than 1,500-acres in the "*Connectivity/ Fragmentation"* analysis is 5,565 acres [Table 103]. This compares with an average patch size of 7,124 acres for the six potential grizzly bear "core areas" larger than 2,500 acres and surrounded by an additional 0.3 mile non-motorized buffer zone [Table 112][2]. This average is considerably

[2] Large non-motorized road patches used in the connectivity/fragmentation analysis are delineated from road's edge, whereas grizzly bear core areas require a buffer of 0.3 mi between the road and the core area.

larger than the recommended 2,500 acres for such core areas in the Northern Continental Divide Ecosystem Recovery Zone to the north [see USFS 2005]; but on the other hand, the core areas account for only 24 percent of the Divide landscape. By way of comparison, guidelines applied to Bear Management Units (BMUs) in the Northern Continental Divide Ecosystem Recovery Zone to the north aim for a minimum of 68 percent of each Subunit in unroaded core areas. These inherent differences are indicative of why the Divide landscape is classified as a "distribution zone" and not a "recovery zone".

Effects of Alternative 2

Alternative 2 would reduce current open route density from 2.1 mi/mi² to 1.9 mi/mi² in the northern Distribution Zone. In the southern Distribution Zone, the reduction is minimal, with density remaining at about 1.3 mi/mi² [Table 113].

Alternative 2 would increase the total area in secure core areas from 42,745 acres to 47,055 acres. In the northern distribution Zone, it would enlarge an already secure habitat block in the Black Mountain-Deadman Creek area and create a new refuge in the and Sweeney-Austin Creek area [Table 113]. In the southern part of the Zone, two of the three existing core areas would remain essentially the same but the third (Electric Peak) would lose 250 acres because of newly opened motor routes in the Baldy Ridge area. Overall, the appreciable expansion of secure habitat north of Highway 12 would more than compensate for the relatively small loss to the south. The number of habitat blocks large enough to qualify as potential grizzly bear core areas would increase from four to five. Secure habitat blocks would come to occupy about 26 percent of the landscape, a bit more than in alternative 1 [Table 112].

In terms of motorized disturbance around key sites, alternative 2 would increase motorized use in four areas: Baldy Ridge, upper Telegraph Creek, Slate Lake–Slate Creek and upper Ontario Creek–Bison Creek (all in the southern half of the Distribution Zone). It would eliminate motorized intrusion in the Black Mountain area (inside the Distribution Zone at the northern end of the Plan Area).

Effects of Alternative 3

Alternative 3 would reduce open route density in the Distribution Zone from the current 1.5 /mi² to 1.3 mi/mi² [Table 113], somewhat less than alternative 2. This reduction would be more notable in the northern part of the Distribution Zone, dropping from the current 2.1 mi/mi² to 1.7 mi/mi². In the area south of Highway 12, open route density would drop only from 1.3 mi/mi² to 1.1 mi/mi², but the motorized closures would be more strategic in terms of expanding secure habitat areas. In the area north of the highway, the Black Mountain-Deadman Creek area would increase in size and the new Austin-Sweeney block would be larger than the area produced by alternative 2. In total, secure habitat would increase from the current 10,010 acres to 16,330 acres [Table 112]. South of the highway, secure habitat acreage would increase from 32,735 acres to 39,450 acres. All three core areas would expand, although the change would be minimal in the Lazyman Gulch Roadless block. Altogether, secure core area type habitat would increase from 24 percent to 31 percent of the landscape [Table 113].

Alternative 3 would not increase motorized presence in any of the key areas likely to have been providing habitat for grizzlies in the last five years. It would decrease potential for such presence in three of these areas. The resulting parameters, while well below what is required of a grizzly bear recovery zone, represent a measurable improvement over current conditions.

Effects of Alternative 4

Alternative 4 would produce the same open motor route density in the northern half of the grizzly bear Distribution Zone as alternative 3 (1.7 mi/mi²). In the southern half of the Zone, open route density (1.2 mi/mi²) would be slightly more than in alternative 3 (1.1 mi/mi²). These two alternatives are very similar, with alternative 4 allowing only 13 more open route miles than alternative 3 [Table 113].

Alternatives 3 and 4 differ somewhat more in terms of the amount of secure core area habitat produced: 51,075 acres in alternative 4 as opposed to 55,780 acres in alternative 3 [Table 112]. Almost all of this difference occurs in the souther half of the Distribution Zone as a result of newly opened motor routes in the Jericho Mountain and Electric Peak blocks. Nonetheless, open route patterns in alternative 4 would allow 29 percent of the landscape to provide secure grizzly bear habitat blocks as opposed to 24 percent at present (alternative 1) [Table 112].

In terms of motorized presence in key areas likely to have been providing habitat for grizzlies in recent years, alternative 4 is less intrusive than alternatives 1 and 2 but more so than alternative 3. Like alternative 2, alternative 3 would establish a summertime motor trail on currently closed road #4104-A1 along upper Ontario and Bison Creeks, an area of excellent potential grizzly habitat and within two to three miles of sites where grizzlies have been reported in the last five years. While not as disruptive as an arterial or collector road, the trail would introduce motorized disturbance into an environment potentially useful to grizzlies. Alternative 4 would not sanction motorized use in other key grizzly areas and in this regard it is nearly identical to alternative 3. This includes expansion of non-motorized core areas in the Black Mountain region along the northern edge of the Plan Area.

As with alternative 3, the resulting conditions, while well below what is required of a grizzly bear recovery zone, represent a measurable improvement over current conditions.

Effects of Alternative 5

Alternative 5 would produce the lowest open route densities in both the north and south segments of the Distribution Zone and the lowest overall density of any alternative (1.2 mi/mi²). Although the miles of motor trails active during the summer would increase, the miles of open road would decline substantially, both north and south of Highway 12 [Table 113]. Alternative 5 would also generate the largest increase in non-motorized grizzly bear habitat blocks: from 42,745 acres at present to 64,980 acres. A new habitat block (3,405 acres) would appear in the Treasure Mountain area, increasing the number of these potential core areas from five to six [Table 112].

On a large scale, alternative 5 would be the most favorable to grizzly bear habitat because of its lower open road densities and appreciable increment in contiguous unroaded habitat. However, newly designated motor trails proposed in this alternative would create some site-specific problems in key habitat areas likely to be used by grizzlies. These include the Slate Lake area, upper Elliston Creek and upper Ontario/Bison Creeks, all areas where grizzlies have been reported (though rarely) over the past dozen years. These areas are discussed in some detail the later section, *"Local Effects in Key Areas".*

Cumulative Effects

This summary of cumulative effects is based on the matrix in *appendix B*, which identifies past, present and reasonably foreseeable actions and circumstances, in addition to this project, that may affect grizzly bears and their habitat. The scope of the analysis includes the Divide

landscape (Helena NF land with non-Forest inholdings), adjacent National Forest lands (on the Lincoln Ranger District and the Beaverhead-Deerlodge NF) and neighboring non-Forest lands (private, State, County, municipal and BLM). This summary is common to all alternatives.

Forest Service Past and Ongoing Activities

Recent/ongoing activities on the Forest that have improved prospects for grizzly bears include: Designation of the Northern Continental Divide Ecosystem Grizzly Bear Distribution Zone north of Mullan Pass (2002) and its recent expansion southward to cover the entire Divide landscape (2013); trail relocation projects that have removed trails from riparian areas to upslope locations (Blackfoot Meadows, CDNST); mine reclamation projects, some of which have improved riparian habitat function favorable to bears; establishment of the Statewide OHV Plan (2001), which prohibits riding off established motor routes; grazing allotment revisions that have often reduced cattle numbers and improved habitat; road and motor trail closures associated with timber sales (Clancy-Unionville, Sound Wood, Treasure Mountain) that have enlarged non-motorized habitat blocks.

Activities that have locally reduced the effectiveness of potential grizzly habitat or have had a mixed effect include: timber harvest in the 1970s, 1980s and 1990s that has created large clearcuts, as opposed to a finer-grained habitat mosaic (Bison Creek, Mike Renig Gulch-Hahn Creek, Slate Creek, Lump Gulch, Ophir Creek-Cave Gulch, Mullan Pass, Lava Mtn, Deadman); road permits allowing access across Helena NF land to private holdings; retention of private recreational residences on Helena NF land (esp. near the Divide at MacDonald Pass); small mining operations (under the 1872 Mining Act) in areas where grizzlies have been observed; construction and maintenance of communications sites and power lines; widespread fencing associated with grazing allotments that complicate movement; efforts to spread out livestock use on some allotments, which may bring cattle into new areas of potential grizzly habitat; retention of numerous dispersed camping sites; unrestricted back-country recreational use (backpackers, day-hikers, horseback riders, hunters). Timber harvest has recently been completed in the Clancy-Unionville project area, removing blocks of beetle-killed lodgepole pine in the upper Lump Gulch/ Travis Creek drainages and along the Brooklyn Bridge ridge south of Helena. The ongoing Red Mountain Flume Chessman Reservoir Project is removing dead lodgepole pine from 490 acres in the upper Tenmile drainage. Resulting habitat opportunity for grizzly bears would be mixed.

Some recent hazard tree removal projects are unlikely to impact grizzly bears because of their association with roads and developed recreation sites (Park Lake and Cromwell Dixon Campgrounds, MacDonald Pass CDNST Trailhead). Several other projects designed to remove hazard trees are unlikely to influence grizzly bears because of their association with roads and developed recreation sites (Kading and Moose Creek campgrounds, Tenmile picnic area, Roadside Hazard Trees, MacDonald Pass Ski Trails).

Adjacent Private and Other, Past and Ongoing Actions

Private land development (mostly rural home building) continues to create sites that generate problems for animals striving to move through or occupy the landscape (barriers to movement, habitat loss, bear attractants, dogs). Other human endeavors with similar effects include mining operations, ATV-trail bike riding areas, new and upgraded roads (notably, the widening and paving of the Marysville road), unregulated private timber harvest and clearing of vegetative cover from riparian sites. Livestock grazing on private lands near the Forest has some potential

to create conflicts with bears under certain circumstances (sheep being particularly vulnerable). Recent purchase of 27,600 acres of private ranchland in the Spotted Dog drainage by MFWP will forestall subdivision and development of those lands immediately west of the Helena NF boundary and allow them to remain in a condition more amenable to grizzly bear habitation and passage.

Forest Service Reasonably Foreseeable Actions

Reasonably foreseeable activities on Helena NF land that may affect grizzlies to one degree or another include improvement of the Rimini Road (in a potential wildlife travel zone), implementation of grazing allotment revision (Clancy, MacDonald Pass, Austin, Empire), increased recreational use of back-country environments and salvage projects designed to deal with dead tree and woody debris accumulations resulting from the recent mountain pine beetle epidemic. Some of these projects would be extensive: (1) the Telegraph Vegetation Project, affecting a variety of habitats just west of the Continental Divide and (2) the Tenmile-South Helena Project, which would alter dead-tree environments over a wide area from the Continental Divide eastward to the outskirts of Helena. Effects on grizzly bear habitat would be mixed, some beneficial, some problematic. Key ahbitat sites would be protected in all cases.

Adjacent Private and Other, Reasonably Foreseeable Actions

Future activity on non-Forest land in the cumulative effects area that may affect grizzly bears includes: settlement and associated development of private lands (including road building); timber harvest and removal of beetle-killed dead trees; continued motorized recreation.

Summary and Conclusions

All alternatives would comply with the *Grizzly Bear Recovery Plan*, the *IGBC Guidelines* and with appropriate standards and guidelines in the *Helena Forest Plan.*

Alternative 1 would retain four large non-motorized core habitat areas averaging roughly 10,685 acres each (24 percent of the landscape). Unweighted open motor route density would remain at 1.5 mi/mi².

Alternative 2 would increase the number of large non-motorized core habitat areas to five with an average size of 9,410 acres (26 percent of the landscape). Unweighted open motor route density would remain at 1.5 mi/mi².

Alternative 3, like Alternative 2, would support five large non-motorized core habitat areas, but with an average size of 11,155 acres. They would cover 31 percent of the landscape. Unweighted open motor route density would decline to 1.3 mi/mi².

Alternative 4 would also support five large non-motorized core habitat areas. These areas would average 10,215 acres and would cover 29 percent of the landscape, a bit less than alternative 3. Unweighted open motor route density would be 1.4 mi/mi².

Alternative 5 would increase the number of non-motorized potential core areas to six. These areas would average 10,830 acres and would cover 37 percent of the landscape. Unweighted open route density would drop to 1.1 mi/mi².

Under all alternatives, road/ motor trail densities in the Travel Plan Area would remain overly high by Northern Continental Divide Ecosystem Recovery Zone standards. Given the presence of a few several large non-motorized habitat areas, they are low enough to support a small local grizzly bear population and to support linkage zone function. No conflicts with livestock and no

human-caused grizzly bear mortalities have been recorded in the Divide landscape in several decades.

Canada Lynx

Effects of travel management on lynx are assessed via standards and guidelines in the Northern Rockies Lynx Management Direction(NRLMD) (2007b, attachment 1), which is now incorporated into the Helena Forest Plan. Since none of the alternatives propose new road construction or specific road improvements that would directly alter vegetation, direct effects on habitat are essentially non-existent for this particular phase of travel management. Primary effects, therefore will be those generated by shifts in open road distribution and in snowmobile routes that provide access for trappers and packed over-snow travel routes into lynx winter habitat for competing carnivores. There is also some potential for motorized routes disrupting lynx movement patterns in linkage habitat. Potential effects on critical habitat are further evaluated in relation to "primary constituent elements" (PCEs) for lynx identified by the USFWS in documentation designating critical habitat in February 2009 (Federal Register, Vol. 74, No. 36, p. 8638).

Common Effects of Travel Management

General Effects of Open Roads

Useful information on the effects of roads and trails on lynx and their prey is meager (Apps 2000; McKelvey *et al.* 2000). Much of it is anecdotal and studies that have specifically targeted road impacts have not produced definitive conclusions.

Construction of roads sometimes removes linear swaths of suitable lynx habitat, which may have a local impact if habitat is limiting or key sites are affected. Some researchers have noted that adult females may move kittens to new den sites to avoid nearby vehicle traffic that escalates as summer comes on (Ruggiero *et al*. 1999). In some cases, lynx may alter normal travel and hunting patterns to avoid open roads, but they are also likely to travel along roadways less than 50 feet wide with good cover along both edges (Koehler and Brittell 1990). Field research and observation indicate that in normal circumstances most lynx do not necessarily avoid habitat near roads except for roads with high traffic volume (Aubry *et al.* 1999; Ruggiero *et al*. 1999).

Lynx are particularly vulnerable to exploitation by trapping (Bailey *et al.* 1986). Although they can no longer be targeted by trappers in Montana, lynx are at risk from traps set for any mid-sized furbearer and therefore are affected by roads and snowmobile trails that provide access for trappers in winter. Research does indicate that lynx are probably more vulnerable to trapping near open roads (Koehler and Aubry 1994; Bailey *et al.* 1986).

Denning habitat is usually not a limiting factor for lynx in the northern Rockies (USFS 2007c, p. 173) and the Lynx Management Direction does not present a standard that specifies how much denning habitat needs to be retained in a given LAU (USFS 2007b, p. 14-17). However, Guideline VEG G11 states that substantial pockets of large woody debris should be distributed throughout each LAU and that if denning habitat appears to be deficient, projects should be designed to retain coarse woody debris (USFS 2007b, Attachment 1, p. 5). The Divide Travel Plan does not propose to alter existing patterns of woody debris, but it would indirectly provide opportunities for firewood cutters to remove snags and logs from road corridors, which, in some cases, may degrade potential lynx denning habitat. Normally, areas within 300 feet of open roads are unlikely denning sites, but they could serve the purpose in certain circumstances, such as where

understory regeneration is thick, downfall is abundant, traffic is infrequent and opportunities are limited elsewhere.

Refuge and Connectivity

While it is not conclusively known what effect roads and motorized trails have on lynx, research suggests that local unroaded or non-motorized refuges are important for successful lynx reproduction and for ecological fitness (Ruediger *et al.* 2000). Such refugia include large areas of high quality habitat relatively secure from human exploitation, habitat degradation and disruptive winter access. Landscape connectivity is also an important component of lynx conservation. Areas of high human use can interrupt habitat connectivity and further fragment lynx habitat (Ruediger *et al.* 2000). Previous sections of this report dealing with "*Fragmentation and Connectivity"* and with the "*Grizzly Bear"* present assessments of large blocks of non-motorized habitat that may be of use to lynx as sanctuaries [see Table 102, Table 103, Table 112 and associated discussion]. These analyses show that the average size of potential lynx refuges increases substantially under alternative 2 and more so under alternatives 3 and 4.

Snow Compaction

Roads and trails provide unobstructed routes for snowmobiles, cross-country skiing and other winter uses that create snow compaction. Compacted routes facilitate winter access for carnivores that would otherwise be unable to negotiate the deep snow characteristic of lynx winter habitat. Lynx have evolved a competitive advantage in deep, non-compacted snow that tends to exclude other predators during winter, a time when prey is most limiting (Buskirk *et al.* 1999; Ruediger *et al.* 2000). Competing carnivores that might be able to take advantage of solid over-the-snow routes include coyotes, bobcats, red foxes, mountain lions, wolves and wolverines (although wolverines are also willing to move through deep loose snow on a regular basis). Although coyotes and bobcats are most often cited as the primary competing carnivores taking advantage of compacted snow routes, systematic tracking surveys in the Divide landscape (Wild Things Unlimited, 2007-2010) found that the most frequently encountered winter competitors were coyotes and red foxes [see Gehman *et al.* 2008, 2009].

Research on this issue is new and so far, conclusions have been limited. One study of the effect of snow compaction on coyotes and lynx in western Montana (Kolbe *et al.* 2005) found that while coyotes did use packed snowmobile and ski trails in lynx habitat, most of their travel was off-trail, often in areas where snow was shallow or naturally compacted. As well, coyotes acted primarily as scavengers in winter and did not compete significantly with lynx for live prey.

Another recent study in northern Utah (Bunnel 2006, cited in USFS 2007c) found that coyotes stayed relatively close to snowmobile trails (within 350 meters) when snow was deep and prey was common in the trail corridor. The sum of recently completed and ongoing research suggests that lynx and coyote populations often coexist on winter range but that there is no good evidence that lynx populations are suffering as a result (USFS 2007b, p. 24). A number of studies have observed also that lynx normally tolerate at least moderate levels of snowmobile traffic through their winter habitats and that they readily use packed snowmobile routes as travelways (Aubry *et al.* 1999).

Effects Assessment: Comparison of Alternatives

Attachment 1 in the Northern Rockies Lynx Management Direction ROD (2007b) displays the objectives, standards and guidelines designed to promote lynx conservation. *Objectives* are descriptions of desired resource conditions for lynx. *Standards* are management *requirements*

designed to meet objectives. *Guidelines* are management actions that, while not required, are *normally taken* to meet objectives (USFS 2007b, p. 7). Standards and guidelines that deal with the potential effects of travel management on lynx can be found in *NRLMD* sections addressing "human use projects" (HU), "linkage areas" (LINK) and management applicable to all actions in LAUs (ALL).

Guidelines HU G6 and HU G8 deal with road upgrading and maintenance. They will apply to future road projects emanating from the Divide Travel Plan but not to this phase of the planning effort. Guidelines HU G7 and HU G9 address the placement, design, closure and reclamation of *new* roads. Since no Travel Plan alternative proposes to construct new roads, this guidance does not apply, although it may be useful in assessing the closure of existing roads. The *NRLMD* does not provide standards or guidelines that address the density of open roads, motor trails, foot trails, or closed roads [see discussion in *NRLMD ROD,* p. 26-27].

Standard LINK S1 requires identification of potential lynx highway crossings when planning highway construction or reconstruction in known linkage areas. Likewise, Guideline ALL G1 directs using methods that avoid or reduce effects on lynx when constructing or reconstructing highways. Since none of the alternatives propose highway construction or reconstruction, this direction does not apply to the Divide Travel Plan. The problems that two these standards/guidelines address, however, are relevant in that (1) highway crossings are a problem on U.S. Highway 12 around MacDonald Pass and (2) one project (by another agency) that may qualify as "highway reconstruction" (the Rimini road project) lies within the Plan Area. These circumstances do not influence the Divide Travel Plan's compliance with the *NRLMD,* but they are part of the environmental baseline that needs to accounted for.

This leaves Guidelines HU G11 and HU G12, which deal with over-the-snow routes and the issue of winter access into lynx habitat. These guidelines are as follows:

HU G11. *Designated over-the-snow routes* or designated play areas should not expand outside baseline *areas of consistent snow compaction*, unless designation serves to consolidate use and improve lynx habitat. This may be calculated on an LAU basis or for a combination of immediately adjacent LAUs.

HU G12. Winter access for non-recreation special uses and mineral and energy exploration and development should be limited to designated routes or designated over-the-snow routes.

A breakdown of snowmobile routes in the Divide Travel Plan Area is shown in Table 99. Currently, the Plan Area supports 81 miles of roads and trails that have been *specifically designated* for snowmobile use under the existing Travel Plan [see HELENA NATIONAL FOREST Visitor Map, 2006; Divide Travel Plan map for alternative 1]. The Travel Plan also allows snowmobile use on any Forest or County road open to highway-legal vehicles, whether or not it is specifically designated as a snowmobile route, as long as the road is (1) unplowed and (2) not within an area closed to snowmobiles. Snowmobilers currently make use of 239 miles of these "allowed" routes, most of which have been in use for decades [Helena NF Recreation files; Helena Snowdrifters Snowmobile Club meetings]. Roughly 48 percent of the non-specified routes (114 miles) are shown on the map of *Snowmobile Routes on the Helena National Forest* (Helena Snowdrifters 2003). Action alternatives would specifically designate many of these traditional routes as "snowmobile trails". This represents a shift in status from an *allowed* use to a *specifically designated* use. It does *not,* however, represent an actual increase in the identified network of packed over-snow routes.

In addition to this system of routes on which snowmobile use is *specified* or *allowed* by the Travel Plan, a number of roads that technically are "closed to motorized vehicles yearlong" also have been serving as snowmobile trails for the past two to three decades. The reasons for the original route restrictions for snowmobiles [which date from the 1970s and 1980s] are unclear, particularly since the areas through which the roads travel are open to cross-country snowmobiling, which means that, in practice, snowmobilers have been permitted to ride next to or between the roads, but are technically forbidden to ride on the roads. In some cases, snowmobilers have established trails adjacent to the roadbeds, but in other cases they have been using the roads themselves.

For the most part, the Helena NF has allowed the unauthorized on-road use to continue in areas where no problems for wildlife or other recreational activity (notably, cross-country skiing and snowshoeing) have been evident. Alternatives 2, 3, 4 and 5 would now legitimize the longstanding snowmobile use on a number of these restricted road systems and allow the next-to-the-road and cross-country use to move onto the roads. The road systems to be thus designated have been chosen based on historic snowmobile use patterns and the absence of observed resource problems [supporting data coming from longtime field observations by Helena NF recreation and wildlife personnel and discussions with the Helena Snowdrifters Snowmobile Club]. Under all alternatives, wheeled vehicles would continue to be excluded year-round.

The change in designation would affect 36 miles of currently restricted roads in lynx habitat under alternative 2, 33 miles under alternatives 3 and 4 and 49 miles under alternative 5. Combined with new road/trail closures in other areas, the net increase of officially sanctioned snowmobile routes in lynx habitat would be 32 miles under alternative 2, 28 miles under alternatives 3 and 4 and 44 miles under alternative 5 [the change in actual usage, apart from trail designation, is displayed in Table 114 below; LAU maps are in Figure 28, Figure 29 and Figure 30 in *"Affected Environment "*].

Table 114 - Net Change in Miles of Active Snowmobile Trail in Lynx Habitat

Lynx Analysis Units	Net Change from the 1999-2000 Baseline Condition in Miles of Active Snowmobile Routes in Lynx Habitat				
(LAUs)	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
North of U.S. Highway 12					
di-01	0	0	-1	0	-3
di-02	0	-2	-2	-2	-5
South of U.S. Highway 12					
di-03	0	-1	-2	-2	-2
di-04	0	-2	-2	-2	-12
di-05	0	0	0	0	-1
di-06	0	0	0	0	0
Change North of Highway 12	0	-2	-3	-2	-8
Change South of Highway 12	0	-3	-4	-4	-15
Change in Total Plan Area	0	-5	-7	-6	-23

None of the action alternatives would produce an on-ground increase in established over-the-snow routes as per *NRLMD* Guideline HU G11 [refer to the bottom row of Table 99]. That is, the area of snow compaction in lynx habitat would not increase under any of the action alternatives and would not be greater than the baseline level of snow compaction that was

documented for the *Canada Lynx Conservation Assessment and Strategy (CLCAS)* in 1999 to 2000. The baseline snowmobile route mileage in the Travel Plan Area is 425 miles, of which, 165 miles are in lynx habitat. This has not changed since 1999. Route miles in lynx habitat would decrease to 161 miles in alternative 2 and to 159 miles in alternatives 3 and 4. Table 114 shows the changes by LAU.

The Helena NF has not designated off-route "play areas" for snowmobiles in the Divide landscape; but unless such riding is prohibited by specific area closures, it is allowed and there is a general understanding as to where these traditional play areas are located. While in most cases, off-trail riding involves play areas near sanctioned trails, there is potential for pioneering routes off into new areas, which could extend the reach of competing carnivores. In the Divide landscape, most of this activity is confined to higher elevation meadows, parks and other breaks in forest cover where snowmobiles have room to maneuver. As a result, almost none of it is in mapped lynx habitat (which is forested). No Travel Plan alternative designates specific play areas or makes changes to existing snowmobile routes that would encourage more off-route riding. To the contrary, alternatives 2, 3 and 4 propose to expand the number and size of areas where off-route snowmobile riding is restricted. As a result, all four alternatives comply with the "play area" aspect of Guideline HU G11.

Table 115 summarizes acreages within each LAU closed to off-trail snowmobile riding under each alternative [see also Alternative maps]. Acres in Table 115 have been estimated from Divide Travel Plan alternative maps and rounded to the nearest 10 acres. The snowmobile closure in the MacDonald Pass cross-country ski area (820 acres) in di-05 has not been included since it contains numerous packed over-the-snow routes generated by trail grooming.

Table 115 - Areas Closed to Off-Route Snowmobile Riding

alternatives	Snowmobile Closure Acres within Lynx Analysis Units					
	di-01	di-02	di-03	di-04	di-05	di-06
Alternative 1	0	0	18,555	1,200	6,580	8,420
Alternative 2	3,300	3,660	18,555	2,455	12,925	8,420
Alternative 3	3,300	3,660	18,555	4,020	14,590	8,420
Alternative 4	3,300	3,660	18,555	4,020	14,590	8,420
Alternative 5	7,585	8,175	18,555	9,765	18,020	8,420

Alternative 1 would maintain about 34,600 acres of snowmobile area closures, of which roughly 70 percent are in potential lynx habitat. Alternative 2 would expand this to more than 50,100 acres, of which about 77 percent are in lynx habitat. Alternatives 3 and 4 would provide a closure area of around 53,400 acres, with about 79 percent in lynx habitat. Alternative 5 would close the most acreage to cross-country snowmobiling, roughly 71,300 acres, of which about 78 percent are in lynx habitat. A majority of the area closures in the Travel Plan Area are south of U.S. Highway 12. This is the part of the Divide landscape that the *NRLMD* classifies as "secondary" occupied lynx habitat, but it is the part of the landscape where most of the verified lynx observations have been made in the last five years. The upshot is that these snowmobile restrictions are targeted at that portion of the Travel Plan Area where they are most likely to benefit lynx as currently distributed, regardless of whether or not the area has been classified as critical lynx habitat.

As to Guideline HU G12, the Travel Plan does not address access for special uses or mineral/ energy exploration and development. The Helena NF deals with proposals for these activities via a special use permitting process. So, this guideline does not apply to Travel Plan proposals.

Effects Assessment: Critical Habitat

Effects on critical habitat are assessed in terms of the impact that each alternative has on the four primary constituent elements (PCEs) associated with "boreal forest landscapes" that are capable of supporting lynx (*Federal Register*, Vol. 74, No. 36, p. 8638). PCEs apply both to suitable (mapped) lynx habitat in the region north of U.S. Highway 12 and to "matrix habitat" that surrounds and connects areas of suitable habitat in that area. Characteristics of the various PCEs and potential effects of Travel Plan alternatives are as follows:

PCE (a). "Preferred habitat conditions, which include dense understories of young trees, shrubs or, overhanging boughs that protrude above the snow and mature multistoried stands with conifer boughs touching the snow surface".

Effects: None of the proposed alternatives would have any effect this on this PCE because none of them propose to alter forest vegetation. Any indirect effects, such as might come from firewood cutting in open road corridors, would have no measurable effect on dense understory vegetation.

PCE (b). "Winter snow conditions that are generally deep and fluffy for extended periods".

Effects: Alternatives influence this element by allowing snow-compacting activity, primarily snowmobiling, in occupied winter lynx habitat. Alternative 1 would maintain all current sanctioned snowmobile routes. The three action alternatives would slightly reduce road and trail miles on which existing snowmobile use is sanctioned in critical lynx habitat (by two miles in alternatives 2 and 4 and by three miles in Alternative 3).

PCE (c). "Sites for denning that have abundant coarse woody debris, such as downed trees and root wads".

Effects: Travel management affects this element indirectly by maintaining open roads in potential lynx habitat that allow firewood cutters to remove snags and woody debris that might, in some circumstances, contribute to lynx denning. Alternative 1 retains the status quo in this regard. Alternative 2 reduces open road mileage in critical lynx habitat by about seven percent and alternatives 3 and 4 reduce it by about eight percent.

PCE (d). "Matrix habitat (not supporting hares) that occurs between patches of boreal forest in close juxtaposition such that lynx are likely to travel though such habitat while accessing patches of boreal forest within a home range".

Effects: None of the four alternatives would directly affect matrix habitat because none of them propose to alter vegetation or other habitat components. There would be no new road construction. Alternatives 2, 3 and 4 would reduce road density in matrix habitat in LAUs that support critical lynx habitat (LAUs di-01, di-02).

The effects generated by these alternatives would not result in "adverse modification" of critical lynx habitat. They would allow "the affected critical habitat to remain functional…to serve the intended conservation role for the species" (*Federal Register*, Vol.74, No. 36, p. 8644).

Comparison of Alternatives

Effects of Alternative 1 (Existing Condition)

Effects of Open Roads

Alternative 1 would maintain the status quo with regard to open roads and snowmobile routes that facilitate access for trappers and firewood cutters. The Travel Plan Area currently supports 450 miles of roads and motor trails open at some time of the year. There have been no reports of lynx incidentally trapped in the Divide landscape in recent years, although they are known to inhabit the area yearlong.

Refuge and Connectivity

Alternative 1 would retain the existing dispersion of potential lynx safe areas. Connectivity analysis indicates that there are currently 20 large non-motorized habitat blocks (greater than 1,500 acres) in the Travel Plan Area, averaging 5,565 acres in size (as measured from the edges of surrounding open routes) [Table 103]. Grizzly bear habitat analysis indicates that the Divide landscape supports four non-motorized potential core areas larger than 2,500 acres with boundaries at least 0.3 miles from open routes. These areas average 10,645 acres and cover 24 percent of the landscape [Table 112]. The fact that lynx have been inhabiting the Plan Area consistently in recent years suggests that this is adequate, at least for a small population.

Snow Compaction

Alternative 1 would maintain existing condition: The Travel Plan Area would continue to support 418 miles of active snowmobile routes, 341 miles of which are currently sanctioned by the existing Travel Plan and 77 miles of which are not. Roughly 165 miles of the active trails pass through mapped lynx habitat. Alternative 1 would comply with *NRLMD* Guideline HU G11 with regard to designated over-the-snow routes. No specific snowmobile play areas would be designated in this alternative and all areas where off-route riding is currently restricted would continue to be closed to such use. With the exception of a small closure around the MacDonald Pass cross-country ski area, all snowmobile area closures are currently south of Highway 12 in LAUs di-03, 04, 05 and 06. Of these, two are winter closures applicable to lynx habitat: the Electric Peak and Lazyman Gulch Roadless Areas. Alternative 1 thus complies with the play area direction of *NRLMD* Guideline HU G11.

Effects of Alternative 2

Effects of Open Roads

Alternative 2 would reduce miles of open road and trail available to wheeled vehicles and to snowmobiles by about five miles (from 450 miles to 445 miles). Some of these closures apply to lynx habitat and would selectively reduce access opportunity for trappers and wood cutters.

Refuge and Connectivity

Alternative 2 would increase the size of potential refuge zones by consolidating adjacent areas (closing intervening roads) and enlarging others (closing peripheral roads). Connectivity shows that Alternative 2 would produce 17 large non-motorized habitat blocks (greater than 1,500 acres) averaging 6,469 acres in size (as measured from the edges of surrounding open routes) [Table 103]. However, the total acreage of habitat within such blocks would decrease slightly from 111,305 acres to 109,970 acres. Grizzly bear habitat analysis indicates that the Plan Area would support five areas larger than 2,500 acres with boundaries at least 0.3 miles from open

routes, with average size would increasing from 7,403 acres to 7,732 acres. Thee potential core areas would cover 26 percent of the landscape [Table 112].

Snow Compaction

Alternative 2 would reduce the current network of active snowmobile trails in the Travel Plan Area from 418 miles to 394 miles, resulting in a five mile reduction of packed trails in lynx habitat. Trails "specified" or "allowed" by the Travel Plan would increase from 341 miles to 378 miles, a net increase of 37 miles in lynx habitat. All of these trails, however, were active prior to 1999 to 2000 and have been tallied as part of the baseline condition for the *CLACS.* In the end, then, alternative 2, by reducing the actual mileage of snowmobile trails, would contribute to the consolidation and improvement of lynx habitat. The alternative thus complies with *NRLMD* Guideline HU G11 with regard to over-the-snow routes.

No snowmobile play areas would be designated in alternative 2 and no expansion of existing non-designated play areas is likely (F. Bailey, personal communication 2011). The area closed to off-route snowmobiling would expand from 35,570 acres to 50,130 acres, with new closures in Tenmile Creek, Mike Renig Gulch-Hahn Creek, Sweeney Creek and on the Avon Valley face. Alternative 2 complies with designated play area direction in *NRLMD* Guideline HU G11.

Effects of Alternative 3

Effects of Open Roads

Under Alternative 3, routes open to wheeled vehicles would decline by 71 miles from 450 miles to 379 miles. This would, in turn, incrementally reduce trapper access to certain lynx habitat sites and reduce the area from which snags and woody debris could be removed from the road corridor by firewood cutters.

Refuge and Connectivity

Alternative 3 would increase the acreage of potential lynx refuges. Connectivity analysis shows 15 large non-motorized habitat blocks (greater than 1,500 acres), averaging 10,942 acres [Table 103]. Total area within such blocks would increase from 111,305 acres to 121,705 acres. Grizzly bear habitat analysis indicates that the Plan Area would support five areas larger than 2,500 acres surrounded by 0.3-mile buffers. The average size of these areas will increase from 10,686 acres to 11,156 acres. They would cover 31 percent of the landscape [Table 112].

Snow Compaction

Alternative 3 would reduce the network of active snowmobile trails in the Plan Area only slightly from the current 418 miles to 379 miles. This would produce a decline of seven miles in lynx habitat. Of these active trails, those "specified" or "allowed" by the Travel Plan would increase from 341 miles to 396 miles. In lynx habitat the increase would be 28 miles. Since these trails were calculated as part of the "baseline condition" in 1999 to 2000, there would be no increase in active packed trails. In the end, alternative 3, would reduce the actual mileage of snowmobile trails and would thus contribute to the consolidation and improvement of lynx habitat. The alternative thus complies with *NRLMD* Guideline HU G11 with regard to over-the-snow routes.

No specific snowmobile play areas would be designated in alternative 3 and no expansion of existing (though non-designated) play areas is foreseen (F. Bailey, personal communication 2011). The area closed to off-route snowmobiling would be expanded from 35,570 acres to 53,370 acres, with new or expanded area closures in Tenmile Creek, Mike Renig Gulch–Hahn

Creek, Sweeney Creek and on the Avon Valley face. Alternative 3 would comply with snowmobile play area direction in *NRLMD* Guideline HU G11.

Effects of Alternative 4

Effects of Open Roads

Under Alternative 4, roads and trails open to wheeled vehicles and snowmobiles would decline from current levels by 57 miles (from 450 miles to 393 miles). This would reduce trapper access to certain lynx habitat sites and reduce the area from which snags and woody debris can be removed from the road corridor by firewood cutters. Alternative 4 would maintain 14 miles more open road and motor trail than alternative 3 but 52 miles less than Alternative 2.

Refuge and Connectivity

Alternative 4 would increase the acreage of potential lynx refuges from current levels somewhat less than alternative 3. Connectivity analysis shows 16 large non-motorized habitat blocks (greater than 1,500 acres) averaging 7,510 acres under alternative 4 [Table 103]. Total acreage in these blocks would increase from the current 111,303 acres to 120,155 acres. Grizzly bear habitat analysis indicates that the Plan Area would support five areas larger than 2,500 acres surrounded by 0.3-mile buffers, averaging 10,215 acres and covering 29 percent of the landscape[Table 112].

Snow Compaction

Alternative 4 would slightly reduce the the current network of active snowmobile trails in the Travel Plan Area from 418 miles to 404 miles, a decline of six miles in lynx habitat. Of these trails, 341 miles are currently "designated"or "allowed" by the Travel Plan. This number would increase to 385 miles in alternative 4. The result in lynx habitat would be an increase of 44 miles of "designated" routes. As with alternatives 2 and 3, alternative 4 would comply with *NRLMD* Guideline HU G11 with regard to over-the-snow routes, since these trails were calculated as part of the "baseline condition" for the *CLCAS* in 1999 to 2000. The upshot is that the alternative would contribute to the consolidation and improvement of lynx habitat by reducing the actual mileage of snowmobile routes on the ground.

No snowmobile play areas would be designated in alternative 4 and no expansion of existing (though non-designated) play areas is foreseen (F. Bailey, personal communication, 2011). The area closed to off-route snowmobiling would be the same as in alternative 3: 53,370 acres. The alternative would comply with snowmobile play area direction in *NRLMD* Guideline HU G11.

Effects of Alternative 5

Effects of Open Roads

Under alternative 5, roads and trails open to wheeled vehicles and snowmobiles would decline from current levels by 126 miles (from 450 miles to 324 miles), by far, the most of any action alternative. This would substantially reduce trapper access to certain lynx habitat sites and reduce the area from which snags and woody debris can be removed from the road corridor by firewood cutters.

Refuge and Connectivity

Alternative 5 would increase the acreage of potential lynx refuges from current levels more than any other action alternative. Connectivity analysis shows 17 large non-motorized habitat blocks (greater than 1,500 acres) averaging 7,691 acres under alternative 3 [Table 103]. Total acreage

in these blocks would increase from the current 111,305 acres to 130,745 acres. Grizzly bear habitat analysis indicates that the Plan Area would support six areas larger than 2,500 acres surrounded by 0.3-mile buffers, averaging 10,830 acres and covering 37 percent of the landscape [Table 112].

Snow Compaction

Alternative 5 would slightly reduce the the current network of active snowmobile trails in the Travel Plan Area from 418 miles to 403 miles, a decline of six miles in lynx habitat. Of these trails, 341 miles are currently "designated"or "allowed" by the Travel Plan. This number would increase to 403 miles in alternative 5: that is, all snowmobile trails would be designated for use. The result in lynx habitat would be an increase of 44 miles of "designated" routes. As with alternatives 2, 3 and 4, alternative 5 would comply with *NRLMD* Guideline HU G11 with regard to over-the-snow routes, since these trails were calculated as part of the "baseline condition" for the *CLCAS* in 1999-2000. The alternative would thus contribute to the consolidation and improvement of lynx habitat by reducing the actual mileage of snowmobile routes on the ground.

No snowmobile play areas would be designated in alternative 5 and no expansion of existing (though non-designated) play areas is foreseen (F. Bailey, personal communication, 2011). The area closed to off-route snowmobiling would be 71,305 acres, twice the current condition. The alternative would comply with snowmobile play area direction in *NRLMD* Guideline HU G11.

Cumulative Effects

This summary is based on the detailed matrix in *appendix B*, which identifies all past, present and reasonably foreseeable projects and other activities, in addition to proposed Travel Management, that may affect lynx and lynx habitat. The scope of the analysis includes the Divide landscape (Helena NF land with non-Forest inholdings) and immediately surrounding lands (private, State, County, municipal and BLM). This summary is common to all alternatives.

Lynx have large home ranges and travel great distances. Therefore, activities occurring throughout the Divide landscape, in bordering areas of adjacent landscapes and on nearby private, municipal, State and BLM lands may be of some relevance. Adjacent National Forest lands, the Blackfoot landscape on the Lincoln Ranger District to the north and the Beaverhead-Deerlodge NF to the south, are of particular importance. Most of the non-Forest lands bordering the Helena NF to the east and west on either side of the Continental Divide are at relatively low elevation (below 5,500 feet) and do not provide suitable habitat for lynx occupancy, but they may serve as linkage or occasional travel zones. Non-Forest lands that are capable of providing viable habitat are private and State inholdings within National Forest boundaries at higher elevation (cool forest habitats above 5,500 feet).

Forest Service Past and Ongoing Activities

Some recent and ongoing activities on the National Forest have had a mixed influence on lynx and lynx habitat. Timber harvest over the last 20 years has created clearcuts of all sizes. In each case, this initially created blocks of unsuitable lynx habitat, some of it persisting over the long-term. But where seral communities dominated by dense sapling conifers have developed, viable snowshoe hare habitat has emerged. These harvest units have created a mosaic of early and later successional habitats across the landscape, an arrangement generally more favorable to lynx than an unbroken sea of mature/pole forest. Timber harvest projects from the the 1970s,

1980s and 1990s that have had this effect in lynx habitat, to one degree or another, include: Bison Mountain, Ontario Creek, Mike Renig Gulch-Hahn Creek, Slate Creek, Deadman, Strawberry, Corral Gulch, Lava Mountain and Buffalo Creek. Recent harvest activity in the Clancy-Unionville project area is having some impact on potential lynx habitats, primarily by taking out dead trees that could, in some circumstances, provide denning habitat components. Be that as it may, the *NRLMD* has determined that denning habitat is not a limiting factor for lynx and has not put forward a standard or guideline to address it (see *NRLMD ROD*, p. 17). These areas will develop as stand-initiation hare habitat in the next 15 to 20 years. The ongoing Red Mountain Flume-Chessman Reservoir project, which is removing a corridor of dead trees from around the reservoir and flume (490 acres) will be maintained in an open-forest condition in the future and will not provide suitable lynx habitat in the future. Recently completed and ongoing hazard tree removal along open roads (Roadside Hazard Tree Removal Project) and in developed recreation sites (Park Lake, Cromwell Dixon, Kading Moose Creek campgrounds; CDNST trailhead) should have no effect on lynx.

Likewise, management of grazing allotments has proven detrimental to lynx simply by virtue of its allowing large numbers of cattle to continue impacting Helena NF resources that may be of use to lynx and more importantly, to primary lynx prey (snowshoe hares). On the other hand, revision of allotment management plans over the past two decades has reduced cattle numbers and spawned a variety of range improvements aimed at protecting riparian sites. These projects have conspicuously improved vegetation condition in many riparian and other wet sites, restoring foraging opportunities for lynx.

Actions that have improved prospects for lynx include: closure of Inventoried Roadless Areas to snowmobiles (Electric Peak, Lazyman Gulch); trail relocation projects that have moved trails from riparian areas to upslope sites (Blackfoot Meadows, CDNST); initiation of the Statewide OHV Plan (2001), which prohibits riding off established motor routes; road and motor trail closures associated with timber harvest projects that have expanded blocks of non-motorized habitat (Clancy-Unionville, Sound Wood, Mullan Pass, Treasure Mountain, Lava Mountain).

Activities that have locally reduced the effectiveness of potential lynx habitat or, in some cases, had a mixed effect include: retention of private recreational residences on Helena NF land (particularly in the linkage area near MacDonald Pass); retention of numerous groomed snowmobile trails in lynx habitat; retention of numerous roads passing through key lynx habitat (saddles, forested stringers, riparian areas, denning habitat stands).

Recent and ongoing travel planning efforts on adjacent Ranger Districts could benefit lynx by expanding security areas and reducing snow compacting activity. Lynx range widely and enhanced habitat conditions in adjacent areas could aid lynx populations and subsequent dispersal to the Divide landscape. Conversely, travel management decisions elsewhere could reduce lynx populations in those areas and lower the potential for emigration/immigration.

Adjacent Private and Other, Past and Ongoing Actions

Recent and ongoing private land development would continue to impact lynx where it occurs in lynx habitat, primarily via degradation of available foraging habitat. It is unlikely that lynx occur on most adjacent non-Forest lands because of their low elevation and a predominance of dry forest and non-forest habitat types. Inholdings at higher elevation often qualify as potential lynx habitat. Many of these holdings have been logged in the last 30 years and are in various stages of succession, most of them not favorable to lynx because of erratic regeneration. Others are in the process of being cleared of most standing timber that has been killed in the ongoing bark

beetle outbreak. Where lodgepole pine is the dominant overstory, there is some potential for future development of stand-initiation hare habitat.

Forest Service Reasonably Foreseeable Actions

Reasonably foreseeable activities on Helena NF land that may affect lynx to one degree or another include improvement of the Rimini Road (in a potential travel zone), continued revision of grazing allotment management plans, winter travel planning in the Blackfoot landscape and salvage projects designed to deal with the ongoing bark beetle epidemic. The most prominent of these latter proposals are the Telegraph and Tenmile-South Helena projects, both of which would remove dead and downed beetle-killed trees over an extensive area. The Telegraph project also proposes thinning in early-successional lodgepole pine stands, although those qualifying as viable snowshoe hare habitat would be left unthinned. These projects present a mixed bag of effects for lynx. Removal of dead trees would provide an opportunity for more rapid and dense regeneration of lodgepole pine stands, hastening the advent of extensive stand initiation snowshoe hare habitat. Leaving the coarse woody debris in place would lead to slower, more erratic regeneration of early seral forest, but would provide for better cover n the immediate future and denning opportunities for lynx. Continued hazard tree removal along open roads and in developed recreation sites is unlikely to affect lynx.

Adjacent Private and Other, Reasonably Foreseeable Actions

Future activity on non-Forest land in the cumulative effects area that may affect lynx includes: settlement and associated development of private lands (including new roads); timber harvest and removal of beetle-killed trees; continued snowmobile use and other motorized activity.

Summary and Conclusions

All alternatives would comply with relevant standards and guidelines of the Northern Rockies Lynx Management Direction (NRLMD ROD, Attachment 1), which was amended into the Helena Forest Plan in 2007.

Alternative 1 would retain 20 large unroaded habitat blocks, averaging 5,565 acres, as lynx refuges. Such habitat would total 111,305 acres. Active snowmobile trails would remain at 418 miles and off-trail snowmobile closures at 35,570 acres. While the existing snowmobile trail system may be having some effect on lynx habitat use patterns, lynx do not appear to be adversely affected since they continue to coexist with the system in its current configuration. This trail system would be retained in Alternative 1.

Alternative 2 would consolidate some large unroaded habitat blocks as lynx refuges. The result would be 17 blocks averaging 6,469 acres. Total refuge habitat would be 109,970 acres, 1,335 acres less than at present. Active snowmobile trails in lynx habitat would decrease by five miles. Off-trail snowmobile closures would increase to 50,130 acres. Alternative 2 may affect, but is not likely to adversely affect lynx.

Alternative 3 would consolidate more unroaded habitat blocks as lynx refuges, resulting in 15 blocks averaging 8,114 acres. Total refuge habitat would be 121,705 acres, 11,735 acres more than alternative 2. Active snowmobile trails in lynx habitat would decrease by seven miles. Off-trail snowmobile closures would increase to 53,370 acres. As with alternatives 1 and 2, alternative 3 may affect, but is not likely to adversely affect lynx.

Alternative 4 would maintain 16 unroaded habitat blocks, with each block averaging 7,510 acres. Total refuge habitat would be 120,155 acres, slightly less than alternative 3. Active snowmobile

trails in lynx habitat would decrease by six miles. Off-trail snowmobile closures would be the same as alternative 3, 49,710 acres. As with the previous alternatives, alternative 4 may affect, but is not likely to adversely affect lynx.

Alternative 5 would maintain 17 unroaded habitat blocks, with each block averaging 7,691 acres. Total refuge habitat would be 130,745 acres, the most of any alternative. Active snowmobile trails in lynx habitat would decrease by eight miles. Off-trail snowmobile closures would take in considerably more ground than any other alternative, 71,305 acres. As with the previous alternatives, alternative 5 may affect, but is not likely to adversely affect lynx.

Sensitive Species

This review of sensitive species, along with the assessment of management indicator species that follows, serves as the Biologicval Evaluation for this project.

Wolverine

Effects on wolverines are described in terms of (1) human activity in areas likely to support natal denning sites and (2) the availability of safe havens where motorized use and human activity in general is absent or occurs at low levels. The abundance of ungulate carrion, an important consideration for wolverines, is a function of big game habitat management by the Helena NF and hunting regulation by MFWP and is not addressed in this section.

Common Effects of Travel Management

Remote country appears essential to wolverine viability (Hornocker and Hash 1981). Human encroachment into existing back-country refuges may threaten the wolverine's ability to maintain basic life history requirements (Copeland and Hudak 1995). Certain activity may lead to habitat fragmentation that could limit basic interaction between wolverine subpopulations (Copeland 1996). It has been hypothesized that the persistence of wolverines in Montana, despite unlimited historic trapping and hunting, may be a function of extensive designated wilderness and remote, inaccessible habitat (Hornocker and Hash, 1981; Ruggiero *et al*. 1994).

High road densities and the associated human activity are known to disturb wolverines. Roads may eliminate the potential for otherwise suitable foraging and denning habitat, reducing chances of successful kit rearing (Copeland 1996). Roads allow access to hunters and trappers and increase the possibility of poaching (Hornocker and Hash 1981). Wolverines are renowned for their vulnerability to trapping and susceptibility to over-harvest (Claar *et al.* 1999).

Technological advances in snowmobiles and increases in winter recreation in general (cross-country skiing, helicopter skiing, snowshoeing) have elevated the probabilities of displacing wolverines from potential denning habitat (Copeland 1996). Magoun and Copeland (1998) found that females in Idaho moved their young to new maternal den sites after disturbance by researchers. Risk of litter loss is potentially high if den relocation occurs. Because wolverines have low reproductive rates, such losses are magnified to a greater extent than in most mammal populations. Squires and others (2002) did trap wolverines in areas of high snowmobile activity, indicating that the animals do not necessarily avoid these areas, although reproductive success may be impaired. In general, refuge zones, both for denning and for general daily activity, may be the most important habitat components for wolverines. Protection of viable high elevation denning sites where deep snow persists in spring is likely to take on added importance in the future as global warming continues to shrink the size of these areas, potentially eliminating some of them entirely.

Ungulate carrion is a primary winter food item for wolverines; so, human activities that reduce elk and deer populations can also affect wolverines (Banci 1994; Copeland 1996). Be that as it may, it is highly unlikely in the northern Rockies that ungulate populations could decline to such a level that local wolverines would be measurably affected.

Natal and Maternal Denning Habitat

The Region 1 wolverine habitat model has not identified any natal/maternal denning habitat in the Divide landscape. A few sites in the landscape, however, do exhibit characteristics typical of wolverine denning sites (for both natal and maternal dens). These are mountain basins with rockslides and avalanche chutes on steep slopes that tend to accumulate woody or rocky debris, as well as deep snow that persists through the spring. Areas with these components include the eastern slopes of Nevada and Black Mountains in the north end of the landscape and slopes and basins on Lee Mountain, Red Mountain, Cliff Mountain, Electric Peak, Jericho Mountain, Bison Mountain, Thunderbolt Mountain and Luttrell Peak in the southern half of the landscape.

A perusal of these areas on Divide Travel Plan alternative maps indicates that none of them supports snowmobile trails or known snowmobile play areas close enough to potential denning sites to be of concern. Habitat sites on Electric Peak and on Nevada, Black, Thunderbolt, Cliff and Bison Mountains are in or adjacent to Roadless Areas where snowmobile use is prohibited or impractical because of difficult terrain. Potential habitat on Red Mountain is also too difficult for snowmobilers to access. Sites on Lee Mountain and Luttrell Peak are close to historic mining operations but are not in areas likely to pick up snowmobile use. No the action alternative would generate new snowmobile use in any of these areas and it is highly unlikely that any of them would impact wolverines at natal or maternal denning sites.

Non-Denning Refuges

Beyond the denning season, wolverines are drawn to relatively large blocks of habitat, abundantly forested, in which human presence is minimal. Such areas have been assessed previously in sections on *Connectivity and Fragmentation* (non-motorized habitat patches larger than 1,500 acres) [Table 102 and Table 103], *Grizzly Bear* (non-motorized habitat blocks larger than 2,500 acres and at least 0.3 mile from open roads) [Table 112] and *Elk* (elk security areas larger than 250 acres and at least 0.5 mile from open roads) [Table 109, Table 110]. These habitat blocks are important to male wolverines year-round and to adult female wolverines outside the natal denning season as areas in which they can forage, rest, breed, raise young and travel with minimal human interference.

Table 116, below, estimates total acres in refuge zones available to wolverines as calculated by these three different analyses. Connectivity analysis, which calculates non-motorized acreage from the edge of surrounding open roads, provides a much broader estimate of available refuge habitat (ranging from 62 percent to 74 percent of the Plan Area) than the two analyses that buffer the distance from roads (by 0.3 mile for grizzly bear habitat and by 0.5 mile or more for elk security). Refuges measured by the grizzly bear analysis range from 24 percnet to 37 percent of the Plan Area and those measured via elk security area analysis cover 19 percent to 29 percent[3]. As is evident in Table 116, alternatives 3, 4 and 5 provide notably more non-motorized habitat than alternatives 1 and 2, regardless of the analysis method.

[3] These percentages are higher than those from elk security analyses (Table 30) since they are calculated only for the Travel Plan Area rather than for the entire Divide landscape as in the elk security analysis.

Table 116 - Measures of Non-Motorized Sanctuaries

Measures of Non-Motorized Habitat	Acres of Potential Refuges in the Planning Area				
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Connectivity Analysis: Non-Motorized Habitat Blocks >1,500 acres with No Road Buffer	111,305	109,970	121,705	120,155	130,745
Grizzly Bear Analysis: Non-Motorized Habitat Blocks >2,500 acres > 0.3 mi from Open Roads	42,745	47,055	55,780	51,075	64,980
Elk Security Analysis: Non-Motorized Habitat Blocks >1,000 acres > 0.5 mi from Open Roads	32,925	34,568	45,199	42,317	51,479

However measured, habitat with low human presence has been sufficient in the past to sustain a small, apparently resident, wolverine population in the Divide landscape. Biologists, local residents and other Forest users have been reporting the presence of wolverines for more than 20 years and recent winter tracking surveys have verified the presence of two adult males in the area and suggested the presence of more animals. By this measure, refuge habitat appears adequate. Alternative 2 (in two of three analyses) would improve this situation and alternatives 3 and 4 (in all three analyses) would improve it more.

Comparison of Alternatives

Effects of Alternative 1 (Existing Condition)

No known wolverine natal or maternal denning habitat is threatened by current patterns of snowmobile use or other winter recreation in the Divide landscape. This status is preserved in alternative 1. Non-motorized refuges would continue to occupy approximately 63 percent of the Travel Plan Area as calculated by connectivity analysis, 24 percent of the area as calculated by grizzly bear refuge analysis and about 19 percent of the area as calculated by elk security area analysis.

Effects of Alternative 2

Alternative 2 would not add snowmobile routes in areas with potential to support wolverine natal or maternal denning habitat. It would increase the area closed to off-trail snowmobile riding. No wolverine denning habitat would be threatened by resulting patterns of snowmobile use or other winter recreation in the Divide landscape. Under alternative 2, non-motorized sanctuaries would occupy approximately 62 percent of the Travel Plan Area as calculated by connectivity analysis, 27 percent of the area as calculated by grizzly bear refuge analysis and 19 percent of the area as calculated by elk security area analysis.

Effects of Alternative 3

Alternative 3 would not add snowmobile routes in areas with potential to support wolverine natal/maternal denning habitat. It would increase the area closed to off-trail snowmobile use. No wolverine denning habitat would be threatened by the pattern of snowmobile use or other winter recreation in the Divide landscape. Under alternative 3, non-motorized refuges would occupy 25 percent of the area calculated by elk security area analysis, 31 percent of the area calculated by grizzly bear refuge analysis and 69 percent of the Plan Area calculated by connectivity analysis.

Effects of Alternative 4

In terms of snowmobile access, alternative 4 is identical to alternative 3 and it would have essentially no effect on wolverine natal/maternal denning habitat. By increasing the area closed to off-trail snowmobile riding, it would lower the potential for negative human-wolverine encounters in winter. Under alternative 4, non-motorized refuge areas would occupy about 68 percent of the Travel Plan Area as calculated by connectivity analysis, 29 percent of the area as calculated by grizzly bear refuge analysis and 24 percent of the area as calculated by elk security area analysis.

Effects of Alternative 5

Under alternative 5, the pattern of snowmobile routes would remain similar to other action alternatives (Table 99), but areas off-limits to cross-country snowmobiling would increase to twice the current acreage (Table 115). By increasing the area closed to off-trail snowmobile riding, it would lower the potential for negative human-wolverine encounters in winter. As with other alternatives, alternative 5 would have no effect on potential wolverine natal/maternal denning habitat. Non-motorized refuge areas would occupy about 74 percent of the Plan Area as calculated by connectivity analysis, 37 percent of the area as calculated by grizzly bear refuge analysis and 29 percent as calculated by elk security area analysis.

Cumulative Effects

This summary of cumulative effects is based on the detailed matrix in *appendix B*, which identifies all past, present and reasonably foreseeable projects and other activities, in addition to proposed travel management, that may affect wolverines and wolverine habitat components. The scope of the analysis includes the Divide landscape (Helena NF land with non-Forest inholdings) and immediately surrounding lands (private, State, County, Municipal and BLM). Wolverines that currently occupy the Divide landscape are known to use areas immediately adjacent to the National Forest and in fact, Wild Things Unlimited tracked one animal through part of the town of Elliston during the winter of 2009 to 2010 (Gehman *et al.* 2010, p. 7, 11). However, there is no indication that wolverines range further out into the valleys well beyond Helena NF boundaries. Effects described in this summary are common to all alternatives.

Forest Service Past and Ongoing Activities

Recent and ongoing activities on the National Forest that have improved prospects for wolverine include: area closures for snowmobiles in the Electric Peak and Lazyman-Black Mountain Roadless areas; establishment of the Statewide OHV Plan, which prohibits riding off established motor routes; road and motor trail closures associated with timber harvest projects (Clancy-Unionville, Sound Wood, Mullan Pass, Lava Mountain, Treasure Mountain). These decisions have expanded blocks of non-motorized habitat and potential wolverine refuges.

Activities that have locally reduced the effectiveness of potential wolverine habitat to one degree or another include: numerous road permits allowing access across Helena NF land to private holdings; retention of private recreational residences on Helena NF land (especially in the linkage zone at MacDonald Pass); small mining operations (under the 1872 Mining Act) in areas where wolverines have been observed; construction and maintenance of communications sites and power lines; development and retention of numerous snowmobile trails in potential wolverine habitat; retention of numerous dispersed camping sites and unrestricted back-country recreational use.

These activities increase, to one degree or another, the potential for wolverine-human encounters and reduce the country through which wolverines are able to roam generally free from human influence. Few, if any, of these enterprises are likely to disrupt wolverine natal denning sites, the exception being large-scale, year-round mining operations at high elevation (the Luttrell Pit at the southern edge of the analysis area being the only current example). Other activities that may approach potential denning habitat do not occur during the wolverine denning period (winter and early spring). High-elevation snowmobile routes and play areas, which have caused problems for denning wolverines in other parts of the northern Rockies, are not located near perspective denning sites in the Divide landscape.

New road systems associated with timber sales, some of which remain open to vehicle use, have reduced unroaded wolverine habitat and increased access for trappers. These include Bison Creek, Mike Renig Gulch-Hahn Creek, Slate Creek, Lump Gulch, Ophir Creek-Cave Gulch, Deadman, among others. Timber harvest itself has a mixed effect on wolverine habitat and the ability of wolverines to avoid humans and find food. In general, projects that have removed good quality cover and complex understory habitat supporting diverse potential food sources have been detrimental. Those that have improved habitat productivity by opening up dense, depauperate forest and increasing edge and ecotone may be beneficial.

Ongoing and recently completed removal of beetle-killed trees from along Forest roads (Forestwide Hazardous Tree Removal Project, 2010) and in administrative and developed recreational sites (Kading, Moose Creek, Cromwell Dixon, Park Lake, campgrounds; MacDonald Pass CDNST trailhead; Tenmile picnic area; Moose Creek cabin) are unlikely to have any meaningful effect on wolverines.

Adjacent Private and Other, Past and Ongoing Actions

Private land development (primarily rural home building) is continuing to create more sites that prove problematic for animals attempting to move through or occupy the landscape (barriers to movement, habitat loss, food attractants, dogs). Many of these developments are at low elevation in areas seldom traversed by wolverines, but some are associated with higher elevation inholdings (Telegraph Creek, Ontario Creek, Little Blackfoot, upper Tenmile) and may create problems. The town of Rimini and a number of dwellings on mid-high elevation Forest inholdings occupy ground that might otherwise be favorable as wolverine habitat. Cabins used only seasonally or intermittently throughout the year, especially those that harbor stored food, may attract wolverines. The Great Divide ski area on BLM land in the northeast part of the analysis area usurps a large block of potential habitat that wolverines are now likely to avoid in winter.

Forest Service Reasonably Foreseeable Actions

Hazard tree removal and dead tree salvage projects resulting from the bark-beetle epidemic have some short-term potential for negative human-wolverine encounters while work is in progress but are unlikely to generate meaningful habitat problems or benefits. The most prominent of these projects are the Red Mountain Flume-Chessman Reservoir and Telegraph Creek fuels projects. While these projects propose to harvest dead trees that could conceivably provide woody debris accumulations in which wolverines might den, the potential for future denning in the proposed harvest units once trees fall is low (elevations are too low, there are no avalanche chutes or large rockslides nearby, density of large dead trees is generally too low, most areas are too close to regular human activity). Wolverines could use accumulated

deadfall, if not for denning, then for resting or escape cover. Removal of dead trees could thus influence future movement patterns. Given the abundance and wide distribution of non-harvested areas, however, the low density of the local wolverine population and the adaptability of wolverines to a wide array of habitat formations, it is highly unlikely that the proposed projects would have any influence on the ability of wolverines to continue to occupy the landscape. Proposed hazard tree removal along open roads and in developed recreation sites would have no effect on wolverines.

Adjacent Private and Other, Reasonably Foreseeable Actions

The primary foreseeable activity on non-Forest land within the cumulative effects area that can affect wolverines is the ongoing development of private inholdings (building construction, road building, forest clearing, local mining and general human activity).

Summary and Conclusions

None of the alternatives would negatively impact key habitat components for wolverines. No natal denning habitat would be disrupted by roads or snowmobile use and the acreage of non-motorized habitat refuges (as measured from roads' edge) would decrease slightly, remain steady, or increase [see Table 116, row 1].

Alternative 1 would maintain large non-motorized sanctuaries at the current level of about 63 percent of the Travel Plan Area (as calculated by connectivity analysis). Alternative 2 would shrink large non-motorized refuges slightly to about 62 percent of the Plan Area. Alternatives 3 and 4 would increase the reach of large non-motorized refuges to about 68 percent of the Travel Plan Area. Alternative 5 would increase large non-motorized havens to about 74 percent of the Travel Plan Area. The small, but persistent local population of resident wolverines would remain in place under all alternatives.

None of the effects generated by this project or by other Helena NF fuels/timber management projects in the Divide landscape are factors contributing to the wolverine having been listed as a threatened species under the Endangered Species Act. The USFWS has indicated that the listing arose from concerns over the loss of natal denning habitat due to global climate change.

Northern Rocky Mountain Gray Wolf

Common Effects of Travel Management

Effects are described in terms of parameters that threaten wolves through (1) human contact and conflict (primarily, livestock grazing, human settlement in the wildland-urban interface, legal wolf hunting and trapping and illegal shooting); (2) activities that compromise denning or rendezvous sites and (3) activities that affect the prey base. These follow the three key components of wolf habitat identified in the *Wolf Recovery Plan* (USDI 1987). Viable denning and rendezvous sites, freedom from human interference and adequate prey.

Human Conflict

In the 19th century, wolf populations declined due to conflicts with humans, pressure from human settlement, livestock predation, a lack of understanding of wolf ecology and habits and subsequent eradication programs (USDI 1987). By 1920, wolves had been eliminated from most of the 48 contiguous states (northern Michigan and Minnesota being the only exceptions). Recovery in the northern Rockies began in the 1980s via slow immigration from Canada.

Today, in spite of wolf numbers far below those of the 1800s, wolf-human conflicts have re-emerged, most notably with regard to predation of big game and livestock. Each year from 1997 through 2007, USFS Wildlife Services received an average of 79 complaints of suspected livestock losses to wolves in Montana. Roughly 40 percent of the losses were confirmed to be wolf kills (Sime *et al.* 2007, p. 18). In 2009, this proportion had risen to 50 percent (Sime *et al.* 2010, p. 34). Between 2006 and 2010, the number of livestock killed by wolves rose significantly. Wildlife Services reported 79 wolf kills of adult sheep, lambs and young cattle in 2006. In 2010, the number was 164 kills (Sime *et al.* 2011, p. 33). At the same time, livestock predation by other large predators (grizzly bears, mountain lions and particularly, coyotes) has increased dramatically as well: 976 kills in 2006; 4,462 kills in 2010 [see summary in the *Helena Independent Record,* Dec. 12, 2010]. In 2011, confirmed losses to wolves dropped off dramatically from 2010 numbers, down to 86 kills statewide. MFWP speculates that this may be due in large measure to targeted wolf control in certain areas with chronic predation problems (Hanauska-Brown *et al.* 2011, p. 14).

Elevated wolf predation is partly, if not primarily, a function of expanding wolf populations. Reasons for the spike in coyote, grizzly bear and mountain lion predation, however, is less clear, since populations of these carnivores have been stable or have risen at more modest rates than those of wolves. Nonetheless, the return of the wolf to the northern Rockies after an absence of nearly three quarters of a century, coupled with heightened livestock losses and the historic antipathy of ranchers toward this particular carnivore, have served to give the wolf a higher profile than other predators. This is particularly true in local areas where ranchers consistently see losses to their herds (Sime *et al.* 2007, p. 17). Currently, when wolves attack livestock and where further losses appear likely, Wildlife Services, at the direction of MFWP, seeks out and relocates or, most often, kills the offending animals. A total of 583 wolves were killed to resolve conflicts with livestock from 1987 to 2009 in Montana (Sime *et al.* 2010, p. 34).

The impact that wolves can have on native ungulate populations puts them at loggerheads with many hunters who see them as a threat to their ability to bag an elk or other game animal. In essence, the wolf represents new competition to human predation-by-hunting. So far in Montana, wolves have noticeably reduced elk populations to the detriment of hunters in a few local areas, such as in the central Gallatin River watershed, the area immediately north of Yellowstone Park and along the West Fork of the Bitterroot River (Cunningham 2010; Sime 2010). But many hunters perceive this to be a universal statewide phenomenon, which serves to instill animosity toward wolves among this segment of the population. Anytime these hunters find fewer elk in a given area in any given year, whether it be a function of weather, retreat to private land sanctuaries, a variety of predators, or whatever, they feel it must be due to wolves. It is likely that in parts of the state traditional elk population levels mediated by the old equilibrium between elk, vegetation and human predation will now move to a lower plateau with this re-emergence of another major predator (aside from humans) into the system [Hebblewhite 2010]. It will be many years before these new levels are perceived as the norm and resentment of wolves and consequent pressure to reduce wolf numbers, declines.

Increasingly, as people settle in the wildland-urban interface and on previously wide-open ranchland, the potential for human-wolf encounters increases. While wolves are not known to have directly threatened humans in Montana, they have killed dogs and other domestic animals. As well, many people perceive wolves as a menacing presence and it is not uncommon for them to shoot at wolves as a matter of course. Wolves are also sometimes caught in traps set for other animals. A number of wolves have been hit and killed by vehicles on highways in

Montana, Idaho and Wyoming in recent years, including an adult female killed near MacDonald Pass in the Divide Travel Plan Area in 2002.

Denning and Rendezvous Sites

Wolves may use the same *den sites* from one year to the next or maintain several dens in a local area through which they cycle over the years (USDI 1987). Packs are sensitive to human activity near den sites and they may move if disturbed (Ballard *et al*. 1987). Most dens are located well away from trails and backcountry campsites. *Rendezvous sites* are specific resting and gathering areas that wolves use in summer and early fall. Wolves move to several rendezvous sites in the course of a summer, the first one usually located one to six miles from the natal den. Packs use rendezvous sites until pups are mature enough to travel with the adults. Wolves are most sensitive to disturbance at the first rendezvous site and become less so at later sites (USDI 1987).

The *Wolf Recovery Plan* (USDI 1987) recognized den and rendezvous sites as key components of wolf habitat to be protected from human interference. Based on U.S. Fish and Wildlife Service (USFWS) recommendations, the Helena NF routinely proposes that known wolf dens on the Forest be buffered from any local project (or recreational activity) by at least at least ½ mile during the denning season. Rendezvous sites are more ephemeral and mobile, but any such sites that can be identified are also buffered from human presence as much as possible while they are active.

Prey Base

Wolves prey primarily on ungulates (USDI 1987). During May and June, wolves focus on newborn deer, moose, elk and bison in calving/fawning areas. In summer and fall, ungulates constitute the highest percentage of biomass; in winter wolves prey almost exclusively on deer, elk and moose (although livestock may figure into the mix in ranchland areas). Because ungulates represent the bulk of the wolf's food supply, factors that affect ungulate distribution and abundance (habitat and access management, winter range productivity) also affect wolves. These factors are discussed in previous sections on *Elk* and other big game species.

Roads

Roads have not been identified as a component directly affecting the recovery and viability of wolf populations in the northern Rockies. The presence of roads on the landscape, however, is associated with indirect effects that can put pressure on wolves. These include the effect that roads have on the local abundance and distribution of ungulate populations upon which wolves depend for food; greater potential for human interference at key sites, such as dens; and the loss of space free from regular human presence in general. Other indirect effects are the potential for mortality associated with vehicle accidents and legal/illegal shooting that roads facilitate (Theil 1985; Mech 1989; Mech *et al.* 1988; Boyd and Pletscher 1999).

Comparison of Alternatives

Effects of Alternative 1 (Existing Condition)

There have been no known dens or rendezvous sites in the Travel Plan Area in the last several years (the last known sites being those associated with the Great Divide pack prior to 2003). Consistent, though low-key, wolf activity in the upper Tenmile drainage over the past five years, however, suggests that there may have been den and rendezvous sites on the Forest in that

area. Denning sites of known packs are located and monitored by MFWP each year and the information passed on to the Helena NF so that adjustments to activities on the Forest, including travel management, can be made to protect denning sites while they are active. As a result, retention of the status quo in alternative 1, would have no effect on these key sites

Alternative 1 complies with all *Forest Plan* big game standards and elk and deer populations in the Divide landscape are robust [see *Affected Environment* for *Elk, Mule Deer and Moose*]. Retaining the existing condition would not imperil the ungulate prey base for current and future wolf packs.

The availability of large blocks of habitat free from motorized disturbance under alternative 1 has been quantified and discussed in previous sections on *Grizzly Bear* and *Connectivity and Fragmentation* [see Table 102, Table 103, Table 113]. The fact that the Divide landscape and adjacent areas have been occupied by resident wolf packs more or less continuously since 1995 suggests that these areas provide sufficient space for wolves to escape human presence. Wolf packs have run into trouble confronting human enterprises (notably livestock operations) almost entirely on private lands away from the National Forest. But while on the National Forest, wolves have seldom, if ever, been involved in negative encounters with humans or livestock. The reasons for their disinclination to pursue cattle on National Forest summer ranges is unknown.

Effects of Alternative 2

Alternative 2 is highly unlikely to affect established denning or rendezvous sites. It would reduce slightly the total acreage in non-motorized habitat patches larger than 15,000 acres [see Table 103]. On the other hand, it would increase the acreage of non-motorized blocks larger than 2,500 acres (and more than 0.3 mile from open roads) [see Table 112]. In either case, the changes in availability of habitat in which wolves might establish dens and carry on with other activities on the Forest away from regular human presence would be relatively small under alternative 2 and would have no measurable effect on wolf population viability.

In terms of the availability of large prey, while alternative 2 increases the acreage of elk security areas (from 33 percent to 34 percent of the fall range) [Table 109, Table 110], elk numbers are unlikely to measurably increase as a result of this change alone. The primary factor determining the size of local elk populations in the future will not be due to variations in Travel Plan alternatives, but rather, to the number and variety of elk hunting permits allowed by Montana Fish, Wildlife and Parks. The roads certainly facilitate hunting opportunity, but overall population numbers are a direct result of hunter success. In this regard, the degree to which hunters are able to access off Forest lands where elk often seek refuge during the hunting season will also affect elk numbers. Block management agreements and State land purchases (as in the Spotted Dog country) will drive this access. Alternative 2 would allow elk to continue inhabiting the Plan Area at least at current population levels, thereby assuring a prey base for wolves.

Effects of Alternatives 3 and 4

Effects would be similar for alternatives 3 and 4. As with alternatives 1 and 2, alternatives 3 and 4 would have no effect on established denning or rendezvous sites. Both alternatives would increase the total acreage of large non-motorized habitat patches (however measured) [see Table 102, Table 103, Table 109, Table 110, Table 112 and Table 116], expanding the areas in which wolves can establish new dens and carry on with other activities away from regular

human interference. But, the effects, in terms of their contribution to wolf population viability, are unlikely to be measurable.

Although alternatives 3 and 4 would improve elk summer habitat effectiveness [Table 107] and expand the acreage of elk security areas [Table 109], elk numbers are unlikely to measurably increase as a result of these changes alone. Elk populations have been increasing throughout the Travel Plan Area in recent years and may continue to do so, as a result of improved elk habitat effectiveness and security on the Forest and the increasing tendency of elk to move early in the hunting season to private lands off-limits to hunters. While this continues to provide a good prey source for wolves, it is unlikely to lead to a substantially greater wolf presence in and around the Travel Plan Area over the long-term. Landowner concerns over excess elk competing with livestock for forage on wintering grounds should curtail future population increases. The tendency of wolves in this area of regular private/Forest land juxtapositon to spend much of their time working the private ranch will continue to see their numbers limited by control efforts, including hunting and trapping.

Effects of Alternative 5

As with the other four alternatives, alternative 5 would have no effect on established denning or rendezvous sites. It would increase the total acreage of large non-motorized habitat patches, as seen in Table 102, Table 103, Table 109, Table 112 and Table 116. This would expand the areas in which wolves can establish new dens and carry on with other activities away from regular human interference to a greater degree than any other alternative. However, as with other alternatives, the effects, in terms of their contribution to wolf population viability, are unlikely to be measurable.

Alternative 5 would provide the highest level of elk summer habitat effectiveness [Table 107] and elk security [Table 109, Table 110] of any alternative. But, as with alternatives 3 and 4, elk numbers are unlikely to measurably increase as a result of these factors alone: wolf populations will be limited by factors other than prey availability, primarily, human control efforts (mostly on private land in this area).

Cumulative Effects

This summary of cumulative effects is based on the detailed matrix in *appendix B*, which identifies all past, present and reasonably foreseeable projects and other activities, in addition to proposed Travel Management, that may affect wolves and wolf habitat components. The scope of the analysis includes the Divide landscape (Helena NF land with non-Forest inholdings) and enough surrounding non-Forest lands to encompass known den sites since 1995, in particular, sites along Spotted Dog Creek, roughly three miles beyond the western Helena NF boundary and in China Gulch, about ¾ mile beyond the NE corner of the Planning Area. Effects described in this summary are common to all alternatives.

Forest Service Past and Ongoing Activities

Recent and ongoing activities on the National Forest that have improved prospects for wolves include: establishment of the Statewide OHV Plan, which prohibits riding off established motor routes, thus reducing potential for negative wolf-human encounters; grazing allotment revisions that have generally reduced cattle numbers and grazing seasons, thus improving habitat conditions for big game species while at the same time reducing potential for wolf-livestock interaction on the Forest; road and motor trail closures associated with timber harvest projects

(Clancy-Unionville, Sound Wood, Mullan Pass, Treasure Mountain, Lava Mountain) that have expanded blocks of non-motorized habitat and potentially reduced opportunity for negative wolf-human encounters; trail relocation projects that have removed trails from riparian areas to upslope locations away from sites more likely to attract wolves and their prey (Blackfoot Meadows, CDNST).

Activities that have increased the likelihood of wolf-human encounters include: road permits for access across Helena NF land to private holdings; retention of private recreational residences on Helena NF land; small mining operations (under the 1872 Mining Act) in areas where wolves have been observed; construction and maintenance of communications sites and power lines; efforts to spread livestock distribution across allotments, which may bring cattle into areas where they are more vulnerable to wolf predation; retention of grazing allotments on the Forest providing ongoing opportunity for wolf predation; retention of numerous dispersed camping sites; unrestricted back-country recreation (backpackers, day-hikers, horseback riders, hunters).

The recent establishment (2009) and ongoing evolution of the State wolf hunting program is not limited to National Forest land. However, because much of the big game hunting in the Divide landscape occurs on the Helena NF and because many of the wolves that have been harvested over the past four years have been shot by hunters looking primarily for deer and elk, wolf hunting is likely to have an important impact on any animals that normally range over the Forest.

Adjacent Private and Other, Past and Ongoing Actions

Private land development (primarily rural home building) is continuing to create more sites that prove troublesome for wolves moving through the landscape (bringing them into contact with human habitation, domestic animals and residents with guns). Ranching operations on private lands near the Forest have proven to have high potential for wolf-human conflict. Wolves inevitably descend to private ranch and agricultural lands in the valleys as winter comes on and sometimes, they remain there yearlong. This has been a problem primarily in the Avon Valley and Greater Spotted Dog Creek drainage along the west side of the Divide landscape, a circumstance that may, in part, be related to elk coming down off the Forest in early-mid fall to avoid hunters on the National Forest and remaining in the valleylands for up to eight months. In the last few years, wolves have also been attacking livestock on Sieben Ranch Company lands northeast of the landscape, although this area is some 10 to 15 miles distant across the Little Prickly Pear Valley. The demise of most wolf packs that have inhabited the Divide landscape has resulted from their preying on domestic livestock and their subsequent removal by Federal and State agencies.

Forest Service Reasonably Foreseeable Actions

Reasonably foreseeable activities on Helena NF land that may affect wolves to one degree or another include improvement of the Rimini Road, which will allow higher traffic speeds in a potential wolf travel zone; continued implementation of grazing allotment revision, which will shift cattle distribution local. Large timber harvest projects designed to deal with the ongoing bark beetle epidemic (Telegraph Creek, Tenmile South Helena) and continued hazard tree removal projects at a number of developed recreation sites and along roadsides may cause wolves to avoid local areas while project operations are active but will not alter habitat in ways that would benefit or cause problems for wolves.

Adjacent Private and Other, Reasonably Foreseeable Actions

Future activity on non-Forest land in the cumulative effects area that may affect wolves is mostly a function of continued settlement and development of private lands (including new roads), activities that increase potential for wolf-human encounters. Unlike many large carnivores on the Helena NF, wolves frequently inhabit and travel through the maze of private and public lands in the valleys and foothills adjacent to the Forest. Continued development of these lands may put pressure on wolves to seek out more isolated habitats on the National Forest.

Summary and Conclusions

All alternatives would comply with guidance established by the *Wolf Recovery Plan* as to actions that influence human-wolf conflict, denning and rendezvous sites and the big game prey base.

Alternative 1 would maintain the status quo, which is not negatively impacting wolves.

Alternative 2 would reduce open road density in some areas, increase it in others; it would reduce the acreage of non-motorized habitat blocks larger than 1,500 acres but increase the acreage of non-motorized blocks larger than 2,500 acres. In sum, it would provide a mixed bag of changes, none of them substantial enough to influence wolf population viability.

Alternative 3 would reduce the potential for wolf-human encounters by lowering open road density and substantially increasing the acreage of large non-motorized habitat blocks (however measured). It would reduce the potential for negative wolf-human encounters more than Alternative 2, but not enough to measurably influence population viability.

Alternative 4 would maintain slightly higher open road density and slightly less acreage in large non-motorized habitat patches than alternative 3. But the two alternatives are very similar and effects would be likewise.

Alternative 5 would maintain the lowest open road density and the most extensive acreage of large non-motorized habitat blocks of any alternative. This would increase prey potential and reduce probability of negative encounters with humans. Any measurable increases in local wolf population numbers are unlikely to result from these factors alone.

Virtually all issues with wolves in and around the Divide landscape since their arrival in the late 1980s have been on private or other non-forest lands. Problems have not been driven by management actions or other circumstances on the Helena NF. This scenario is expected to continue.

Fisher

Common Effects of Travel Management

Fishers do not necessarily avoid roads and areas of human settlement, but the loss of suitable forest habitat that often accompanies these developments has been a primary reason for population decline (Heinemeyer and Jones 1994). Habitat loss and lessened habitat effectiveness in riparian areas is especially detrimental. Even in areas unaffected by timber harvest or clearing for building, firewood cutters typically remove most large snags from open road corridors, eliminating a key habitat component of potential use to fishers. Another problem has been trapping, often abetted by roads and other access channels for trappers on snowmobiles. Fishers are wide-ranging, curious and opportunistic and thus highly susceptible to trapping. Even in areas where quotas are minimal or where fishers are off-limits to trapping, they are caught incidentally in sets for other species (Jones 1991).

Comparison of Alternatives

Effects of Alternative 1 (Existing Condition)

Alternative 1 would retain the current configuration of motor routes. This includes 340 miles of roads open to wheeled vehicles on public land (and thus, open to firewood cutters) and 418 miles of routes used by snowmobiles. Trapping access to potential fisher habitat (primarily, patches of riparian forest) would remain at its current level. Trapping activity in the Divide landscape is variable from year to year, but generally low. This, combined with the rarity of fishers in the landscape, has resulted in no fishers being caught in recent decades. The potential for fisher mortality via trapping, as facilitated by the road/trail network, would remain slight.

Effects of Alternative 2

With alternative 2, open road miles on public land would remain much the same as in alternative 1, declining by only six miles to 334 miles. The area from which firewood cutters would be able to remove large snags and logs that might be useful to fishers would thus be essentially unchanged. Roads and trails available to snowmobiles would decline from 418 to 394 miles. At the same time, an additional 9,630 acres of off-route areas would be closed to snowmobiles. Assuming that most trappers make use of established snowmobile routes for setting traplines rather than pushing out into off-route areas, the key change under alternative 2 would be the decline in available routes. This would decrease trapper access to a variety of habitats, including a limited amount of potential fisher habitat.

Effects of Alternative 3

Alternative 3 would produce a larger reduction in open road mileage on public land than alternatives 1, 2 and 4: from 340 miles to 295 miles, a decrease of 45 miles in road corridor accessible to firewood cutters. An additional 13,730 acres would be closed to off-route snowmobile use and roads/trails available to snowmobiles would remain much the same as at present, declining only from 418 miles to 416 miles. Trapper access to potential fisher habitat would thus decrease slightly.

Effects of Alternative 4

In alternative 4, roads open to firewood cutters would fall partway between alternatives 2 and 3 at 304 miles (a decrease of 36 miles from current conditions). As with alternative 3, areas available for off-route snowmobiling would decline by 13,730 acres. Roads and trails available to trappers on snowmobiles would decrease by 14 miles to 404 miles, more than alternative 2 (394 miles), slightly less than alternative 3 (416 miles). Given the rarity of fishers in the landscape and the relatively small amount of primary fisher habitat penetrated by the road system, these changes (under alternatives 2 , 3 and 4) would be unlikely to measurably affect prospects for fisher viability on the Helena NF or in this part of the northern Rockies in general.

Effects of Alternative 5

Alternative 5 would produce the largest reduction in open road mileage on public land: from 340 miles to 185 miles, a decrease of 155 miles in road corridor accessible to firewood cutters. An additional 13,730 acres would be closed to off-route snowmobile use and roads/ trails available to snowmobiles would decline modestly from the current 418 miles to 403 miles, essentially the same as alternative 4. Trapper access to potential fisher habitat would thus decrease slightly.

Cumulative Effects

The cumulative effects summary is based on the detailed matrix in *appendix B*, which identifies all past, present and reasonably foreseeable projects and activities that may affect fishers and fisher habitat components. The scope of the analysis includes the Divide landscape (Helena NF land with non-Forest inholdings) and immediately surrounding lands (private, State, County, Municipal and BLM). Effects described in this summary are common to all alternatives.

Forest Service Past and Ongoing Activities

Past timber harvest in the Divide landscape, has removed mature and old-growth forest capable of providing primary fisher habitat (in particular, mid/low-elevation riparian forest). Timber harvest projects that have had this effect, to one degree or another, include: Bison Mountain, Ontario Creek, Mike Renig Gulch-Hahn Creek, Slate Creek, Deadman, Strawberry, Corral Gulch, Buffalo Creek, Sound Wood and Treasure Mountain, among others. Among smaller projects are the MacDonald Pass ski trail hazard tree project (in productive forest habitat just below the Divide) and a number of tree removal operations scheduled for campgrounds, picnic areas and other developed recreational sites (which are unlikely to provide viable fisher habitat).

Primary actions that have locally reduced the effectiveness of potential fisher habitat by providing access for trappers and firewood cutters include retention of groomed snowmobile trails roads passing through forested riparian habitat.

Actions that have improved prospects for fishers include: Closure of Roadless Areas to snowmobile use (Electric Peak, Lazyman Gulch); trail relocation projects that have removed trails from productive riparian areas to upslope locations (Blackfoot Meadows, CDNST); establishment of the Statewide OHV Plan, which prohibits riding off established motor routes; road and motor trail closures associated with timber harvest (Clancy-Unionville, Sound Wood, Mullan Pass, Treasure Mountain) that have expanded blocks of non-motorized habitat.

Recent and ongoing travel planning efforts on adjacent Forests, as well as the Lincoln Ranger District, could be beneficial to fishers if they provide local safe havens free from motorized access. Because fishers are capable of traveling some distance, improved habitat conditions on other Forests could improve fisher populations and subsequent dispersal opportunities to the Helena National Forest. Conversely, travel management decisions elsewhere could reduce fisher populations in those areas and reduce the potential for emigration/immigration.

Adjacent Private and Other, Past and Ongoing Actions

Recent and ongoing private land development (building construction, clearing, thinning, commercial timber harvest, dead tree salvage) will continue to impact potential fisher habitat, particularly where it occurs in forested riparian areas. Actions that reduce key habitat components (large snags and logs, overhead cover) could have an effect.

Forest Service Reasonably Foreseeable Actions

Reasonably foreseeable activities on Helena NF land that could affect fishers to one degree or another include salvage projects designed to deal with the ongoing bark beetle epidemic which will remove substantial numbers of large dead trees, some of which could be of use to fishers. These include the Telegraph Creek and Red Mountain Flume-chessman Reservoir projects (although neither area contains more than small fragmented patches of potentially suitable fisher habitat).

Adjacent Private and Other, Reasonably Foreseeable Actions

Future activity on non-Forest land within the cumulative effects area that could affect fishers includes: Settlement and associated development of private lands and timber harvest and removal of large beetle-killed trees.

Summary and Conclusions

Fishers are extremely rare in the Plan Area and differences between alternatives, road miles open to firewood cutters (who remove key habitat components) and trappers on snowmobiles (who pose a mortality risk), are insufficient to impact fishers one way or the other.

Alternative 1 would retain 340 miles of open roads on public land and 418 miles of snowmobile routes. Alternative 2 would maintain 334 miles of open roads on public land and 394 miles of snowmobile routes. Alternative 3 would maintain 295 miles of open roads on public land and 416 miles of snowmobile routes. Alternative 4 would maintain 304 miles of open roads on public land and 404 miles of snowmobile routes. Alternative 5 would maintain 185 miles of open roads on public land and 403 miles of snowmobile routes.

Black-backed Woodpecker

Common Effects of Travel Management

The presence of open roads and motor trails has no direct effect on black-backed woodpecker habitat. Impacts come indirectly from the loss of dead trees to firewood cutting or to Forest operations designed to remove hazard trees from along the roads. Since black-backed woodpeckers are attracted first and foremost to snag arrays created by stand-replacing fire, roadside snag removal in these environments is the most telling. Woodpecker numbers are much lower in stands created by other agents, even where dead tree abundance is high.

Region 1 habitat models show only a single patch of primary black-backed woodpecker habitat in the Divide landscape, namely, the MacDonald Pass burn (170 acres) from 2009. The ongoing bark beetle onslaught, however, may put the status of black-backed woodpecker habitat in flux. The rapid expansion of open-canopied stands of dead and dying trees across the landscape may be creating new habitat opportunities for black-backed woodpeckers. On the other hand, the strong preference that these woodpeckers show for burned forest snags may mean that the beetle-killed forest will not be exploited by these woodpeckers. Even if blackbacks do move into the beetle-kill, it represents a short-term opportunity, likely to last no more than 10 years as the bark beetles run their course and the woodpeckers' food supply fades away.

During that time period, even with the likelihood that many snags would be removed by dead tree salvage operations, the loss of snags along roads to firewood cutting will not be a factor in determining whether or not black-backed woodpeckers are able to occupy the landscape. Because of the magnitude of the beetle kill, the fact that the open road corridors will not be available as habitat will be of no real consequence under any Travel Plan alternative. Concentrations of dead tree habitat will be abundant and widely distributed, a circumstance that has not been extant in the Divide landscape since the turn of the 20th century. This may be a moot point, however, if black-backed woodpeckers continue to spurn the beetle-killed forest.

Comparison of Alternatives

Effects of Alternative 1 (Existing Condition)

Alternative 1 maintains the status quo. The abundance of dead trees available as potential black back-woodpecker habitat is may be diminished wherever firewood cutters can remove snags from the open road corridors. The degree to which black-backed woodpeckers are actually present in these areas depends upon the character of the environment created by the ongoing bark-beetle infestation of pine forests. This environment is currently a work in progress and the effect of leaving the existing road system in place is speculative with regard to a species that appears to develop robust populations only in the aftermath of stand-replacing fire.

Effects of Alternative 2

Alternative 2 would reduce open roads on public land by six miles. This represents road corridor that would no longer be available to firewood cutting and removal of roadside hazard trees. The degree to which this would affect black-backed woodpeckers (which have yet to put in appearance in the beetle-killed forest) is highly speculative. It is unlikely that the removal of nine miles of road corridor from the firewood cutting base would in any measurable way improve prospects for black-backed woodpeckers.

Effects of Alternative 3

Alternative 3 would reduce open roads on public land by 45 miles. While this would be an appreciable reduction in the road corridor available to firewood cutters, it is unlikely that it represents a large enough area of concentrated dead tree habitat to produce a commensurate increase in local black-backed woodpecker numbers, especially given their strong preference for burned trees.

Effects of Alternative 4

Alternative 4 would reduce open roads on public land by 36 miles. As with alternatives 2 and 3, this decrease in the availability of non-burned forest to firewood cutting would not meaningfully increase habitat opportunity for black-backed woodpeckers.

Effects of Alternative 5

Alternative 5 would reduce open roads on public land by 155 miles, appreciably more than any other action alternative. Nonetheless, this decrease in the availability of non-burned forest to firewood cutting would not meaningfully increase habitat opportunity for black-backed woodpeckers.

Cumulative Effects

This summary is based on the detailed matrix in *appendix B*, which identifies past, present and foreseeable projects and other activities that may affect black-backed woodpeckers and their habitat components. The scope of the analysis includes the Divide landscape (Helena NF land with non-Forest inholdings), adjacent National Forest lands (Helena NF Lincoln Ranger District; Beaverhead-Deerlodge NF) and immediately surrounding lands (private, State, County, Municipal and BLM). Effects described in this summary are common to all alternatives.

Forest Service Past and Ongoing Activities

The MacDonald Pass Ski Trails, Forestwide Roadside Hazard Tree Removal and Red Mountain Flume Chessman Reservoir projects have removed beetle-killed mature trees from several hundred acres, although black-backed woodpeckers had not been reported in any of these

project sites. The latter two projects are still in progress. Also recently completed are a number of tree removal operations scheduled for campgrounds, picnic areas and other developed recreation sites (which are unlikely to provide viable black-backed woodpecker habitat). Fire management policy aimed at preventing stand replacing fires over several decades has, in the Divide landscape, resulted in a paucity of black-backed woodpecker habitat. No other Forest Service policies or actions have had meaningful implications for these woodpeckers.

Adjacent Private and Other, Past and Ongoing Actions

Timber harvest on private lands has reduced the potential for a scenario where stand replacing fire would create abundant black-backed woodpecker habitat in those areas.

Forest Service Reasonably Foreseeable Actions

Reasonably foreseeable activities on Helena NF land that could affect black-backed woodpecker habitat revolve around projected salvage projects designed to deal with the ongoing bark beetle epidemic which will remove substantial numbers of dead trees. These include the Telegraph Creek project (which involves both removal of beetle-killed mature trees and the precommercial thinning of sapling conifers in old clearcuts) and the Tenmile South Helena project (which involves removing standing dead trees (soon to be downed dead trees) from an extensive area throughout the upper Tenmile watershed.

Adjacent Private and Other, Reasonably Foreseeable Actions

Future activity on non-Forest land that could affect black-backed woodpeckers is tied to salvage of dead trees and thinning projects designed to reduce the probability of stand replacing fire.

Summary and Conclusions

Differences between alternatives, in terms of road corridor acreage available to firewood cutters, would be too small to impact black-backed woodpeckers, which need extensive concentrations of dead trees to inhabit an area and which have a strong preference for burned forest rather than beetle-killed trees. Given the acreage of beetle-killed pine outside the road corridors, the impact on black-backed woodpecker occupancy would be insubstantial.

Alternative 1 would retain current road corridor acreage on public land from which firewood cutters could remove dead trees that could provide marginal black-backed woodpecker habitat. Alternative 2 would reduce roads on public land available to firewood cutters by six miles. Alternative 3 would reduce roads available to firewood cutters on public land by 45 miles. Alternative 4 would reduce public roads available to firewood cutters by 36 miles. Alternative 5 would reduce public roads available to firewood cutters by 155 miles.

Western Boreal Toad

Common Effects of Travel Management

Primary local risk factors for western toads are those that affect breeding habitat via reduction in size and quality of riparian areas. Activities that eliminate key vegetation and increase water turbidity reduce the quality of riparian areas as breeding habitat. Road construction and the subsequent presence of dirt/gravel roads in riparian areas increase sedimentation in adjacent aquatic habitats unless mitigation measures are initiated and sustained. Off-route motorized use in riparian areas can also reduce habitat by degrading vegetation and increasing sedimentation (Maxell and Hokit 1999).

While toad populations are highest near riparian areas, adult toads travel some distance away from breeding sites, moving through a variety of upland habitats. Because they are small, move slowly and deliberately and are highly dependent on cover, toads find Forest roads to be more of a barrier than almost any other local wildlife species. In addition to being a deterrent to efficient movement through the landscape, well-traveled roads are often a source of mortality for toads and for amphibians and reptiles in general.

Western toads often seek shelter in logs and under other coarse woody debris and removal of these components from the road corridor, typically by firewood gatherers or by Forest Service burning operations designed to reduce fuel loading, can reduce local habitat opportunity [see additional discussion in sections on *Riparian Habitats* and *Snag and Woody Debris*].

Comparison of Alternatives

Effects of Alternative 1 (Existing Condition)

Alternative 1 retains the current configuration of roads and motor trails. This leaves 474 miles of open roads and trails in the Travel Plan Area, 83 miles of which are in riparian habitat conservation areas (RHCAs). Off-route riding would continue to be restricted by the Statewide OHV Decision (USFS, USFWS 2001), which limits off-road vehicle use to a 300 feet corridor on either side of the road for reaching dispersed camping sites and prohibits riding in sensitive habitats (particularly wet sites). A Forest road system of this magnitude, while a contributing factor to depressing local western toad populations, represents a relatively minor impact compared to other decimating factors and sources of habitat degradation (chytrid fungus, draining and diversion of ponds and streams, water pollution, predatory fish introduction, cattle at aquatic sites).

Effects of Alternative 2

Alternative 2 would reduce open route mileage from 474 to 469 miles overall and from 83 to 76 miles in riparian habitat conservation areas. This would incrementally reduce mortality risk for western toads, reduce the area from which coarse woody debris is likely to be removed by firewood gatherers and reduce the miles of roadside riparian habitats likely to be disrupted by motorized use. The result would not be measurable in terms of shifts in local western toad population viability.

Effects of Alternative 3

Alternative 3 would reduce open route mileage from 474 to 403 miles overall and from 83 to 69 miles in riparian habitat conservation areas. This would incrementally lower mortality risk for western toads, reduce the area from which coarse woody debris is likely to be removed by firewood cutters and reduce the miles of roadside riparian habitats likely to be disrupted by motorized use. The decline in potential impacts, though greater than under alternative 2, would not be measurable in terms of local western toad population viability.

Effects of Alternative 4

Alternative 4 is similar to alternative 3 in terms of its effect on roads and trails in riparian areas. It would reduce open route mileage from 474 to 417 miles overall and from 83 to 70 miles in riparian habitat conservation areas. As with alternative 3, this would incrementally lower mortality risk for western toads, reduce the area from which coarse woody debris is likely to be taken for firewood and reduce potential motorized disruption of roadside riparian habitats. The

decline in potential impacts would not be measurable in terms of local western toad population viability.

Effects of Alternative 5

Alternative 5 would be most the effective of the action alternatives in tempering the impact of motor routes on western toads across the Travel Plan Area. It would reduce open route mileage from 474 to 348 miles overall and from 83 to 65 miles in riparian habitat conservation areas. As with other action alternatives, alternative 5 would diminish mortality risk for western toads by vehicles on roads and trails, reduce the area from which coarse woody debris is likely to be taken for firewood and lower the potential for motorized disruption of roadside riparian habitats. The decline in potential impacts would not be measurable in terms of local western toad population viability.

Cumulative Effects

This summary is based on the detailed matrix in *appendix B*, which identifies past, present and reasonably foreseeable projects and other activities, along with proposed Travel Management, that may affect western toads. The scope of the analysis includes the Divide landscape (Helena NF land with non-Forest inholdings) and immediately surrounding lands (private, State, County, Municipal and BLM). Effects described in this summary are common to all alternatives.

Forest Service Past and Ongoing Activities

Recent and ongoing activities on the Helena NF that may negatively affect western toads include: Timber sales that have created large openings with minimal coarse woody debris (Bison Mountain, Ontario Creek, Mike Renig Gulch-Hahn Creek, Slate Creek, Deadman, Strawberry, Corral Gulch, Buffalo Creek, Mullan Pass, Treasure Mountain); retention of grazing allotments on the Forest, most of which allow cattle some degree of access to aquatic habitats; small mining operations; large mining operations on and adjacent to the Forest (Montana Tunnels, Luttrell).

Among small/mid-sized projects are the Red Mountain Flume Chessman Reservoir project (removing dead trees and woody debris from roughly 490 acres), the MacDonald Pass ski trail hazard tree project (in productive forest habitat with numerous drainage-head wet sites) and a number of tree removal operations scheduled for campgrounds, picnic areas and other developed recreation sites (which are unlikely to provide viable western toad habitat).

Actions that have improved prospects for western toads include: Revision of allotment management plans that have resulted in lower cattle numbers and range improvements aimed at protecting riparian sites; trail relocation projects that have removed trails from productive riparian areas to upslope locations (Blackfoot Meadows, CDNST); establishment of the Statewide OHV Plan, which prohibits riding off established motor routes except for dispersed camping access; road and motor trail closures associated with timber harvest projects (Clancy-Unionville, Sound Wood, Mullan Pass, Treasure Mountain); mine site reclamation projects that have reduced sedimentation and pollution at a number of aquatic sites.

Adjacent Private and Other, Past and Ongoing Actions

Development of private lands adjacent to the forest and on inholdings within Forest boundaries has modified riparian and aquatic habitats (by water diversion, sedimentation, degradation of vegetation) and subtracted potential breeding habitat for western toads. Timber harvest on private land has removed forest cover useful to toads, but has often increased the amount of

coarse woody debris at ground level, a benefit to toads. Cattle grazing on private ranchlands has led to degradation of riparian/aquatic habitat at many of sites. ATV, trail bike and four-wheel-drive riding in riparian areas disrupts habitat where toad densities are likely to be highest.

Forest Service Reasonably Foreseeable Actions

Reasonably foreseeable activities on Helena NF land that may affect toads to one degree or another include improvement of the Rimini Road, continued grazing allotment revision and salvage projects designed to deal with bark beetle infestation that may remove or thin understory vegetation and woody debris. Prominent among these are the Telegraph Creek project (which would both remove of beetle-killed mature trees and thin stands of sapling conifers in old clearcuts), the Tenmile south Helena project (which would remove standing snags and coarse woody debris from extensive areas of the upper Tenmile Creek drainage and the area south of Helena) and continuation of the Forestwide Roadside Hazard Tree Removal Project.

Adjacent Private and Other, Reasonably *F*oreseeable Actions

Future activity on non-Forest land within the cumulative effects area that may affect western toads includes: settlement and associated development of private lands (including road building); timber harvest and removal of beetle-killed trees; continued ATV and other motorized activity; continued heavy grazing on private ranchlands, including riparian sites.

Summary and Conclusions

Given the relatively minor contribution of Forest roads to mortality factors impacting western toads, differences in road miles between alternatives would be highly unlikely to show measurable differences in local toad populations.

Under alternative 1, 83 miles of road would be retained in riparian habitat conservation areas. Under alternative 2, open road mileage would decline to 76 miles in riparian habitat conservation areas. Under alternative 3, open road mileage would decline to 69 miles in riparian habitat conservation areas. Under alternative 4, open road mileage would decline to 70 miles in riparian habitat conservation areas. Under alternative 5, open road mileage in riparian habitat conservation areas would decline from 83 miles to 65 miles.

Flammulated Owl

Common Effects of Travel Management

Flammulated owls are small raptors, active primarily from dusk to dawn. McCallum (1994) observes that they appear quite tolerant of humans: In the northern Rockies, they will nest, roost and forage close to houses and to open roads and well-used trails if habitat structure is suitable. The mature and old-growth ponderosa pine stands that traditionally provided that habitat structure in the Divide landscape have been logged particularly heavily since the late 1860s and their relatively low abundance and fragmented dispersion on the landscape are limiting factors for flammulated owls. In these circumstances, the presence of human activity along roads and trails in ponderosa stands, though not an ideal set of conditions, appears not to be a primary determinant of habitat selection. If the basic habitat is there, the owls take advantage of it.

The impact of roads is indirect in that firewood cutters working the open road corridors are likely to remove large dead trees that the owls most often use for nesting. Flammulated owls

will nest in live conifers where pileated woodpeckers have excavated cavities, but large snags are the primary source of nest holes and in the road corridor, they are ephemeral.

The on-going pine mountain pine beetle epidemic is of particular relevance to flammulated owl habitat, since mature ponderosa pine forests, particularly the more open-grown stands with large trees at lower and mid elevations, represent a primary environment for these birds. The increase in large cavity-prone trees in stands of this structure represents new habitat opportunities for flammulated owls wherever sufficient live canopy remains. In the open road corridors, however, the loss of these components is virtually inevitable.

Flammulated owl habitat has been mapped via the Region 1 habitat model, which is designed to predict environments most optimal to flammulated owl nesting, roosting and foraging. Primary source data for the model has come from research in westside Forests, notably the Bitterroot, Lolo and Nez Perce NFs. Field surveys on the Helena NF suggest that, as with several other species, habitat usage in the drier, more fragmented forests east of the Continental Divide is more diverse. That is, the owls tend to use combinations of habitat components that are variations of the more optimal westside arrangements, making use of two or three separate habitat patches, each with one optimal component, rather than holding out for a single stand with all components combined. On the Helena NF, flammulated owls have also been observed taking advantage of mature aspen stands. As a result, the Region 1 model almost certainly underestimates flammulated owl habitat in the Travel Plan Area. Be that as it may, Table 117 summarizes the relative potential for loss of snags to firewood cutting in modeled flammulated owl habitat under different alternatives.

Table 117 - Snag Removal Zones Along Open Roads

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Miles of Open Road in Suitable Flammulated Owl Habitat	49	44	40	40	29
Maximum Acres in the 600-ft Snag Removal Corridor	3,565	3,200	2,910	2,910	2,110
Percent of Suitable Habitat in the 600-ft Snag Removal Corridor	18%	16%	14%	14%	10%

Comparison of Alternatives

Effects of Alternative 1 (Existing Condition)

Alternative 1 would have no direct effect on flammulated owls since no new road or trail construction is part of the proposal and no habitat components would be lost as a result. Alternative 1 would maintain the status quo and would not increase the potential for indirect effects resulting from removal of large dead trees that might serve as nesting substrate. Snag removal by firewood cutters and under the proposed Helena NF hazard tree removal program will increase in the near future because of the proliferation of dead trees generated by ongoing bark beetle infestations. This elevated level of activity, however, is not a function of this alternative.

Effects of Alternative 2

There would be no direct effects on flammulated owls since, as with alternative 1, no new road or trail construction is a part of this alternative and no key habitat components would be removed as a consequence. Road closures in alternative 2 would reduce the maximum roadside

area available to snag depletion by firewood cutters in flammulated owl habitat by about 385 acres, or from 18 percent to 16 percent of modeled owl habitat.

Effects of Alternative 3

Alternative 3 would have no direct effect on flammulated owls since no new road or trail construction is part of proposal and no habitat components would be lost as a result. Road proposals in alternative 3 would reduce the roadside area susceptible to snag depletion by firewood cutters in flammulated owl habitat by roughly 669 acres compared to current conditions, from 18 percent to 14 percent of modeled habitat.

Effects of Alternative 4

As with the previous alternatives, alternative 4 would have no direct effect on flammulated owls since there would be no new road or trail construction and no resulting loss of habitat components. In terms of its potential for indirect effects on flammulated owl habitat, alternative 4 is almost identical to alternative 3. It would reduce the roadside area susceptible to snag depletion by firewood cutting in flammulated owl habitat by about 633 acres compared to current conditions, from 18 percent to 14 percent of modeled habitat in the Travel Plan Area.

Effects of Alternative 5

Alternative 5 would have no direct effect on flammulated owl habitat since, as with other alternatives, no new roads or trails would be constructed and no habitat components would be lost as a result. The area subject to indirect effects on flammulated owls would be the least of any alternative. The roadside area susceptible to snag depletion by firewood cutting in flammulated owl habitat would drop from 3,565 acres to 2,110 acres, from 18 percent to 10 percent of modeled habitat in the Travel Plan Area.

Cumulative Effects

This summary of cumulative effects is based on the detailed matrix in *appendix B*, which identifies past, present and reasonably foreseeable projects and other activities, in addition to proposed Travel Management, that may affect flammulated owl habitat. The scope of the analysis includes the Divide landscape (Helena NF land with non-Forest inholdings) and immediately surrounding lands (private, State, County, Municipal and BLM). Effects described in this summary are common to all alternatives.

Forest Service Past and Ongoing Activities

Past timber harvest throughout the Divide landscape, has removed substantial acreages of mature and old-growth forest in which large-diameter conifer snags were prominent components. Timber harvest projects that have had this effect in potential flammulated owl habitat, to one degree or another, include: Mike Renig Gulch–Hahn Creek, Slate Creek, Deadman, Strawberry, Corral Gulch, Buffalo Creek, Mullan Pass and Treasure Mountain, among others. Overall, these projects have depleted suitable flammulated owl habitat.

A few recent timber harvest and thinning projects have emphasized retaining large trees in open-grown stands and allowing them to continue to grow in a forest configurations less likely to succumb to stand-replacing fire (Sweeney Creek, Tucker-Dry, Clancy-Unionville). Over the long-term, these projects benefit flammulated owl habitat. The MacDonald Pass Ski Trail Hazard Tree Removal Project has removed a substantial number of mature trees, but all were dead and the area is not in flammulated owl habitat. Portions of the Forestwide Roadside Hazard Tree

Removal Project have been in mature ponderosa pine and may have resulted in limited increase in potential flammulated owl habitat (although most surviving trees will not be ponderosa pine). None of the ongoing Red Mountain Flume Chessman Reservoir project is in flammulated owl habitat.

The ongoing Helena NF firewood policy that allows members of the public to take up to 10 cords of dead wood within reach of Forest roads continues to result in the removal of most large snags from the road corridors.

Past and Ongoing Actions on Adjacent NonForest Lands

Recent and ongoing private land development (building construction, clearing, thinning, commercial timber harvest, dead tree salvage) has variable effects. Traditional clearcut logging and overstory removal eliminate potential habitat for flammulated owls; thinning projects, many of them aimed at reducing fuel loading for fire protection, are generally beneficial. Some recent timber harvest on BLM lands (notably in the Sheep Mountain area) have opened up dense ponderosa pine stands, allowing them to develop in more open formations that will eventually be suitable for flammulated owls. Portions of the Red Mountain Flume corridor from which dead trees have been removed on private land are not in flammulated owl habitat.

Forest Service Reasonably Foreseeable Actions

Foreseeable activities on Helena NF land that could affect flammulated owls to one degree or another include the salvage projects designed to deal with the ongoing bark beetle epidemic and that will remove numerous large dead trees, some of which could be of use to flammulated owls. On the other hand, those projects that retain mature trees in open-grown formations are likely to benefit the birds over the long-term. The Clancy-Unionville project was originally designed to achieve this forest formation, but extensive beetle kill has required its prescriptions be altered to create more open environments with fewer large trees (many of them now dead): So, this project will be of substantially less benefit than originally intended, at least in the short-term. Both the Telegraph Creek and Tenmile South Helena projects intend to remove dead trees from mature forest over several thousand acres, in some cases resulting in open-grown stands of large residual trees. The bulk of these trees in the upper Telegraph and Tenmile drainages will be in lodgepole pine dominated forests (not flammulated owl habitat); but many areas lower in Tenmile Creek and in the region south of Helena are in ponderosa pine/Douglas-fir forest and some of these stands have potential as flammulated owl habitat. Since most trees removed from these stands will be smaller understory trees, the key components of owl habitat will remain intact and the more open stand structure should improve foraging opportunity.

Adjacent Private and Other, Reasonably Foreseeable Actions

Future activity on non-Forest land within the cumulative effects area that could affect flammulated owl habitat includes settlement and associated development of private lands, often clearing that involves removal of large trees and clearcut/overstory removal timber harvest and removal of large beetle-killed dead trees.

Summary and Conclusions

Flammulated owls are not deterred from nesting near open roads. Removal of dead trees from the road corridor by firewood cutters is unlikely to have any measurable impact on flammulated owl occupancy of the landscape in any alternative: The area of suitable habitat traversed by

open roads is relatively modest and the number of large potential nesting snags (ponderosa pine) in the corridor is small.

Alternative 1 would retain 49 miles of open road in potential flammulated owl habitat.
Alternative 2 would reduce open road in potential flammulated owl habitat to about 44 miles.
Alternative 3 would reduce open road in potential flammulated owl habitat to 40 miles.
Alternative 4 would also reduce open road in potential flammulated owl habitat to 40 miles.
Alternative 5 would reduce open road in flammulated owl habitat from 49 miles to 29 miles.

Management Indicator Species

Pileated Woodpecker (Old-Growth Dependent Group)

Common Effects of Travel Management

Direct effects associated with the road/trail system arise almost entirely from the loss of components used by pileated woodpeckers as a result of road construction. Since road/trail construction is not part of the Divide Travel Plan, few, if any, direct effects would result.

Another potential direct effect of road construction is habitat fragmentation. Rosenberg and Raphael (2000) found that pileated woodpeckers are associated with forest edges but are moderately intolerant of small forest islands. The association of pileated woodpeckers with edge, however, is based on studies of the juxtaposition of mature forest and clearcuts, not the narrow strip-edges created by Forest roads. These strips do not really create isolated “islands” of forest habitat and as a result, the “fragmentation” effect of Forest roads should have little or no influence on pileated woodpecker habitat use patterns; nor are the road edges likely to be substantial enough to attract woodpeckers. The effect would be identical for all four alternatives, since it would apply to both open and closed roads.

Virtually all potential effects emerging from the four proposed alternatives would be indirect, a result of human use of the road system: Road-generated mortality, displacement of woodpeckers from roadside habitat and loss of roadside snags to firewood cutting. The potential for vehicle-generated mortality on Forest roads, from birds being hit by or shot from vehicles, is extremely low (no such incidents ever having been reported on the Forest). So, I have discounted this as a meaningful effect.

Research has not demonstrated that pileated woodpeckers avoid otherwise suitable nesting habitat because of the presence of Forest roads, but intuitively, it seems a real possibility, at least in areas immediately adjacent to regularly-used roads. In general, foraging woodpeckers do not appear averse to making use of habitat near open roads if large dead trees are present there [personal observation]. But none of this has been studied in enough detail to be quantified. Vehicle traffic, with its associated noise, vibration and visual disruption, is the primary problem (Forman *et al.* 2003) and the degree to which pileated woodpeckers may avoid nesting near roadside habitat is undoubtedly a function of the volume and regularity of vehicle use.

The primary indirect effect generated by all four action alternatives would result from the loss of large dead trees in the road corridor to firewood cutting or to Forest Service roadside hazard tree removal projects. Large diameter dead and dying trees are key habitat components for pileated woodpeckers in whatever forest configuration they occur. Mountain pine beetles are in the process of producing numerous large snags within reach of Forest roads throughout

Divide pine forests. The larger snags preferred by pileated woodpeckers for nesting and roosting (preferably greater than 30 inches diameter-at-breast-height) occur almost entirely in ponderosa pine stands; they are highly unlikely in lodgepole pine forests. Some may be found in whitebark pine forests, but few, if any of these stands provide pileated woodpecker habitat or are traversed by open Forest roads.

Table 118 provides an estimate of the maximum zone available to wood cutters along open roads in mapped pileated woodpecker habitat. It is an over-estimation of the area susceptible to regular snag loss, since the pileated woodpecker habitat model used in Table 118 accounts for several forest types, while only the ponderosa pine segment will be producing significant numbers of large snags in the near future. As well, in many areas, the actual access zone is much narrower than 600 feet, because of subirrigated ground, steep slopes and other difficult terrain. The table does provide a means, however, of roughly quantifying differences between alternatives as the indirect effects on woodpecker habitat.

Table 118 - Snag Removal Zones Along Open Roads Pileated Woodpecker

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Miles of Open Road in Suitable Pileated Woodpecker Habitat	147	136	123	125	87
Maximum Acres in the 600-ft Snag Removal Corridor	10,715 ac	9,860 ac	8,925 ac	9,090 ac	6,327
Percent of Suitable Habitat in the 600-ft Snag Removal Corridor	18%	17%	15%	15%	11%

Comparison of Alternatives

Effects of Alternative 1 (Existing Condition)

Road proposals in this alternative (which would maintain the current 147 miles of open road in pileated woodpecker habitat) would create no new opportunities for removal of large snags from the road corridor. Snag loss to firewood cutting and under the Helena NF hazard tree removal program will increase in the near future because of the proliferation of dead trees generated by ongoing bark beetle infestations. No increase, however, would result from implementation of this alternative.

Effects of Alternative 2

As with alternative 1, alternative 2 would produce no direct effects on pileated woodpeckers as a result of new road construction, since none is proposed. Edge effects from open and closed roads would be identical to those under alternative 1 and they would be negligible. Road and trail proposals in this alternative would reduce the maximum roadside area available to snag depletion by firewood cutters in pileated woodpecker habitat by about 850 acres.

Effects of Alternative 3

As with alternatives 1 and 2, this alternative would generate no problems for pileated woodpeckers as a result of new road construction, since none is proposed. Road associated edge effects would be identical to those under alternatives 1 and 2 and they would be negligible. Road and trail proposals in alternative 3 would reduce the maximum roadside area susceptible to snag depletion by firewood cutters in pileated woodpecker habitat by roughly 1,790 acres compared to current conditions.

Effects of Alternative 4

As with alternatives 1, 2 and 3, alternative 4 would create no problems for pileated woodpeckers as a result of habitat components being lost to road construction, since none is proposed. Road associated edge effects would be identical to those under previous alternatives and they would be negligible. Alternative 4 is similar to alternative 3 in terms of its indirect effect on potential pileated woodpecker habitat, reducing the roadside area susceptible to snag depletion from firewood cutting by roughly 1,622 acres compared to current conditions.

Effects of Alternative 5

As with previous alternatives, alternative 5 would not reduce pileated woodpecker habitat via new road construction, since none is proposed. Edge effects associated with roads (open and closed) would be the same as in the other four alternatives and they would be negligible. Alternative 5 would close the most open road and thus would have the least indirect effect on potential pileated woodpecker habitat, reducing the roadside area susceptible to snag depletion from firewood cutting by roughly 4,388 acres compared to current conditions.

Cumulative Effects

This summary of cumulative effects is based on the detailed matrix in *appendix B*, which identifies all past, present and reasonably foreseeable projects and other activities, in addition to proposed Travel Management, that may affect pileated woodpeckers and their habitat components. The scope of the analysis includes the Divide landscape (Helena NF land with non-Forest inholdings) and immediately surrounding lands (private, State, County, Municipal and BLM). Effects described in this summary are common to all alternatives.

Forest Service Past and Ongoing Activities

Past timber harvest in the Divide landscape, has removed a substantial acreage of mature and old-growth forest in which large-diameter conifers were prominent components. Timber harvest projects that have had this effect in pileated woodpecker habitat, to one degree or another, include: Bison Mountain, Ontario Creek, Mike Renig Gulch-Hahn Creek, Slate Creek, Deadman, Strawberry, Corral Gulch, Buffalo Creek, Mullan Pass and Treasure Mountain, among others. Overall, these projects have depleted suitable pileated woodpecker habitat.

A few recent timber harvest and thinning projects have emphasized retaining large trees in open-grown stands and allowing them to continue to grow in a forest configurations less likely to succumb to stand-replacing fire (Sweeney Creek, Tucker-Dry). Over the long-term, these projects benefit pileated woodpecker habitat. The Clancy-Unionville project was originally designed to achieve this forest formation in a number of mature stands, but extensive beetle kill has required its prescriptions be altered to create more open environments with fewer large trees (many of them now dead): So, this project is having a mixed effect. The Forestwide Roadside Hazard Tree project, the MacDonald Pass Ski Trail Hazard Tree Removal project and the Red Mountain Flume Chessman Reservoir project have removed substantial numbers of dead trees, a few of them large enough to accommodate pileated woodpecker nesting and many large enough to provide foraging substrate.

The ongoing Helena NF firewood policy that allows members of the public to take up to 10 cords of dead wood within reach of Forest roads continues to result in the removal of most large snags and intact logs from the road corridors.

Adjacent Private and Other, Past and Ongoing Actions

Recent and ongoing private land development (building construction, clearing, thinning, commercial timber harvest, dead tree salvage) has variable effects. Traditional clearcut logging and overstory removal eliminate habitat for pileated woodpeckers; thinning projects, many of them aimed at reducing fuel loading for fire protection, are generally beneficial.

Forest Service Reasonably Foreseeable Actions

Reasonably foreseeable activities on Helena NF land that could affect pileated woodpeckers to one degree or another include salvage projects designed to deal with the ongoing bark beetle epidemic by removing substantial numbers of large dead trees that could be of use to pileated woodpeckers. On the other hand, those projects that retain mature trees in open-grown formations are likely to benefit the birds over the long-term. Most prominent among these are the proposed Telegraph Creek and Tenmile South Helena projects.

Adjacent Private and Other, Reasonably Foreseeable Actions

Future activity on non-Forest land within the cumulative effects area that could affect pileated woodpeckers includes settlement and associated development of private lands, often clearing that involves removal of large trees and clearcut/overstory removal timber harvest and removal of large beetle-killed dead trees.

Summary and Conclusions

Differences between alternatives, in terms of road corridor available to firewood cutting, would not be large enough to show up as differences in the ability of pileated woodpeckers to occupy the landscape. Potential nesting trees (ponderosa pine snags greater than 25 inch diameter- at-breast-height) that might be removed are rare in the road corridor and given the proliferation of beetle-killed trees in pine forests across the landscape, nesting habitat will be less limiting than in the past regardless of the alternative selected here.

Under alternative 1, open roads available to firewood cutters in pileated woodpecker habitat would remain at 147 miles. This mileage would decline to 136 miles in alternative 2, 123 miles in alternative 3, 125 miles in alternative 4 and 87 miles in alternative 5.

Northern Goshawk (Old-Growth Dependent Group)

Common Effects of Travel Management

Direct Effects

Direct effects on goshawk habitat would include removal of mature forest cover that could prove useful as nesting habitat during road construction. While such habitat loss poses a peripheral threat to goshawks, most significant impacts derive from large-scale phenomena such as large commercial logging operations and fire, not road construction. Since no alternatives in the Divide Travel Plan contemplate new road construction, even this relatively minor impact does not apply in this case. Human activity associated with road construction in summer also has potential to displace goshawks from active nests that were adequately buffered from human intrusion when they were established in the spring.

Indirect Effects

Indirectly, roads negatively impact goshawk habitat through the associated human activity. Goshawks are sensitive to human presence near nests and can be very aggressive in defending

both the nest and the larger area within which newly fledged young are operating, the post-fledging family area (PFA). Goshawks nesting in areas near established roads show a tolerance of existing conditions: primary problems arise from construction of new roads into previously undisturbed goshawk nesting sites and PFAs, an eventuality not proposed in any of these alternatives. Opening closed roads to new motorized uses may also create problems for goshawks nesting in the area and a few such proposals are spread through the action alternatives. Human presence in potential foraging areas (including a variety of conifer forest formations, aspen stands and forest/grassland edges) is less problematic. Goshawks have frequently been observed killing and feeding on prey near roads, dwellings and developed recreation sites (although they will temporarily abandon the feeding site if humans approach too closely).

Other indirect effects associated with roads are removal of large snags in the road corridor by firewood cutters and as is now occurring, by the Helena NF roadside hazard tree crews. Dead trees provide habitat for cavity nesters, a number of which serve as prey for goshawks. Reynolds *et al.* (1991) considered snags to be a primary component of goshawk nesting and foraging habitat and included them in guidelines for optimal goshawk home ranges.

Table 119 summarizes the maximum potential area susceptible to snag removal along open roads. The numbers undoubtedly overestimate the potential area for snag loss since much of the 600 ft roadside corridor is in rough terrain or other country that prohibits firewood cutters from moving more than a short distance off the road and that also discourages goshawk nesting. The table does present a mechanism, however, for quantifying and comparing the impacts of the four different alternatives.

Table 119 - Snag Removal Zone Along Open Roads Northern Goshawk

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
ForagingHabitat					
Miles of Open Road in Suitable Goshawk Foraging Habitat	195	181	162	163	116
Maximum Acres in the 600-ft Snag Removal Corridor	14,180	13,185	11,760	11,855	8,436
Percent of Foraging Habitat in the 600-ft Snag Removal Corridor	12%	11%	10%	10%	7%
Nesting Habitat					
Miles of Open Road in Suitable Goshawk Nesting Habitat	4.1	4.3	4.0	4.1	2.9
Maximum Acres in the 600-ft Snag Removal Corridor	300	315	290	300	211
Percent of Nesting Habitat in the 600-ft Snag Removal Corridor	16%	17%	15%	16%	11%

Comparison of Alternatives

Effects of Alternative 1 (Existing Condition)

Alternative 1 would retain the existing condition. There would be no direct effects on goshawks since there would be no new road construction tied to implementation of the alternative. As a result, there would be no increased potential for indirect effects resulting from removal of large snags. Snag loss to firewood cutting and the proposed Helena NF hazard tree program will increase in the near future because of the proliferation of dead trees generated by ongoing bark

beetle infestations. This increase, however, would not result from implementation of alternative 1.

Effects of Alternative 2

There would be no direct effects on goshawks since no new road construction is proposed in alternative 2. Road proposals in this alternative would reduce the roadside area available to snag depletion by firewood cutters in goshawk foraging habitat by about 995 acres. In nesting habitat, the potential snag loss zone increases slightly, by about 15 acres. Alternative 2 would open currently closed road/trail systems that pass through, at least partly, mature forest habitat during the goshawk nesting season in the upper Telegraph, Negro Mountain and Slate Lake areas. On the other hand, it would impose motorized closures on forested road/trail systems in the Negro Mountain, Sweeney Creek, Priest Pass and Black Mountain areas that could relieve pressure on nesting goshawks. So, the two sets of actions come close to balancing out.

Effects of Alternative 3

There would be no direct effects on goshawks since alternative 3 promotes no new road construction. Road closures in alternative 3 would reduce the roadside area susceptible to snag depletion by firewood cutters in goshawk foraging habitat by about 2,420 acres and in nesting habitat by about seven acres. Alternative 3 would not introduce motorized use into any currently closed road/trail system and would therefore not increase potential disturbance of nesting goshawks. It would close currently open road/trail systems that pass through potential goshawk nesting habitat in the Negro Mountain, Sweeney Creek, Priest Pass, Black Mountain, Spotted Dog and Kading areas and thus lower the possibility of motorized disturbance.

Effects of Alternative 4

Alternative 4 would have no direct effects on goshawks as no new road construction is proposed. With regard to indirect effects, alternative 4 is very similar to alternative 3: Road closures would reduce the roadside area susceptible to snag depletion from firewood cutting in goshawk foraging habitat by about 2,327 acres and would retain the current acreage in nesting habitat. Alternative 4 would impose motorized closures on currently open forested roads and trails in the Negro Mountain, Sweeney Creek, Priest Pass, Black Mountain and Kading areas during the goshawk nesting season. It would provide somewhat less relief from potential disturbance of nesting goshawks than alternative 3; but it would not increase the existing potential for disturbance in any area.

Effects of Alternative 5

There would be no direct effects on goshawks since alternative 5 promotes no new road construction. Road closures in alternative 5 would reduce the roadside area susceptible to snag depletion by firewood cutters in goshawk foraging habitat by about 5,744 acres and in nesting habitat by about 89 acres. Alternative 5 would sanction motorized use in currently closed road/motor trail systems in upper Ontario Creek, upper Slate Creek and upper Elliston Creek. It would close currently open road/trail systems that pass through potential goshawk nesting habitat in the Negro Mountain, Jericho Mountain, Sweeney Creek, Priest Pass, Sawmill Gulch, Esmeralda Hill, Greenhorn Mountain, Black Mountain, Spotted Dog and Kading areas. Overall, alternative 5 would decrease potential for disturbance of nesting goshawks more than any other alternative.

Cumulative Effects

This summary of cumulative effects is based on the detailed matrix in *appendix B*, which identifies all past, present and reasonably foreseeable projects and other activities, in addition to proposed Travel Management, that may affect goshawks and their habitat. The scope of the analysis includes the Divide landscape (Helena NF land with non-Forest inholdings) and immediately surrounding lands (private, State, County, Municipal and BLM). Effects described in this summary are common to all alternatives.

Forest Service Past and Ongoing Activities

Past timber harvest in the Divide landscape (mostly by clearcutting), has removed thousands of acres of mature and old-growth forest over the last 30 years, much of which provided nesting and foraging habitat for goshawks. Timber harvest projects that have had this effect, to one degree or another, include: Bison Mountain, Ontario Creek, Mike Renig Gulch-Hahn Creek, Slate Creek, Deadman, Strawberry, Corral Gulch, Buffalo Creek, Mullan Pass and Treasure Mountain. For the short- and mid-term, these projects have depleted suitable goshawk habitat.

A few recent timber harvest and thinning projects have emphasized retaining large trees in open-grown stands and allowing them to continue to grow in a forest configurations less likely to succumb to stand-replacing fire (Sweeney Creek, Tucker-Dry). These projects eliminate goshawk nesting habitat but retain foraging habitat. The ongoing Clancy-Unionville project in the Lump Gulch, Quartz Creek and Buffalo Creek drainages, originally designed to produce open-grown foraging habitat, will no longer be able to achieve this end because of intense insect-generated tree mortality. This project will now have a mixed effect depending on the representation of Douglas-fir, which is not susceptible to the pine beetles. Projects designed primarily to remove dead beetle-killed trees have lowered, somewhat, the suitability of potential goshawk foraging habitat, but have not influenced nesting stands, as the beetle-induced defoliation has already eliminated nesting potential. These projects include the Forestwide Roadside Hazard Tree Removal Project., the MacDonald Pass ski trail hazard tree project and a number of tree removal operations in campgrounds, picnic areas and other developed recreational sites.

The ongoing Helena NF firewood policy that allows members of the public to take up to 10 cords of dead wood within reach of Forest roads continues to result in the removal of most large snags and intact logs from the road corridors.

Adjacent Private and Other, Past and Ongoing Actions

Recent and ongoing private land development (building construction, clearing, thinning, timber harvest, dead tree salvage) has variable effects. Traditional clearcut logging and overstory removal, eliminate potential goshawk habitat; thinning projects, many of them aimed at reducing fuel loading for fire protection, may retain foraging habitat over the long-term.

Forest Service Reasonably Foreseeable Actions

Reasonably foreseeable activities on Helena NF land that could affect goshawks to one degree or another include salvage projects designed to deal with the ongoing bark beetle epidemic, which will remove substantial numbers of large dead trees that could continue as components of goshawk foraging habitat. The effect, as related to the salvage cutting, will be of short duration, since the dead trees will fall of their own accord within a few years, reducing the suitability of the habitat for goshawks. Any of these projects that are able to retain mature

trees in open-grown formations are likely to retain long-term foraging habitat. Current dead tree harvest proposals include the Telegraph Creek and the Red Mountain Flume-Chessman Reservoir projects.

Adjacent Private and Other, Reasonably Foreseeable Actions

Future activity on non-Forest land within the cumulative effects area that could affect goshawks includes continuing timber harvest on private, State and BLM lands, dominated by thinning for fire protection and salvage of beetle-killed dead trees.

Summary and Conclusions

Effects under all alternatives would be indirect and rather insubstantial, arising from loss of snags and woody debris in the road corridor to firewood gatherers. This would represent a loss of habitat structure for potential prey species. Differences between alternatives are insufficient to be reflected in different levels of local goshawk occupancy.

Alternative 1 would retain 4.1 miles of open road in goshawk nesting habitat and 195 miles in foraging habitat. Alternative 2 would maintain 4.3 miles of open road in goshawk nesting habitat and 181 miles in foraging habitat. Alternative 3 would maintain 4.0 miles of open road in goshawk nesting habitat and 163 miles in foraging habitat. Alternative 4 would maintain 4.1 miles of open road in goshawk nesting habitat and 163 miles in foraging habitat. Alternative 5 would mould maintain 2.9 miles of open road in goshawk nesting habitat and 116 miles in foraging habitat.

Hairy Woodpecker (Snag-Dependent Species)

Common Effects of Travel Management

Hairy woodpeckers are directly impacted by the road/trail system when new road construction eliminates key habitat components, namely, dead, dying and other insect-prone trees. Since none of the Divide Travel Plan alternatives contemplate construction of new motorized routes, there will be no direct effects from this source.

All effects under proposed alternatives are indirect. Dead trees in the open road corridors will be lost to firewood cutting and to roadside hazard tree removal by Forest Service crews. Bark beetle infestations are in the process of producing an abundance of snags within reach of Forest roads throughout Divide pine forests. For hairy woodpeckers, already relatively common in the landscape, this is an expansive habitat opportunity throughout all pine forests at all elevations and these birds are likely to proliferate over the next 15 to 20 years.

Table 120 estimates the acreage of roadside corridors available to firewood cutters in two delineations of hairy woodpecker habitat: (1) *optimal nesting* habitat, as estimated by the Region 1 habitat model and (2) *mature forest* habitat in general. The Region 1 model presents a more narrow construct of hairy woodpecker habitat, focusing on mature forest stands (overstory trees greater than 10 inches diameter-at-breast-height) of sparse/ intermediate density (less than 50 percent canopy closure) with numerous dead trees (at pre-beetle outbreak levels). Stands of this sort provide ideal nesting and foraging habitat for hairy woodpeckers. However, the model appreciably underestimates the reach of suitable hairy woodpecker habitat in the Divide landscape. In fact, hairy woodpeckers appear in virtually all forested habitats on the Helena NF other than seedling/sapling stands devoid of residual snags. Although they are most common in environments with a plethora of dead and dying trees, they are often seen in stands that appear relatively healthy, as long as enough insect-supporting trees are present.

They also forage in stands dominated by pole-sized trees, although they may be unable to nest there. As bark beetle infestation continues, much of the general "mature forest habitat" tallied in Table 120 will convert to "optimal habitat" [the optimal habitat in this table representing pre-beetle circumstances].

Table 120 - Snag Removal Zone Along Open Roads Hairy Woodpecker

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Miles of Open Road in *Mature Forest* available to Hairy Woodpeckers	294	260	233	235	168
Acreage of the 600-ft Snag Removal Corridor in *Mature Forest* Habitat	21,300	18,900	16, 970	17,091	12,218
Miles of Open Road in *Optimal* Hairy Woodpecker Habitat	43	41	36	37	26
Acreage of the 600-ft Snag Removal Corridor in *Optimal* Habitat	3,149	2,982	2,633	2,690	1,890

Comparison of Alternatives

Effects of Alternative 1 (Existing Condition)

There would be no direct effect on hairy woodpeckers since no new road or trail construction is proposed in this alternative and no snag habitat would usurped by direct actions connected with maintaining the status quo.

Road and trail proposals in this alternative (which maintain the status quo) would generate no new potential for removal of large snags. Snag removal by firewood cutters and under the proposed Helena NF hazard tree removal program will increase along existing open roads in the near future because of the proliferation of dead trees generated by the ongoing bark beetle infestation. This increase, however, will not result from implementation of this alternative.

Effects of Alternative 2

Alternative 2 would generate no direct effects on hairy woodpeckers as no new roads or trails are proposed. Proposals in this alternative would reduce the roadside area susceptible to snag depletion by firewood cutting in modeled hairy woodpecker habitat by about 165 acres and in mature forested habitat in general by about 2,400 acres. This would be an indirect effect.

Effects of Alternative 3

There would be no direct effects on hairy woodpeckers since no new road or trail construction is proposed in alternative 3. Road and trail proposals in alternative 3 would reduce the current roadside area susceptible to snag depletion by firewood cutters by about 515 acres in modeled hairy woodpecker habitat and by about 4,330 acres in mature forest habitat in general.

Effects of Alternative 4

Alternative 4 would generate no direct effects on hairy woodpeckers since no new road or trail construction is proposed. Reduction in the area susceptible to snag depletion by firewood cutters would be somewhere between that provided by alternative 2 and alternative 3: A decline of about 459 acres in modeled hairy woodpecker habitat and about 4,209 acres in mature forest habitat in general.

Effects of Alternative 5

There would be no direct effects on hairy woodpeckers since no new road or trail construction is proposed in alternative 5. Road and trail proposals in alternative 5 would reduce the current roadside area susceptible to snag depletion by firewood cutters by about 1,259 acres in modeled hairy woodpecker habitat and by about 9,082 acres in mature forest habitat in general.

Cumulative Effects

This summary is based on the detailed matrix in *appendix B*, which identifies past, present and reasonably foreseeable projects and other activities, in addition to travel management, that may affect hairy woodpecker habitat components. The scope of the analysis includes the Divide landscape (Helena NF land with non-Forest inholdings) and adjacent lands (private, State, County, Municipal and BLM). Effects described are common to all alternatives.

Forest Service Past and Ongoing Activities

Timber harvest over the past 30 years, primarily via clearcutting and other regeneration harvest methods, has removed substantial acreages of hairy woodpecker habitat. Residual snags in some of these areas have continued to support woodpeckers, but, overall, the habitat quality has declined. Timber projects that have had this effect include: Bison Mountain, Ontario Creek, Mike Renig Gulch-Hahn Creek, Slate Creek, Deadman, Strawberry, Corral Gulch, Buffalo Creek, Mullan Pass and Treasure Mountain, among others.

A few recent timber harvest and thinning projects have emphasized retaining large trees, as well as snags, in open-grown stands and allowing them to continue to grow in forest formations less likely to succumb to stand-replacing fire (Sweeney Creek, Tucker-Dry). Over the long-term, these projects benefit hairy woodpeckers. The recent Clancy-Unionville project in the Lump Gulch, Quartz Creek and Buffalo Creek drainages, originally designed to harvest green trees, is now focused primarily on removing dead trees. Although much hairy woodpecker habitat will remain, the result will be considerably less favorable to them than the original pre-beetle vision.

Recent and ongoing activities on the National Forest that have improved prospects for snags and consequent habitat opportunity for hairy woodpeckers are the road closures associated with a number of timber harvest projects (Clancy-Unionville, Sound Wood, Mullan Pass, Treasure Mountain, Lava Mountain), which limit roadside firewood cutting. These projects have all adhered to Forest Plan standards for retaining snags and replacement snags. In some cases, decisions not to pursue potential salvage opportunities (Jericho Mountain, Snowshoe Creek, MacDonald Pass burn) have resulted in retention of large blocks of snags.

A number of projects have removed substantial numbers of beetle killed trees, thus locally reducing nesting and foraging habitat for hairy woodpeckers. These include the Forestwide Roadside Hazard Tree Removal project, the Red Mountain Flume Chessman Reservoir project, the MacDonald Pass Ski Trail Hazard Tree project (in productive forest habitat just below the Divide) and a number of tree removal operations scheduled for campgrounds, picnic areas and other developed recreation sites (areas used by hairy woodpeckers).

Recent Carbaryl spraying of campgrounds and other administrative sites (Cromwell Dixon campground, MacDonald Pass trailhead) has been intended to prevent large trees from dying in areas of concentrated public use. This enterprise has met with limited success and thus has not been a major factor in suppressing snag creation.

The ongoing policy of allowing public firewood cutting on the National Forest is the primary factor driving the removal of most large snags from Forest road corridors. Ongoing efforts by the Helena NF to limit the potential safety hazard posed by large numbers of dead trees in areas frequented by the public have accelerated the process of snag loss in road corridors and other accessible sites. These actions have also reduced the number of snags available to firewood cutters. Hazard tree removal projects have recently been completed or are going forward at a number of campgrounds (Cromwell Dixon, Moose Creek, Kading, Park Lake), day-use areas (Moose Creek, MacDonald Pass), trailheads (MacDonald Pass CDNST), administrative sites (Moose Creek ranger station, Kading cabin), as well as along open Forest roads.

Adjacent Private and Other, Past and Ongoing Actions

Recent and ongoing private land development, particularly clearing, thinning, commercial timber harvest and dead tree salvage has had variable effects. Traditional clearcut logging and overstory removal, eliminate most habitat components for hairy woodpeckers; thinning projects, many aimed at reducing fuel loading for fire protection, preserve some habitat, but generally lower suitability because of the elimination of dead and dying trees.

Forest Service Reasonably Foreseeable Actions

The most prominent foreseeable activities on Helena NF land that could affect hairy woodpeckers to one degree or another are salvage projects designed to deal with the ongoing bark beetle epidemic, removing substantial numbers of dead trees that could be of useful habitat components. On the other hand, those projects that retain mature trees in open-grown formations are likely to benefit the woodpeckers over the long-term. Current proposals include the Telegraph Creek project (which involves both removal of beetle-killed mature trees and the precommercial thinning of sapling conifers in old clearcuts) and the Tenmile South Helena project (which involves cutting dead trees, prescribed burning of dead trees, deadfall and thinning from below in green stands).

Adjacent Private and Other, Reasonably Foreseeable Actions

Future activity on non-Forest land within the cumulative effects area that could affect hairy woodpeckers includes settlement and associated development of private lands that involves timber harvest and removal of beetle-killed dead trees.

Summary and Conclusions

The only effects on hairy woodpeckers would be indirect, resulting from removal of dead trees from the road corridors by firewood cutters. Given the vast acreage of snags being created by bark beetles across the landscape, losses in the road corridor would be insignificant and differences between alternatives, in terms of woodpecker numbers, would be undetectable.

Alternative 1 would retain 43 miles of open road in optimal hairy woodpecker habitat and 294 miles in mature forested habitat that the woodpeckers may also use. Alternative 2 would maintain 41 miles of open road in optimal hairy woodpecker habitat and 260 miles in mature forested habitat. Alternative 3 would maintain 36 miles of open road in optimal hairy woodpecker habitat and 233 miles in mature forested habitat. Alternative 4 would maintain 37 miles of open road in optimal hairy woodpecker habitat and 235 miles in mature forested habitat. Alternative 5 would maintain 26 miles of open road in optimal hairy woodpecker habitat and 168 miles in mature forest habitat.

Marten (Mature Forest Dependent Species)

Common Effects of Travel Management

Indirectly, roads negatively impact marten habitat by providing access routes for firewood cutters, who remove snags and logs. Snags and coarse woody debris (stumps, logs and large woody fragments) provide critical habitat components for marten foraging, resting and denning (Spencer 1987; Buskirk *et al.* 1989; Coffin 1994).

Roads also facilitate trapping. Trapping affects marten populations by altering sex and age structure (disproportionately capturing juveniles and males) and by lowering local population density (Hodgman *et al.* 1994). In some drainages marten can be completely eliminated (at least in the short-term) by persistent trapping. Roads in forested areas increase trapping pressure on marten and result in higher capture rates in roaded versus unroaded areas. Thompson (1994) found that the increased impacts of trapping in logged sites as opposed to unlogged areas were a direct result of the higher road densities generated by logging operations (and the access provided primarily to trappers on snowmobiles).

Table 121 summarizes miles of road in marten habitat that may contribute to dead tree/log removal and to trapping, an indirect effect. These are maximum areas: substantial portions of the 600-feet corridors are actually inaccessible to firewood cutters or are not seen as profitable locations by trappers.

Table 121 - Snag Removal Zone Along Open Roads in American Marten Habitat

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Miles of Open Road in Suitable Marten Habitat	294	260	233	235	168
Maximum Acreage of the 600-ft Snag Removal Corridor	21,295	18,895	16,965	17,090	12,220
Percent of Suitable Habitat in the Maximum Snag Removal Corridor	12%	11%	10%	10%	7%

Comparison of Alternatives

Effects of Alternative 1 (Existing Condition)

Maintaining the status quo under alternative 1 would have no direct effect on marten habitat since there would be no mandate to construct new road. Likewise, there would be no increase in the potential for indirect effects resulting from removal of large snags. Snag removal in the road corridors by firewood cutters and under the proposed Helena NF hazard tree removal program will increase in the near future because of the proliferation of dead trees generated by ongoing bark beetle infestations. This increase, however, is not a function of this alternative.

Effects of Alternative 2

There would be no direct effects on marten since no new road or trail construction that would eliminate marten habitat is part of alternative 2. Road and trail proposals in this alternative would reduce the roadside area available to snag depletion by firewood cutters in marten habitat by about 2,400 acres.

Effects of Alternative 3

There would be no direct effects on marten since no new road or trail construction is part of this alternative. Road and trail proposals in alternative 3 would reduce the roadside area susceptible

to snag depletion by firewood cutters in marten habitat by about 4,330 acres compared to current conditions.

Effects of Alternative 4

As with other action alternatives, alternative 4 would generate no direct effects on marten since it would involve no new road or trail construction. Road and trail proposals in alternative 4 would reduce the roadside area susceptible to snag depletion by firewood cutters in marten habitat by about 4,210 acres compared to current conditions.

Effects of Alternative 5

Alternative 5 would also generate no direct effects on marten habitat since it would involve no new road or trail construction. Road and trail proposals in alternative 5 would reduce the roadside area susceptible to snag depletion by firewood cutters in marten habitat by about 9,080 acres compared to current conditions, substantially more than any other alternative.

Cumulative Effects

This summary is based on the detailed matrix in *appendix B*, which identifies all past, present and reasonably foreseeable projects and activities, in addition to proposed Travel Management, that may affect marten and marten habitat. The scope of the analysis includes the Divide landscape (Helena NF land with non-Forest inholdings) and immediately surrounding lands (private, State, County, Municipal and BLM). Effects described here are common to all alternatives.

Forest Service Past and Ongoing Activities

Past timber harvest throughout the Divide landscape, has removed substantial acreages of mature and old-growth forest capable of providing primary marten habitat, particularly projects that have intruded into riparian forest. Timber harvest projects that have had this effect, to one degree or another, include: Bison Mountain, Ontario Creek, Mike Renig Gulch-Hahn Creek, Slate Creek, Deadman, Strawberry, Corral Gulch, Buffalo Creek, Sound Wood and Treasure Mountain, among others.

Primary actions that have locally reduced the effectiveness of potential marten habitat by providing access for trappers and firewood cutters include retention of groomed snowmobile trails and roads passing through forested riparian habitat.

Actions that have improved prospects for marten include: Closure of Inventoried Roadless Areas to snowmobile use (Electric Peak, Lazyman Gulch); trail relocation projects that have removed trails from productive riparian areas to upslope locations (Blackfoot Meadows, CDNST); establishment of the Statewide OHV Plan, which prohibits riding off established motor routes; road and motor trail closures associated with timber harvest projects (Clancy-Unionville, Sound Wood, Mullan Pass, Treasure Mountain) that have measurably expanded blocks of non-motorized habitat.

The impact of recent projects to remove dead trees (and future coarse woody debris) from potential marten habitat is unclear and depends on the degree to which marten are willing to make use of deadfall accumulations in the absence of overhead canopy. If they use these areas of open woody debris, then the projects have removed suitable habitat; if not, then the projects have probably had little effect. These projects include the Roadside Hazard Tree Removal, MacDonald Pass Ski Trails, Clancy-Unionville and Red Mountain Flume Chessman Reservoir

projects. Operations that have removed dead trees from developed recreation and administrative sites have probably had little effect, since they have generally been unsuitable as marten habitat.

Adjacent Private and Other, Past and Ongoing Actions

Recent and ongoing private land development (building construction, clearing, thinning, commercial timber harvest, dead tree salvage) will continue to impact potential marten habitat, particularly where it occurs in forested riparian areas. Actions that reduce key habitat components, large snags and logs and overhead cover, could have an effect.

Forest Service Reasonably Foreseeable Actions

Reasonably foreseeable activities on Helena NF land that could affect marten to one degree or another include salvage projects designed to deal with the ongoing bark beetle epidemic which, if implemented, will remove substantial numbers of large dead trees that could be of use to marten. As noted above, the degree to which such efforts affect marten is dependent upon how willing the animals are to make use of uncanopied accumulations of coarse woody debris. Prominent among foreseeable projects are the Telegraph Creek and Tenmile South Helena projects.

In addition, travel planning efforts underway on adjacent Forests, as well as the Lincoln Ranger District on the Helena NF, could be beneficial to marten if they provide local sanctuaries free from motorized access. Because marten are capable of traveling some distance, better habitat conditions on other Forests could improve marten populations and subsequent dispersal opportunities to the Helena National Forest. Conversely, travel management decisions elsewhere could reduce marten populations in those areas and reduce the potential for emigration/immigration. Travel planning efforts on the Lincoln Ranger District include the Blackfoot Travel and Blackfoot Winter Travel projects.

Adjacent Private and Other, Reasonably Foreseeable Actions

Future activity on non-Forest land within the cumulative effects area that could affect marten includes: Settlement and associated development of private lands and timber harvest and removal of large beetle-killed dead trees.

Summary and Conclusions

Effects on marten stem from removal of snags and woody debris from the road corridor by firewood cutters and from routes available to trappers on snowmobiles. Given the acreage of snags being created by bark beetles across the landscape, losses in the road corridor would be relatively minor and differences between alternatives, in terms of marten numbers, would not be measurable. Trapper access along established snowmobile routes in marten habitat is much the same for alternatives 1-4, somewhat less for alternative 5.

Alternative 1 would retain 294 miles of open road in suitable (modeled) marten habitat. Alternative 2 would maintain 260 miles of open road in suitable marten habitat. Alternative 3 would maintain 233 miles of open road in suitable marten habitat. Alternative 4 would maintain 235 miles of open road in suitable marten habitat. Alternative 5 would reduce open road mileage in potential marten habitat to 168 miles.

Local Effects in Key Areas

Introduction

Area Selection and Delineation

This section addresses the effects of proposed road and trail management on nine specific sites in the Divide landscape. Travel management proposals for these areas have generated much discussion within the Helena NF, between the Forest and the public and between user groups. A central aspect of the discussion, in many cases, has been the impact of roads and motorized uses on wildlife and wildlife habitat. The need to accommodate wildlife while allowing for public access in these "key areas" has driven many of the differences between alternatives. Proposals for other parts of the Plan Area also differ between alternatives but have generated less comment and controversy. I have circumscribed key areas by whatever boundaries worked to pragmatically encompass the reach of the local road and trail systems: administrative boundaries, section lines, major roads and obvious physical features.

Open Road and Motor Trail Summary

Table 122 summarizes differences between alternatives as to miles of open road and motorized trail in a number of key local areas. Table 123 then converts the road and trail mileages to densities. Densities are meant for local comparison among key areas only and not for determining habitat effectiveness or open road/hiding cover ratios for Forest Plan standards, which are calculated over larger areas (typically, elk herd units).

Table 122 - Miles of Road and Motorized Trail Open

Key Area ID	Area (mi^2)	Miles of Open Roads & Motor Trails									
		Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		open roads	mtr trails	open roads	mtr trails	open roads	mtr trails	open roads	mtr trails	open roads	mtr trails
Spotted Dog Crk – Baldy Ridge – Kading	12.1	18.2	7.4 *	18.2	4.5	1.0	0	8.8	0	1.9	8.7
Negro Mountain	7.2	12.0	0.6	16.2	0	11.8	0	14.5	0	1.9	12.5
Upper Telegraph Crk	5.8	7.7	3.6 *	13.0	0	6.7	0	7.5	0	2.7	7.2
Ontario & Bison Crks	8.8	4.1	0	4.1	2.6	4.1	0	4.1	2.6	3.0	2.2
Hahn Crk – Flume & Mike Renig Gulches	8.9	11.2	0	14.6	0	10.6	0	10.6	0	6.3	0
Slate Crk – Elliston Crk	6.5	4.5	0	8.3	2.2	4.5	0	4.5	0	3.8	6.0
Lower Sweeney Crk – Blue Cloud Crk	4.0	2.2	11.7	2.2	10.6	0.3	0	0.3	0	0.3	0
Priest Pass	7.0	7.9	1.0 *	7.7	0	5.1	0	5.1	0	3.9	0
Meyers Hill – Ophir Crk – Black Mtn	9.9	5.7	5.6 *	3.7	0.6	3.7	0	3.7	0.6	2.2	0

*Includes unauthorized user-made trails.

Table 123 - Open Road and Motor Trail Density in Key Wildlife Areas

Key Area ID	Area (mi²)	Density of Open Roads & Motor Trails (mi/mi²)									
		Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		open roads	mtr trails	open roads	mtr trails	open roads	mtr trails	open roads	mtr trails	open roads	mtr trails
Spotted Dog Crk–Baldy Ridge–Kading	12.1	1.5	0.6	1.5	0.4	0.1	0	0.7	0	0.2	0.7
Negro Mountain	7.2	1.7	0.1	2.2	0	1.6	0	2.0	0	0.3	1.7
Upper Telegraph Crk	5.8	1.3	0.6	2.2	0	1.2	0	1.3	0	0.5	1.2
Ontario & Bison Crks	8.8	0.5	0	0.5	0.3	0.5	0	0.5	0.3	0.3	0.2
Hahn Crk–Flume & Mike Renig Gulches	8.9	1.2	0	1.6	0	1.2	0	1.2	0	0.7	0
Slate Crk–Elliston Crk	6.5	0.7	0	1.3	0.3	0.7	0	0.7	0	0.6	0.9
Lower Sweeney Crk–Blue Cloud Crk	4.0	0.6	2.9	0.6	2.6	0.1	0	0.1	0	0.1	0
Priest Pass	7.0	1.1	0.1	1.1	0	0.7	0	0.7	0	0.6	0
Meyers Hill–Ophir Crk –Black Mtn	9.9	0.6	0.6	0.4	0.1	0.4	0	0.4	0.1	0.2	0

Snowmobile Use

With a couple exceptions (most notably Sweeney Creek–Blue Cloud), on-ground snowmobile use in key habitat areas is the same for all five alternatives. In some areas (Ophir Creek, Elliston–Slate Creek, Negro Mtn and Ontario–Bison Creek), the categorizations of snowmobile routes ("designated", "allowed", "sanctioned") vary among alternatives; but the on-ground pattern of use and the effects generated are essentially the same in all cases. So, I have not included a detailed accounting of how snowmobile routes in key habitat areas are labeled under different alternatives. A more comprehensive discussion of snowmobile use patterns and trail designations can be found in sections that address lynx habitat.

Area Characteristics, Wildlife Issues, Alternative Comparison

Spotted Dog Creek – Baldy Ridge – Kading

Area Characteristics and Wildlife Issues

This wide-reaching, though often primitive, road/trail network covers the big ridge (Baldy Ridge) between the Little Blackfoot River road to the east (in the vicinity of Kading campground) and the upper reaches of Spotted Dog Creek to the west. The segment of the ridge at issue covers roughly 7,500 acres (down to the drainage bottoms on either side) and supports an established road/trail network of about 35 miles, in addition to several miles of ephemeral pioneered motor tracks. The current motor route density[4] (for routes open all or part of the year) is relatively high at 2.1 mi/mi². Most vehicle traffic is concentrated along the Little Blackfoot River road (a wide, graded road) around Kading campground on the southeast periphery of the area. Heaviest use of the road/trail system occurs in the hunting season, although use is often tempered by inhospitable snow conditions later in the season. Summer use consists of weekend

[4] Road densities in this section are estimates for localized areas: they are not applicable to surrounding elk herd units or other larger units used to determine compliance with *Forest Plan* standards and guidelines.

excursions by ATVs, motor bikes and a few highway vehicles, as well as occasional forays by grazing permittees, recreational miners, MFWP biologists and Helena NF field personnel.

Baldy Ridge supports extensive dry grassland interspersed with patches of timber, mostly Douglas-fir and lodgepole pine. More contiguous forest extends down both the east and west slopes. Broadscale MFWP maps show much of the area as elk "winter range", a classification based on elk observations that extend to June 1. In fact, elk have not been observed on the ridge during the winter in the last three decades for which we have records. Elk typically begin to move up into the open grasslands in April or early May and remain through the summer and as much of the fall hunting season as snow depths allow. Since 1995, a series of local wolf packs that have denned in Spotted Dog Creek have included the Baldy Ridge country as part of their territories. Likewise, in the last decade, grizzly bears have been reported in this general area, though rarely and lynx and wolverines have been reported nearby.

Figure 39 - Photo 23. Baldy Ridge
Grassland interspersed with forest along a westward spurs of Baldy Ridge. The primitive four-wheel-drive/OHV route traversing the open grassland here is typical of the Forest road/ motor trail system on the ridge. This road (#1868) would convert to a motor trail in alternative 2; it would be closed to wheeled motor vehicles in alternatives 3, 4 and 5.

There is no short, easy route from the Helena area and Highway 12 to the upper reaches of Baldy Ridge and as a result, human presence has remained relatively spare and fleeting in spite of high road/trail density. Wildlife objectives are to minimize human disturbance on big game summer range (including spring calving areas and late summer/early fall rutting sites) and to retain reasonable security for elk and deer during the hunting season. Maintaining these characteristics also benefits other species of concern, primarily the large carnivores. The presence of snowmobiles in winter is not a major concern.

Figure 40 - Photo 24. Limburger Springs atop Baldy Ridge
The main two-track road is at four-wheel-drive width (greater than 50 inches); the parallel tracks next to it have been made by ATVs (less than 50 inches wide). The route would be closed to wheeled vehicles in alternative 3. It would become a motor trail in alternative 5.

Figure 41 - Photo 25. East side of Baldy Ridge
Motor trail #MT-501. The route would be closed to all wheeled vehicles in alternatives 2, 3 and 4. It would serve as a motor trail in alternative 5.

Effects of Alternatives

Alternative 1: Existing Condition

This alternative would maintain the current network of over 18 miles of open road and seven miles of motor trail (local open route density equals 2.1 mi/m²). With the exception of a short section of the Little Blackfoot River Road (#227) on the southeastern flank and portions of Forest system roads in the Spotted Dog drainage on the west side (#314-j1 and #314-j3), most of the roads are rough four-wheel-drive routes. The only viable connecting routes from the Spotted Dog drainage to the west (#314 and #MTR-1868) and along the ridge from the north are closed from September 1 to May 15, eliminating motorized access from that direction for the entire hunting season. However, the motor trail system coming up out of the Kading area from the east provides year-round access for vehicles less than 50 inches wide (although larger four-wheel-drive vehicles sometimes manage to negotiate Trail #501). Most of the area is protected by a hunting season snowmobile closure. So, between the rough, limited motorized access and later-season snow conditions, fall elk security in this area is reasonably good and would remain so with alternative 1.

Primary problems in summer arise from OHVs of all kinds riding off-route across the grasslands and pioneering new routes through a variety of habitats. While this is not allowed under the Montana-Dakota Cross-Country Driving regulations (2001), the remoteness of this area makes enforcement difficult and the situation is likely to continue under alternative 1. In particular, OHV riders have forged a route that connects the end of road #314-J3 in Spotted Dog with the road system atop Baldy Ridge. The Spotted Dog road had been gated (and marked as closed yearlong) until recently, when gates have been left open, allowing the creation of the new user-made trails. Another prominent user-made motor trail extends from the Limburger Springs area southward to the steep route coming up the Kading Grade (#MTR-502).

The two primary snowmobile routes crossing the area on existing roads and motor trails would be retained and off-route snowmobiling on those portions of the open ridge not wind-blown and bare would be allowed after December 1. This use occurs during a period when elk are not present and bears are not active. Lynx and other winter carnivores may make use of the packed snowmobile trails, but no negative encounters have been reported and the trails do not appear to be creating any notable problems for local wildlife.

Alternative 2

Alternative 2 would maintain a local open road/motor trail density of about 1.9 mi/mi², somewhat less than alternative 1 and it would make a number of changes in route designations and seasonal restrictions. The only existing motorized route eliminated would be the trail running up to the ridgetop from Kading cabin. This would be converted to a foot trail, thereby eliminating all motorized disturbance on the three mi² southeast slope above the Kading area of the Little Blackfoot (between trails #MTR-502 and #501).

Several changes apply to the hunting season. Roads in upper Spotted Dog Creek currently closed during the big game rifle season (#314-J1, #314-J-3) would now be open during that time. Neither of these routes provides a loop driving opportunity or motorized access to the upper ridge. All rifle season vehicle access to upper Baldy Ridge would be eliminated under alternative 2: Existing restrictions on roads/trails #MTR-1868, #314 and the #314 connector to the north would be retained and in addition, the two remaining motor trails coming up from the east side would be closed to vehicles from October 15 to May 15. In all cases, hunting season vehicle restrictions would begin on October 15 (just before the big game rifle season), rather than on

September 1 as with some of the routes now. This would allow ATV and motor bike use to continue through the fall riding season, although it may interfere with bow hunting opportunity (beginning September 1) for some hunters. Under alternative 2, the area would be open to snowmobiles any time snow conditions allow between December 2 and May 15 (although, typically, snowmobiling conditions deteriorate badly toward the end of March).

Alternative 3

The only local route open to wheeled vehicles that would be retained under this alternative is the Little Blackfoot River road (#227) north of Kading campground along the eastern edge of the area. All other motor routes along the Little Blackfoot, on Baldy Ridge and in upper Spotted Dog Creek would be eliminated or converted to non-motorized uses. The resulting open road/motor trail density would be 0.1 mi/mi². As in the other three alternatives, existing snowmobile routes would be retained. But, aside from the snowmobile season (typically early December through late March), alternative 3 would extend the effective (though not officially designated) reach of the Electric Peak Roadless area northward across Baldy Ridge for an additional 16 to 17 mi². It would expand the size of the large elk security area centered in the Roadless Area by roughly one third. In terms of providing an undisturbed environment for wildland species for much of the year, this is the most effective of the four alternatives.

Alternative 4

Alternative 4 is identical to alternative 3 with regard to motor trails: There would be none. But, whereas alternative 3 would support only 1.0 mile of open road (along the eastern boundary of the area, with no motorized access to Baldy Ridge), alternative 4 would provide wheeled vehicles a driving route up onto the ridge from Spotted Dog Creek via a 6.1 mile segment of Road #314. The route would be open to wheeled vehicles from mid May to mid October (and thus closed to them through the big game rifle season and much of the spring). Local open route density would be 0.7 mi/mi² from late spring though early fall. As with the other alternatives, the road (along with the ridgetop road) would be open to snowmobiles after December 1; and while, technically, snowmobiling would be allowed to continue until May 15, the routes usually become too threadbare for snow machines by the end of March. Baldy Ridge would thus be devoid of vehicle traffic from late March/early April through mid-May, the key period when elk and deer are beginning find their way back up to the ridge with spring green-up and when bears are emerging from hibernation. Alternative 4 is somewhat less effective than alternative 3 in providing an undisturbed environment for wildlife but considerably more effective than alternatives 1 and 2.

Alternative 5

Alternative 5 would drop open road density from the current 1.5 mi/mi² to 0.2 mi/mi², a level similar to alternative 3 (0.1 mi/mi²). The only roads open to full sized vehicles would be the Little Blackfoot River Road (#227) to Kading campground and a portion of Road # 314 in Spotted Dog Creek. The remainder of Road #314 would be converted to motor trail and existing motor trail #MTR-501 would be retained. This would result in motor trail density (0.7 mi/mi²) smilar to alternative 1 and would provide motor bikes and ATVs with a route across the ridge from Spotted Dog Creek to the Little Blackfoot and northward along the ridge toward Irish Mine Hill. These trails would be open to snowmobiles in winter but would be closed to all vehicles during the hunting season (Sept. 1 to Dec. 1). Total open route density in summer would be 0.9 mi/mi², more than alternative 3, similar to alternative 4 and much less than alternatives 1 and 2.

This alternative provides for full-sized vehicle access along Baldy Ridge north of Irish Mine Hill, but allows only ATV and motor bike use south of it. It eliminates all vehicle use south of Limburger Spring. It also cuts off motorized access along the Little Blackfoot River beyond Kading campground. The result for wildlife is a zone free from motorized disturbance across this southern part of Baldy Ridge and a broader non-motorized corridor that connects the ridge with the Electric Peak Roadless Area to the southeast.

Summary and Conclusions

Alternative 1 would maintain a local open road/motor trail density of about 2.1 mi/mi² in summer, but with some of these routes closed in hunting season, including the bow season in September and early October. Existing snowmobile routes would be the same in all alternatives.

Alternative 2 would reduce summer open route density to 1.9 mi/mi². It would also reduce motorized access to Baldy Ridge during the big game rifle season, although the current bow season closures would be eliminated.

Compared to alternatives 1 and 2, alternative 3 would dramatically decrease all motorized access to Baldy Ridge throughout the year (open route density = 0.1 mi/mi²), making it, in essence, a northward extension of the Electric Peak Roadless Area to the south in spring, summer and fall.

Alternative 4, with a summer open route density of 0.7 mi/mi² and all routes closed during the big game rifle season, is closer to alternative 3 than to alternatives 1 and 2.

Alternative 5 eliminates motor routes on Baldy Ridge south of Limburger Spring and converts most full-sized vehicle routes north of there to motor trails. It thus supports very low open road density (similar to alternative 3) but fairly high motor trail density (similar to alternative 1). Wildlife habitat effectiveness would improve with the expansion of the non-motorized area on the southern part of the ridge next to the Electric Peak Roadless Area Spring and closure of all motor routes during hunting season.

All five alternatives would contribute to adequate rifle season elk security, but alternative 2 would improve on the status quo and alternatives 3, 4 and 5 more so. Alternative 3 would provide the best summer habitat effectiveness. Wolves and grizzly bears are sometimes in the area and alternative 3 would be the best option for insulating these species from human interference. Alternative 4, with no motor trails and only one ridge road open in summer, would be very effective in this regard as well, as would alternative 5 with its vehicle-free zone south of Limburger Spring. Winter snowmobiling should not be a problem for wildlife as long as current use patterns do not escalate in some unforeseen way.

Negro Mountain

Area Characteristics and Wildlife Issues

The Negro Mountain road system is bounded by the main stem of the Little Blackfoot River to the west and northwest, Telegraph Creek to the east and northeast and Treasure Mountain to the south. Most of the road system is on the Telegraph Creek side of the Negro Mountain divide. The extensive road network north of Negro Mountain was constructed for the Treasure Mountain timber sale in the late 1980s and much of it is off-limits to motor vehicles year-round in order to maintain big game habitat effectiveness and security [as per a 1988 negotiated appeal settlement]. The remainder of the system to the south and east consists of an assortment of Forest System roads, open and closed, as well as several user-made routes. This

adds up to 12.0 miles of Forest system road open at least part of the year and a local open road density of 1.7 mi/mi². While OHV riders have pioneered a number of transient motor trails throughout the area, there is only one recognized (numbered) user-made trail (0.7 mile). All open routes are available to snowmobiles in winter. Most of the road closures in this area are designed to insulate big game habitat.

Much of the area between the Little Blackfoot River and Telegraph Creek is covered by mature and early-seral forest, but the Negro Mountain ridge supports a variety of open grassland habitats ranging from forest openings of a few acres to extensive parks covering hundreds of acres. Elk migrate up into this cover/forage mosaic in mid-spring, some of them calving here and a few spending the summer. A number of elk remain in the area through the fall hunting season, taking advantage of the mosaic of sapling conifers and mature forest around the closed road system north of Negro Mountain and of thickly forested, vehicle-restricted areas around Treasure Mountain to the south. Some of these elk may not descend to winter range until well into December. Elk summer habitat effectiveness and fall security have been primary concerns in managing this road system at least since the mid 1980s.

Figure 42 - Photo 26. Negro Mountain ridge
Four-wheel-drive roads in open grassland on the Negro Mountain ridge at the junction of Roads #4100, #1857-B1 and #1857-B3.

More recently, water quality, sedimentation and fish habitat have emerged as key issues. People have been driving up into the Negro Mountain area for decades to hunt, camp, picnic, view wildlife, look for minerals and tour the country. Until recently, a through-route was available from the Little Blackfoot to the Telegraph Creek side via Forest roads #4100 and #1857-B1 (the Moose Gulch road). Both roads have had problems with persistent erosion on steep slopes. In 2004, a landowner built a house on an inholding astride the Moose Gulch road near the top of the gulch, barring vehicle access from Telegraph Creek. Some vehicles continue to drive up the lower portion of the road, but the route is blocked at about the 1.3 mile mark.

The only other potential access route from the east side, road #1857-A1, is part of the restricted road system north of Negro Mountain and is closed yearlong to allow for elk security and habitat effectiveness. Other problems include (1) pioneering of new routes by OHVs; (2) vehicles fording Ontario Creek and sometimes, the Little Blackfoot River to access road #4100 on the west side; and (3) some ineffective and confusing, road restrictions toward the south that, among other things, allow vehicles (via road #1857-D1) into a closed road system in upper Telegraph Creek.

Effects of Alternatives

Alternative 1: Existing Condition

Alternative 1 would preserve the arrangement described above, retaining 12.0 miles of open road, with a local open road density of about 1.7 mi/mi². Of these roads, 5.6 miles are closed during spring break-up (April 15 to June 1) and the remainder are open yearlong.

The Moose Gulch road (#1857-B1), would continue to generate erosion problems, but the route now dead-ends at the private inholding atop the gulch and as a result, far fewer vehicles make use of it than when it was a through-route. Currently, there is no access all the way to Negro Mountain ridge from Telegraph Creek. The continued yearlong closure on road #1857-A1 and the network of old timber sale roads to which it connects would maintain a pocket of fall elk security and summer habitat integrity in the area north of Negro Mountain. Primary problems remaining would be illegal vehicle use of closed routes, including continued subversion of the upper Telegraph Creek road closures from roads #1857-D1 and #1857-D2; continued pioneering of new motor bike/ATV/ four-wheel-drive routes; lack of legal motorized access to the Negro Mountain ridge from Telegraph Creek; and the need for vehicles to ford Ontario Creek in order to get to Road #4100 on the west side of the ridge. A groomed snowmobile route crosses the area from the Little Blackfoot road to upper Telegraph Creek and is available for snowmobiling from December 1 to October 15 whenever snow depths allow (generally early December through late March).

Alternative 2

Under Alternative 2, 16.2 miles of road would be open to vehicles: 12.1 miles would be open yearlong and 4.1 miles (road # 1857-A1) from May 15 to September 1, resulting in a total open road density of about 2.2 mi/mi². This is higher than at present. No motor trails would be open under this alternative.

Alternative 2 would close the eroding Moose Gulch Road (#1857-B1) between its junction with the Telegraph Creek road and the private inholding on the Negro Mountain ridge. The landowner has blocked public access at the crest of the ridge so that the road no longer provides vehicle access to Negro Mountain. To compensate for access lost by this restriction, 3.5 miles of currently-closed Road #1857-A1 would be opened to vehicles from May 15 to September 1. This would retain local elk security for the big game rifle season and habitat integrity during early spring migration, but it would add a degree of motorized disturbance from late spring into early fall, reducing local elk habitat effectiveness.

In essence, the proposal would close a stream-side route with severe erosion and water quality problems (#1857-B1) in exchange for opening a dry, upland route (#1857-A1) with negative implications for big game, albeit with a mid-fall to mid-spring closure. On balance, retention of fall security (a bulwark against mortality) is more important to elk and deer in this area than maintaining a local disturbance-free corridor in summer. But, the opening of road #1857-A1

would redistribute vehicle use in the Negro Mountain area. It would be responsible for most of the increase in open road mileage in this alternative *versus* the existing condition (alternative 1).

Figure 43 - Photo 27. Road #1857-A1
Road #1857-A1 as it runs through a grassland park used by foraging elk in spring, early summer and fall. The currently closed route would be opened as a road in alternatives 2, 3 and 4 and as a motor trail in alternative 5.

Under alternative 2, road #4100, which ascends the ridge from the west, would eventually provide legal vehicle access from that direction, but not until a bridge is constructed over the Little Blackfoot River at the lower end of the road [which would be a future project separate from the current proposal]. In the meantime, the road technically would be open to vehicles, but for all practical purposes, would not provide viable access from the Little Blackfoot side.

Most other existing road closures would be retained, with the notable exception of roads #1857-D1 and #1857-D2, which connect Negro Mountain roads with the currently-closed upper Telegraph road system. This officially-closed, though often driven, road would become a legally open route year-round (as would the upper Telegraph system to which it connects), creating an extensive new loop driving/ riding opportunity and lowering big game security and habitat effectiveness in that area.

The groomed snowmobile route that traverses the area would be available essentially as it is now (with the opening date shifting from December 1 to December 2).

Alternative 3

Alternative 3, which in most areas emphasizes non-motorized access, would, in this case, provide only marginally less open road than the existing condition (11.8 miles *vs.* 12.0 miles at present). Like Alternative 2, this option would eliminate vehicle access to Negro Mountain on the lower Moose Gulch road (#1857-B1) and substitute road #1857-A1 as the open route from Telegraph Creek (with an October 15 to May 15 closure). But, unlike alternative 2, alternative 3

proposes retaining the yearlong wheeled vehicle closure on road #1857-D1, which would block vehicle access from the upper Telegraph Creek road network to the south. *Better signing and physical barriers would be needed to make this closure effective, measures that are not part of this "open-route/closed-route" proposal and would need to be provided by a separate future proposal*. Unlike alternatives 1 and 2, alternative 3 would also close road #4100, the only viable access route to Negro Mountain from the Little Blackfoot River side, leaving road #1857-A1 as the only driving route to the ridge [and between October 15 and May 15 that route also would be closed as well, excluding wheeled vehicles from the area entirely]. There would be no open motor trails under alternative 3.

In terms of wildlife cost/benefit, alternative 3 is slightly less conducive to big game habitat integrity than the existing condition (given potential effects generated by open route #1857-A1), but more beneficial than alternative 2 (because of the closure on roads #1857-D1 and #1857-D2).

As in alternative 2, the local groomed snowmobile route would be open from December 2 to May 15, as snow conditions allow.

Figure 44 - Photo 28. Forest Road #4100
Forest Road #4100, which ascends the Negro Mtn ridge from the west. The road, which provides access to Negro Mountain from the west, is now open to all vehicles; but access requires fording Ontario Creek at the bottom. Under Alternatives 2, 3 and 4, the route would lose its designation as a Forest System Road until a bridge is constructed across the Little Blackfoot River, thus avoiding the ford at Ontario Creek. Alternative 5 would convert it to a motor trail.

Alternative 4

Alternative 4 is a hybrid proposal somewhere between alternatives 2 and 3. Like alternative 2 (and alternative 1), it would allow the #4100 road system coming up from the Little Blackfoot side to remain open; but like alternative 3 (and alternative 1), it would retain the closure on

roads #1857-D1 and #1857-D2 connecting to the upper Telegraph system to the south. As with other action alternatives, road #1857-A1, currently closed for elk security and habitat effectiveness, would be opened from May 15 to October 15 to compensate for the closure of the Moose Gulch road (#1857-B1) and thus provide access from the lower Telegraph Creek side. As in alternative 2, road #4100 from the west would be technically open to vehicles but would not provide viable access from that direction until a new bridge was constructed over the Little Blackfoot River sometime in the future. alternative 4 would support 14.5 miles of open road and no motor trails. Open route density would be 2.0 mi/mi².

As with alternatives 2 and 3, the opening of road #1857-A1 would erode summer habitat effectiveness for elk in the area north of Negro Mountain, although the rough condition of the upper half of the route is likely to limit casual use by many highway vehicles.

Alternative 5

Under alternative 5, no roads on the Negro Mountain ridge would be open to full-sized vehicles: existing open roads would either be closed or converted to motor trails. Open road density would reduce to 0.2 mi/mi², an artifact of border roads running along the Little Blackfoot River to the west and Telegraph Creek to the east. Motor trail denisty, on the other hand, would be the highest of any alternative at 0.7 mi/mi². The trails would be closed to motorized use during the hunting season (September 1 to December 1). Most would be designated for snowmobile use in winter. Trails that would be open to motor bikes and ATVs include currently-closed Road #1857-A1 northeast of Negro Mountain; Road #4100, which connects to the Little Blackfoot River Road to the west; and Roads #1857, #1857-B1, #1857-B4 and #1857-D1, which connect to a currently-closed part of the Upper Telegraph road system to the south.

Total open route density in summer would be 2.0 mi/mi², much in the same ball park as the other four alternatives, which range from 1.6 to 2.2 mi/mi². The primary difference in alternative 5 is that motorized intrusion into wildlife habitat would come in the form of ATVs and motor bikes rather than as SUVs and pickup trucks. Hunting season closures would be pervasive, similar to other action alternatives and substantially greater than at present. Snowmobile route availability would be similar to other alternatives.

Summary and Conclusions

Alternative 1 would preserve the status quo: Open road density would remain at 1.7 mi/mi² most of the year, access to the Negro Mountain ridge would be blocked from lower Telegraph Creek (by the private inholding above Moose Gulch) and road systems to the north and south would remain off-limits to vehicles so as to promote big game security and habitat effectiveness.

Under Alternative 2, local open road density would increase to 2.2 mi/mi² in summer. Vehicle access from lower Telegraph Creek would be provided via a currently closed road (#1857-A1) to the northeast, allowing a loop riding opportunity between the Little Blackfoot and Telegraph Creek roads. The route would be closed in hunting season to maintain elk security, but summer habitat effectiveness would decline. Currently closed routes into upper Telegraph Creek to the south (roads #1857-D2, #1857-D2) would be opened year-round, further lowering local elk security and habitat effectiveness.

Alternative 3 would maintain open summer road density of 1.6 mi/mi², similar to alternative 1 but through a different combination of open and closed roads. As in alternative2, the currently closed route to telegraph Creek (#1857-A1) would be open between May 15 and October 15. But, unlike alternative2, it would maintain the road closures into upper Telegraph Creek to the

south (#1857-D2), preserving elk security and habitat effectiveness in that area and it would also close the main access road from the Little Blackfoot side (#4100).

Alternative 4 , like alternative 3, would open road #1857-A1 northeast of Negro Mountain for wheeled vehicle access from lower Telegraph Creek from mid-spring to mid-fall and it would maintain the yearlong closure on roads #1857-D1 and #1857-D2 into upper Telegraph Creek to the south. But unlike alternative 3, it would allow continued wheeled vehicle access from the Little Blackfoot drainage via road #4100. Open road density in summer would be 2.0 mi/mi².

Alternative 5 would close several currently open roads on the Negro Mountain ridge and covert the rest to trails open to ATVs and motor bikes from May 15 to August 31. Trail #1857-A1 would provide access from the north, #4100 from the west and the #1857-B/D system from the south. Summer open road density would be 2.0 mi/mi². Much of the system would be open to snowmobiles in winter.

Upper Telegraph Creek

Area Characteristics and Wildlife Issues

This area, immediately west of upper Telegraph Creek, lies between two other key areas: Negro Mountain to the northwest and Ontario/Bison Creek to the southwest. Roads in the eastern half of the area traverse extensive cutting units from the first Treasure Mountain timber sale (1960s). These units are now clogged with large sapling lodgepole pine that provide good hiding cover. Most roads in this area are open to motor vehicles year-round. Roads in the western half of the area pass through a number of more recent clearcuts from the Ontario Creek timber sale (late 1980s). In order to compensate for loss of cover, these roads were closed as part of the elk security/habitat effectiveness plan associated with the timber sale. The road restrictions remain intact, although they are often subverted by vehicles that manage to circumvent barriers, often via road #1857-D1 coming down from the Negro Mountain area to the north.

In addition to serving as big game habitat in summer and fall, the upper Telegraph area supports grizzly bears, lynx, wolverines and sometimes, wolves, all in very low numbers. The non-motorized block between open roads in Telegraph Creek (#1859, #1859-B1, #495-D1) and Ontario Creek (#123) is too small to serve as a bona-fide elk security area, but there is enough rugged, forested country in this intermittent refuge to allow a number of elk to elude hunters in the fall. In addition, a variety of drainage-head habitats across the upper Telegraph Creek watershed provide a fertile summer environment. The broad bulk of Treasure Mountain itself is covered with a patchwork of open and closed lodgepole pine forest (with whitebark pine), dense spruce/fir stands (some approaching old-growth status) and small productive openings This combination of components provides elk with calving and nursery sites, summer cover and forage and a measure of hunting season security.

Currently the upper Telegraph region supports 7.7 miles of open Forest system roads. An additional eight miles of system roads are closed to wheeled vehicles, as are several miles of non-system roads (most of them old mining roads). Also currently in use are approximately 1.6 miles of user-made motor trails. The longest of these is an unauthorized route pioneered over the top of Treasure Mountain and running between open Road #1857-B3 in the north and closed Road #1859-D1 to the south. Another 1.5 miles of closed road at the southern end of the trail is then used to access the main road system from behind the gate on Road # 1859. With these clandestine motor routes added in, open route density is 1.9 mi/mi². Density is 1.4

mi/mi² when these routes are not included. Primary groomed snowmobile routes follow roads #495, #1859 and #1857-D1.

Figure 45 - Photo 29. User-Made Motor Trail
User-made motor trail running through beetle-killed lodgepole pine forest across the broad summit of Treasure Mountain. As of mid-June 2012, the trail had been little used that year and numerous elk cows and calves were present throughout the area. The bulk of the ATV and trail bike use comes in July, August and September.

Effects of Alternatives

Alternative 1: Existing Condition

Alternative 1 would maintain the existing condition described above: Most roads in the east half of the area would remain open to vehicles yearlong and those in the west half would remain closed yearlong. Eventually, improved signing and road barriers should allow effective enforcement of vehicle restrictions, including closure of unauthorized trails, although these measures are beyond the scope of this planning effort. Local open route density would remain at 1.9 mi/mi². Snowmobile routes would be available whenever sufficient snow is present between December 1 and October 15. In this area, snowmobile snow may last into April.

Alternative 2

Alternative 2 would substantially expand the open road network by sanctioning wheeled vehicle traffic on now-closed roads associated with the Ontario Creek timber sale in the west half of the area. This includes roads #1859-D4, #1859-E1 and the west half of road #1859, as well as road #1857-D1, which connects with the Negro Mountain road network to the north. Open roads would total 13.0 miles (about 5.4 miles more than at present), producing a local open road density of about 2.2 mi/mi². User-made motor trails would be eliminated. Snowmobile routes would be open December 2 to May 15.

Figure 46 - Photo 30. Road #1857-D1
Road #1857-D1, which connects the upper Telegraph Creek area with the Negro Mountain area to the north. The route is currently closed to all wheeled vehicles yearlong and would remain so under alternatives 3 and 4. It would be open to all vehicles yearlong in alternative 2 and to ATVs and motor bikes in alternative 5. Here, the route passes through an old clearcut full of large sapling conifers, one of the most prominent local habitat formations.

The increase in open roads would lower effectiveness of local habitats in the vicinity of Treasure Mountain for big game animals, as well as for other species wary of motorized activity. It would also erode local habitat security opportunity for elk during the hunting season, most likely displacing animals that currently make use of the area into vehicle-restricted refuges to the south and west.

Alternative 3

Alternative 3 would is somewhat similar to the existing condition (alternative 1) with regard to wheeled vehicles, maintaining considerably lower road density than alternative 2. Roads open to wheeled vehicles would total 6.7 miles (a bit less than at present), resulting in a local open road density of 1.2 mi/mi² (compared to 1.3 mi/mi² under alternative 1 and 2.2 mi/mi² under alternative 2). All open roads would be available to wheeled vehicles year-round, whenever snow conditions allowed. Aside from the elimination of a couple short spur road segments and a user-made motor trail, it is identical to alternative 1, with similar implications for wildlife. Both alternatives 1 and 3 are more favorable to local wildlife in terms of motorized disturbance and hunter access than is alternative 2. Snowmobile season would be the same as alternative 2: December 2 to May 15.

Alternative 4

Alternative 4 is similar to alternatives 1 and 3. It would maintain 7.5 miles of open road (yearlong) and no motor trails. Resulting local open route density would be 1.3 mi/mi². In

general, most roads in the eastern part of the area would be open to wheeled vehicles year-round, those in the western reaches closed year-round. There would be no open road connection to the Negro Mountain area to the north other than by the indirect route along Road #495, which follows the main stem of Telegraph Creek.

As with alternatives 1 and 3, elk security and habitat effectiveness would be good, although improvements in road closure mechanisms and signing would be required to make vehicle use patterns operate as intended. Snowmobile use would be the same as in the other three alternatives.

Figure 47 - Photo 31. Road #1859-E1
Road #1859-E1 passing through stands of beetle-killed lodgepole pine in upper Telegraph Creek. The road is now closed to wheeled vehicles and would remain so in alternatives 3 and 4. This western section of the road would be closed in alternative 5 as well, but its eastern end would serve as part of a motor trail and designated snowmobile route. The entire route would be open year-round in alternative 2.

Alternative 5

Alternative 5 would convert currently open Roads #1859 and #1859-B1 to motor trails and would open parts of currently-closed Roads #1859-E1, #1859-D4 and #185-D4 as motor trails. These trails would feed into the Negro Mountain trail system to the north. User-made trails, such as the one over Treasure Mountain would be closed. The net result would be an increase in motor trail density from 0.6 mi/mi² to 1.2 mi/mi². All motor trails would be closed during the big game hunting season (Sept. 1 to Dec. 1). No roads would be open to full-sized vehicles in this region between Telegraph Creek to the east and Ontario/Monarch Creeks to the west. Accounting for boundary roads along Telegraph, Ontario and Monarch Creeks, open road density would decrease from 1.3 mi/mi² to 0.5 mi/mi². Total open route density in summer would be 1.7 mi/mi², which is somewhat less than alternatives 1 and 2 but more than alternatives 3 and 4.

Summer habitat effectiveness for big game animals, as measured by open motor route distribution, would be similar to alternatives 2, 3 and 4 in that the western half of the area would be free from motorized use. Technically, the same is true for alterntive 1 as well, but the non-motorized pattern is subverted to an extent by unauthorized routes in the Treasure Mountain area. Alternative 5 presents the only secenario in which the entire area between Telergraph and Ontario/Monarch Creeks is off-limits to motor vehicles during the hunting season.

Summary and Conclusions

Alternative 1 would maintain local open route density of 1.9 mi/mi², mostly from open roads in the eastern half of the area, but partly from unauthorized motor trails in the west. Illegal use of restricted roads coming in from the Negro Mountain area to the north (esp. #1857-D1) would also continue to subvert road closures designed to provide for big game security and habitat effectiveness following timber sales in the 1970s and 1980s.

Under Alternative 2, local open route density would increase to 2.2 mi/mi², a result of opening 5.4 miles of currently-closed roads in the western half of the area to yearlong vehicle use(and assuming closure of unauthorized routes). This would diminish local fall elk security and summer habitat effectiveness in the central part of the area, an effect that would most likely be expressed via displacement of elk further west toward Ontario and Monarch Creeks .

The open road system under Alternative 3 would be similar to the existing condition in its primary configuration, with local open route density declining to 1.2 mi/mi², mostly from the closure of short segments of fringe and connector routes, as well as unauthorized motor trails. Integrity of current road closures in the western half of the area would be dependent on better signing and physical barriers to reduce illegal motorized use [though such actions are not part of the current proposal].

Alternative 4 is similar to alternatives 1 and 3 in terms of its road closures and its benefits for local wildlife habitat effectiveness and security. Local open route density would be 1.3 mi/mi². As with other alternatives, all wheeled vehicle closures would be yearlong. Snowmobile routes would be as in the other three alternatives.

Alternative 5 would close all routes between Telegraph and Ontario/Monarch Creeks to full-sized motorized vehicles, converting some routes to motor trails. Summer habitat effectiveness patterns would be similar to other action alternatives. Open route density during that period would be 1.7 mi/mi², with use concentrated in the eastern half of the area. Fall big game security would be the most effective of all alternatives since all trails would be closed to motorized use September 1 to December 1.

Upper Ontario Creek – Bison Creek

Area Characteristics and Wildlife Issues

This area lies immediately south of the upper Telegraph Creek region and takes in the upper reaches of Ontario Creek, including the productive Bison Creek drainage. To the west and south, it abuts country that is either unroaded or in which roads are restricted for wheeled vehicles year-round. An extensive road network (greater than 12 miles) in the western half of the area, constructed for the Bison Mountain Timber sale in the 1970s, accounts for most of the closed road miles.

Wheeled vehicles are currently limited to the periphery of the area (Road #495 in Telegraph Creek and Road #4104 along Monarch Creek) and to a single Forest road (#495-D1) that comes in from the east and follows the upper reaches of Ontario Creek, fording one of its tributaries in the process. This route is often deeply rutted and eroded [Figure 48]. It remains on the east side of Ontario Creek, but ATV and motor bike riders have pioneered a track across the creek so as to hook into closed Road #4104-A2, the CDNST and the restricted Bison Mountain road system [Figure 49]. Open road density in the area is low at 0.5 mi/mi² (generated by 4.1 miles of road open all year).

This area within the curve of the Continental Divide northeast of Bison Mountain encompasses the headwaters of Bison Creek, Ontario Creek and parts of Monarch and Telegraph Creeks [Figure 24]. It is heavily forested, but supports a broad mosaic of early and late-seral forests interspersed with wet meadows, riparian shrub communities and grassland. The structural diversity, combined with the presence of highly productive sites and relative isolation from regular motorized disturbance (and human activity in general), afford excellent summer habitat opportunities for elk, deer, moose, black bears, grizzly bears and a variety of other wildlife species that thrive under such conditions. As with many areas dominated by mature lodgepole pine, forests in these drainages have been under attack by mountain pine beetle over the past few years and standing dead trees have proliferated. Whitebark pine stands have been heavily impacted as well.

Effects of Alternatives

Alternative 1: Existing Condition

This option would maintain the current situation described above. Motorized access to Ontario Creek via road #495-D1, especially the northward extension of the road along the creek, would continue to depress the habitat potential of local riparian areas for more than a mile. Its direct effect on the areawide wildlife environment, however, is probably marginal, given the extensive non-motorized country to the south and west. Indirectly, its impact is more far-reaching because of the illegal access it provides ATVs and trail bikes, once they cross the creek, to the old Bison Mountain road prisms and to the Continental Divide Trail (CDNST). Alternative 1 would maintain 4.1 miles of legally open road, 2.1 miles on road #495-D1 and 2.0 miles on the peripheral roads in Monarch and Telegraph Creeks. Open road density would thus remain at 0.5 mi/mi². There would be no legally open motor trails.

In winter, a groomed snowmobile route (open after November 30) follows road #4104 in Monarch Creek and crosses the area via roads #1404-A1 and #495-D1, connecting to road #495 in Telegraph Creek. There is no big game winter range or wolverine denning habitat within reach of the trail and no wildlife problems are evident.

Alternative 2

The primary change proposed in alternative 2 would be to convert 2.2 miles of currently-closed road #4104-A1 to a motorized trail that would connect Road #495-D1 to Road #4104 in Monarch Creek (to be open May 15 to October 15). The existing road prism would remain in place but motorized use would be limited to trail bikes and ATVs. The short user-made route across Ontario Creek would be sanctioned for motorized use to allow connection with road #495-D1, thus completing a legal loop route involving roads and trails in Ontario, Monarch and Telegraph Creeks. The dead-end extension of road #495-D1 northward along the riparian zone beyond this connection would remain.

The creation of a motorized through-route across the area is more a problem for wildlife than is the dead-end road that comes in from the east at present. This arrangement would lead to an increased flow of motor bikes and ATVs through the area because of the opportunity for a loop ride. When motorized use is persistent (most often on weekends) undisturbed habitat would be fragmented into north and south segments, an effect likely to redistribute elk use in the area, probably toward the south. The same would be true for other uncommon, road-wary species such as black bears, grizzly bears, wolverine, lynx, mountain lions and so on. The snowmobile route through the area would be open December 2 to May 15.

Figure 48 - Photo 32. Road #495-D1
Road #495-D1, which provides access to upper Ontario Creek from the east. The road dead-ends on the east side of Ontario Creek, but some ATV and motor bike riders cross the creek and enter the closed road system on Bison Mountain. This road would remain open down to the creek under all alternatives. In alternatives 2, 4 and 5, it would then continue on as a newly authorized motor trail connecting to Road #4104 in Monarch Creek to the west. In alternatives 1 and 3, there would be no motor trail connection.

Alternative 3

With regard to wheeled vehicles, alternative 3 is identical to alternative 1 (the existing condition) retaining road #495-D1 into upper Ontario Creek, including the northward dead-end extension along the riparian zone and maintaining the closure on road #4104-A1. There would be no authorized motor trail connection over to Monarch Creek. Opening date of the snowmobile route would be changed from December 1 to December 2.

Alternative 4

Alternative 4 is identical to alternative 2, converting closed-Road #4104-A1 along upper Ontario Creek to a motor trail open May 15 to October 15. All other currently closed roads would remain closed. The current snowmobile route would remain in place, with a one-day shift in the opening date. Implications for wildlife are the same as in alternative 2.

Alternative 5

Alternative 5 is nearly identical to alternatives 2 and 4, converting closed-Road #4104-A1 along upper Ontario Creek to a motor trail. However, in alternative 5 the route would be open only from May 15 through August 31, recognizing the hunting season as beginning with the bow season on September 1. All other currently closed roads would remain closed. The current snowmobile route would remain in place, with the opening date the same as alternative 4. Implications for wildlife are the same as in alternatives 2 and 4.

Figure 49 - Photo 33. A Segment of Closed Road #4104-A1

A segment of closed Road #4104-A1 as it runs through sapling-filled clearcuts on the north side of Bison Mountain. The road is gated on its west end in Monarch Creek; but OHVs are able to gain access to it and other roads in the closed system via Road #495-D1 to the east. Vehicles ford Bison Creek from Road #495-D1 and make their way over to the closed system. alternatives 2, 4 and 5 would authorize Road #4104-A1 as a motor trail (May 15 to Aug. 31). The road would remain closed in alternatives 1 and 3.

Summary and Conclusions

Alternative 1 would retain local open road density at 0.5 mi/mi² in spring, summer and fall. Most of the extensive road system in upper Ontario and Bison Creeks, built for past timber sales, would remain gated. It is likely that some illegal motorized use would continue to occur on this road system. But, in general, big game hunting season security and summer habitat effectiveness would remain high. There would be no legal motorized trails in this alternative.

Alternative 2 would retain local open road density of at 0.5 mi/mi², but it would open up a currently closed road along upper Ontario Creek (#4104-A2) as an ATV/bike trail in summer. This route would bisect the area between upper Telegraph and Monarch Creeks, substantially elevating wildlife disturbance through these alpine basins in summer. The route would be closed to vehicles during the big game rifle season, retaining high fall elk security.

Alternative 3 is essentially the same as alternative 1, retaining the existing condition.

Alternative 4 is identical to alternative 2, with the the exception of a one -day shift in the opening date for snowmobile use. Implications for wildlife are the same as with alternative 2.

Alternative 5 is identical to alternative 4, except that the route would close to motorized vehicles after August 31, rather than October 15.

Hahn Creek – Flume Gulch – Mike Renig Gulch

Area Characteristics and Wildlife Issues

This area lies between northern Telegraph Creek (just above its confluence with the Little Blackfoot River) and the Continental Divide to the east. All motorized access is via the Hahn Creek road (#1856), which winds its way eastward up the Hahn Creek drainage from the Telegraph Creek road (#495), eventually passing through the headwaters basins of Flume Gulch, Little Flume Gulch and Mike Renig Gulch just below the Divide.

The road is gated at the 3.7 mile mark near the top of Flume Gulch and motorized use is restricted beyond this point yearlong. A second gate is located at the north end of the road system in Mike Renig Gulch to block vehicles from that direction (although public access is severely limited by private holdings in that area). There are three exceptions to the vehicle restrictions: (1) Forest Service vehicles are allowed in for occasional resource management activities (fire suppression, silvicultural operations, weed control, road maintenance); (2) snowmobiles are permitted on the main road (#1856) and on a short connection to the Divide from December 1 until the snow base deteriorates; and (3) three private landowners, who have built part-time residences on an inholding in upper Mike Renig Gulch 2.5 to 3.5 miles behind the gate, are allowed to drive in between April 1 and November 30 (each has a key to a private lock on the gate). One of the landowners has been accessing the parcel for over 20 years; the other two more recently. In winter, the road is not plowed but snowmobile access to the property is available.

Most landowner intrusion is localized along the main road (#1856) and around the cabins in the bottom of upper Mike Renig Gulch (although there are occasional reports of incursions into other areas). While this use does not appear to be displacing wildlife in any meaningful way [see wildlife field notes for the Telegraph Vegetation Project 2010-2012, HELENA NATIONAL FOREST Wildlife Files], it has aggravated a number of recreationists, particularly hunters, some of whom would also like to be able to drive into the gated area and others of whom feel that the disturbance generated by the landowners impairs their walk-in hunting opportunity. Hikers on the section of the CDNST that follows the road are also occasionally surprised by vehicles in the restricted area.

The four drainages in this area were extensively logged in the early 1980s, mostly by clearcutting. Forest system roads supporting these projects (along with a few routes previously in place) total over 21 miles. Open roads account for 11.2 miles (producing a local open road density of 1.2 mi/mi^2). The gates on Road #1856 were installed in the early 1980s as wildlife mitigation. They were designed initially to buffer big game animals on spring/summer/fall ranges from excessive human interference, thus enhancing both security and habitat effectiveness. Since then, it has become evident that a number of other prominent species also benefit from the closure, lynx, wolverines, black bears, mountain lions and beaver among them.

The upper Flume and Little Flume Gulch basins immediately behind the gate support numerous seeps and springs; and because of poor drainage, the water spreads out into a mosaic of riparian areas, wet meadows and bogs. Beaver activity, which has waxed and waned over the years, has created ponds in the basin, further enhancing habitat opportunities for wildlife. Likewise, the headwaters of Mike Renig Gulch, while more confined, provide highly productive summer habitat. The north and east slopes of Jericho Mountian, which rise gradually above the headwaters of the gulch support excellent productive forest habitat with numerous wet sites, pockets of old-growth and dense cover. Because much of the forest is dominated by Engelmann spruce and subalpine fir, it has remained largely intact in tht face of the pine beetle outbreak. The large dead lodgepole pine scattered through these stands is adding a further element of complexity.

Figure 50 - Photo 34. Wet site in Little Flume Gulch
One of several wet sites amidst sapling-filled clearcuts and mature forest in Little Flume Gulch. This mix of habitats provides excellent summer habitat for elk, deer, moose, black bears, snowshoe hares and numerous other wildlife species.

Overall, these upper drainages support roughly a 50/50 mix of mature and early-successional forest, although Mike Renig Gulch holds more mature forest and Little Flume Gulch more young regenerating forest. A majority of the old cutting units are now dominated by large sapling conifers, which in most cases provide good hiding cover for big game animals. This is excellent summer habitat for moose, elk and deer, as well as black bears, mountain lions, lynx and a wide variety of smaller mammals and birds.

Over the last eight years, much of the mature forest, wherever lodgepole pine is present, has become infested with mountain pine beetle and is now dead or dying. This insect outbreak is in the process of dramatically altering the forest environment throughout the local drainages (and the Divide landscape in general), transforming much of the mature interior forest to open canopied early seral habitat clogged with snags and large woody debris.

Figure 51 - Photo 35. Mike Renig Gulch
A view across upper Mike Renig Gulch, showing the mosaic of green sapling-dominated clearcuts and mature beetle-killed lodgepole pine forest that is now characteristic of most of upper Mike Renig, Flume and Little Flume Gulches.

Some elk remain in the vicinity of the closed road system during the hunting season, although most retreat to more rugged, densely forested country further back from the gate (along and over the Divide and around Jericho Mountain). Many hunters park at the gate and walk into the basins and up to the Divide during the course of the big game bow season (starting September 1) and rifle season (mid October to late November), as long as snow conditions on the Hahn Creek road allow. Elk, deer and most moose abandon the upper drainages as snow accumulates in late fall or early winter.

In the last few years, lynx, wolverines, wolves, coyotes, bobcats, foxes, marten, weasels and mountain lions have all been tracked through the upper drainages in winter (Wild Things Unlimited tracking surveys, 2006 to 2013). The snowmobile route through the center of the area does not appear to be displacing these animals. Snowmobile use levels are low, the activity is limited to daytime hours and concentrated on weekends and virtually all riding is confined to the narrow road prism. The route is available to snowmobiles anytime snow conditions are right, except during the big game rifle season. Most use occurs from mid-December through mid-March.

Figure 52 - Photo 36. Road #1856 near the head of Mike Renig Gulch
Road #1856 near the head of Mike Renig Gulch. The sapling filled clearcuts, such as those in the foreground, provide foraging habitat for lynx. Lynx and wolverines regularly travel this closed road system in winter. The road is closed to public wheeled vehicles year-round but is open to snowmobiles in winter. It would be open during the hunting season in alternative 2.

Effects of Alternatives

Alternative 1: Existing Condition

Under alternative 1, conditions in this key area would remain as described above. Road #1856 and its spurs would remain gated to wheeled vehicle use by the general public yearlong; snowmobiles would continue to use the road as an ungroomed trail to access other trails on the Divide; and the exceptions for the private landowners would remain in place. A diversity of wildlife would continue to use the productive basins as summer habitat (May to September); easy walking access for hunters would continue to displace elk to the far reaches of the upper drainages and to more secure adjacent areas in the fall; and a number of uncommon carnivores would continue to frequent the area in winter (and presumably in other seasons as well).

Alternative 2

Alternative 2 proposes one significant change from the existing condition: The gate on road #1856 would be opened from October 15 to December 1 to allow motorized hunter access for about four miles along the main road during the big game rifle season. Rationale for this arrangement are that (1) access for the general public, even for only a few weeks, will alleviate some of the sense of injustice generated by the exclusive access allowed the private landowners and (2) the area is more important to big game as productive summer habitat than it is as a hunting season refuge. Be that as it may, this would reduce the security value of certain local habitats in upper Flume, Little Flume and Mike Renig Gulches and it is likely that any elk that have used the area for fall refuge in the past would be displaced to more secure areas to the

south and west. The new open route would not come close enough to the elk security area around Jericho Mountain to reduce the size of that refuge. The dates for use of the snowmobile route would change from the current December 1 to October 15 to December 2 to May 15.

Alternative 3

Except for a couple minor differences, alternative 3 is essentially the same as alternative 1, the existing condition. Open road density would be slightly lower due to the closure of the north end of four-wheel-drive road #1863 on the Continental Divide in the southeast corner of the area. Dates for snowmobiles would be as in alternative 2 (December 2 to May 15). The area would continue to serve as prime summer wildlife habitat; human-wary carnivores would continue to make use of the area in winter; fall elk security in Little Flume and Mike Renig Gulches would remain intact, though somewhat marginal because of the proximity of open roads and easy walk-in access.

Alternative 4

Alternative 4 is identical to alternative 3: The implications for wildlife of proceeding with this alternative are the same as for alternative 3 and much the same as for alternative 1.

Alternative 5

Alternative 5 is similar to alternatives 1, 3 and 4, in that it retains the closure on road #1856, restricting motorized use year-round to incidental use by the three landowners with inholdings. In addition, the closure of dead-end spur roads off the main #1856 route would lower open route density to 0.7 mi/mi², much the lowest of any alternative. There would be no motor trails in alternative 5 and Road #1856 would not be designated as a snowmobile route, protecting winter use by lynx, wolverines and other rare carnivores know to have use the area in the past.

Summary and Conclusions

Alternative 1 would retain local open road density at 1.2 mi/mi² year-round. The two gates that block public wheeled-vehicle access to upper Little Flume and Mike Renig Gulches would remain intact, although local landowners would still be allowed access to their inholdings above the Hahn Creek gate. The main road (#1856) would continue to serve as a snowmobile route in winter. Wildlife use of these productive drainage-head basins would remain high.

Under Alternative 2, local open road density would remain at 1.2 mi/mi² for most of the year. But, the gate on the main road in Little Flume Gulch would be opened for the big game rifle season, allowing motorized access to four miles of currently closed road. It is likely that any elk in this area at the start of the rifle season would move to more secure sites in adjacent drainages.

Alternatives 3 and 4 are identical. Under these alternatives, local open road density would decline slightly to 1.2 mi/mi². With a couple minor exceptions, alternatives 3 and 4 are identical to alternative 1 and would maintain the same level of wildlife habitat integrity in this key area.

Alternative 5, like alternatives 1, 3 and 4, would maintain the yearlong gate closures for Little Flume and Mike Renig Gulches. In addition, it would close deadend spur roads off Road #1856, lowering open route density to 0.7 mi/mi². Road #1856 would not be designated as a snowmobile route.

Slate Creek – Elliston Creek

Area Characteristics and Wildlife Issues

This habitat block encompasses most of the Slate Creek drainage and the upper half of the Elliston Creek drainage. The central feature of the upper drainages is Slate Lake, a modest-sized body of water (of about two acres) at mid-high elevation (precisely 6,000 feet) surrounded by an extensive wet meadow complex. The headwaters of both drainages originate here, with Elliston Creek flowing northward and Slate Creek eastward (both eventually ending up in the Little Blackfoot River). The upper Elliston Creek drainage accommodates a few primitive roads/trails, none of which are currently open to wheeled motor vehicles but which see a certain amount of illicit use. The upper drainage is part of an elk security area, the southeastern corner of which encompasses Slate Lake.

The Slate Creek drainage, on the other hand, was logged in the 1970s and 1980s, mostly by clearcutting and retains a functional Forest road network created for those projects. Currently, the western half of the road system toward Slate Lake is closed to vehicle use yearlong, while the eastern half toward the Little Blackfoot River, with connections to the Elliston area toward the north, is open year-round. Open roads in the Slate Creek and upper Elliston Creek drainages cover 4.5 miles, resulting in an open road density of 0.7 mi/mi^2. Closed Forest roads account for 9.9 miles of the system. There is at least one unauthorized user-made motor trail in the Slate Lake area, the use of which requires ATV and motor bike riders to circumvent two closure gates.

A groomed snowmobile trail, available December 1 to October 15, follows roads #1871 and #1871-A1 through the Slate Creek drainage, connecting trails in the Elliston area (to the north) with those in the Treasure Mountain/ Telegraph Creek area (to the southeast). Both roads are open to wheeled vehicles year-round (although snow conditions discourage most winter use).

Riparian areas in the upper half of Slate Creek and the wet meadow/forest mosaic around Slate Lake provide excellent summer habitat for elk, deer, moose, black bears and other species attracted to productive, high-diversity habitats, including rare carnivores such as lynx, wolverines and grizzly bears. The absence of legal motorized access and the scarcity of human presence in general around Slate Lake makes this area particularly attractive to wildland species. In the fall, a substantial number of elk remain in the Slate Lake/Elliston Creek security area as long as possible, often through the entire hunting season if not forced out by snow accumulation. Dense mature forests in the area are currently being opened up by bark beetle infestation, but the area should continue to provide security by virtue of its distance from open roads. A few hunters manage to drive into the area illegally via primitive tracks from the south and by circumventing gates on both the upper and lower Slate Creek roads (#1871 and #1871-A1).

Effects of Alternatives

Alternative 1: Existing Condition

This alternative would maintain the existing condition. The Elliston Creek/Slate Lake elk security area would remain more or less intact and summer habitat effectiveness in the Slate Lake area would remain relatively high. The primary problem for big game species and habitat integrity for wildlife in general would continue to lie, not with the design of the route restrictions, but with attempts to enforce them. For several years, ATVs and motor bikes have consistently been able to pioneer detours around the road barriers in upper Slate Creek (roads #1871 and #1871-

A1) and ride throughout the closed road system and the wet meadows around Slate Lake. The result is destructive to sensitive habitat and disruptive to local wildlife. As well, motorized access to these areas during the hunting season subverts the integrity of the elk security area. Similar incursions occur in upper Elliston Creek. These technical problems, however, are beyond the scope of the Divide Travel Plan, which focuses only on the issue of which routes will be open to motorized use and which will be restricted.

Figure 53 - Photo 37. Closure Gate on Road #1871-A1
The often-circumvented yearlong closure gate on Road #1871-A1, the upper Slate Lake Road. The sapling-dominated clearcuts below the road are typical of much of the Slate Creek area. In alternatives 2 and 5, this road would be open as a motor trail leading to Slate Lake.

Alternative 2

The principal innovation of alternative 2 is expansion of the open road/trail system into the western half of the area. The proposal would open up 3.4 miles of currently-closed system road and user-made trail in the Slate Lake area to provide a legal riding opportunity for ATVs and motor bikes where they now ride furtively. The new open route would follow roads #1871 and #1871-A1 behind the two closure gates in upper Slate Creek and a non-system track that connects the two roads through the Slate Lake meadows. The entire route would be designated a “motorized trail”, available from May 15 to September 1 and *not* open to vehicles wider than 50 inches. The on-ground tactics for developing the trail and enforcing compliance with the new rules would need to be worked out in a later decision (as the trail needs to be moved out of the meadows and away from the lake, where part of it is submerged in wet years).

In addition to the new routes around Slate Lake, road #314-E1, which comes in to Elliston Creek from road #314 to the north and west and is now gated year-round, would be open to all vehicles throughout the year. As a result of these changes, the density of routes open to wheeled vehicles in the Slate Creek/ Elliston Creek area would rise from the current 0.7 mi/mi²

to 1.6 mi/mi² between May 16 and September 1 and to 1.1 mi/mi² between September 1 and May 15.

Figure 54 - Photo 38. User-made ATV trails in the wet meadows around Slate Lake
Riders circumvent the gate on Road #1871-A1 and gain unauthorized access to this productive wildlife habitat. A legal motor trail (#1871-002) would run near Slate Lake and the meadows in alternatives 2 and 5.

Figure 55 - Photo 39. Slate Lake
Current route of the user-made motor trail along the east side of Slate Lake, still submerged in this area as of mid-September 2010.

Consistent presence of ATVs and trail bikes around Slate Lake after May 15 would measurably lower habitat effectiveness of that productive summer range. Currently, the user-made routes run through the margins of the Slate Lake meadows, sometimes churning up the wet habitat. More serious habitat damage, however, is generated by vehicles riding out through the center of the meadows creating multiple off-route tracks. The potential for this activity would rise as motorized use increased. The current snowmobile trail would be available for use from December 2 to May 15.

Alternative 3

This alternative is identical to alternative 1 (the existing condition) with respect to wheeled vehicles and would have the same effect on the wildlife resource. The open road system would remain at 4.5 miles. The user-made at Slate Lake would not be sanctioned as a suitable motorized route. The Slate Lake/ Elliston Creek elk security area would remain intact and the habitat effectiveness of Slate Lake summer habitat would remain relatively high (assuming that road restrictions can be effectively enforced). The current snowmobile trail would be available for use from December 2 to May 15, as in alternative 2.

Alternative 4

Alternative 4 is identical to alternatives 1 and 3 in terms of the official status of the road and motor trail system. Wildlife security and habitat effectiveness would remain basically sound, although they would continue to be less than optimal with ongoing use of unauthorized motor routes in upper Elliston Creek and the Slate Lake area. The technical aspects of enforcing these route closures, which are key to achieving desired condition for wildlife, would not be part of this segment of the Divide Travel Plan decision and would have to wait on follow-up actions authorized by a different decision.

Alternative 5

Alternative 5 is similar to alternative 2 in that it would open up yearlong closure gates on Roads #1871 and #1871-A1 and allow these routes to serve as part of a seasonal motor trail (May 15 to August 31) connected by the currently unauthorized trail through the Slate Lake area. The trail would need to be relocated to avoid damage to the Slate lake meadows and lakeshore, although this would have be done via an action seperate from the current proposal. In addition, a new connection would be created between Road #1871-A1 and currently-closed Road #314-E1 in the Elliston Creek drainage to produce another new motor trail (this also requiring implementation through a separate action). This trail would be available from May 15 to August 31. The resulting summer motor trail density would be 0.9 mi/mi². Total density of all open roads and motor trails would be 1.5 mi/mi² in summer, which is similar to alternative 2 and more than twice that of alternatives 1, 3 and 4. Neither of the new motor trails would be a designated route for snowmobiles in winter.

Because of the presence of motor trails in sensitive areas around Slate Lake and in upper Elliston Creek, alternative 5 would be the most disruptive of the alternatives in terms of wildlife displacement from key habitat between May 15 and August 31. Fall big game security would not be a problem as long as enforcement of travel restrictions is effective.

Summary and Conclusions

Under Alternative 1, local open road density would remain at 0.7 mi/mi² yearlong. While there are no designated motor trails, user-made routes behind the gates on the Slate Lake and Slate Creek roads would continue to pick up some illegal use in summer and fall, as would closed and unauthorized routes in upper Elliston Creek. In spite of this, the upper Slate Creek/ Elliston

Creek area would remain a relatively secure, focal area for wildlife year-round, picking up use by grizzly bears, black bears, mountain lions, elk, deer and moose in spring, summer and fall and by lynx and wolverines year-round.

Under Alternative 2, local open route density would rise to 1.6 mi/mi² as a result of 3.4 miles of newly opened motor trail in the Slate Lake area (to be closed during the big game rifle season, winter and early spring) and 3.0 miles of new yearlong open road in upper Elliston Creek. This increased activity would periodically displace elk and other animals wary of human activity from the Slate Lake meadows area in summer and potentially year-round in upper Elliston Creek.

Alternatives 3 and 4 are essentially identical to alternative 1 and maintain the same level of habitat integrity in the productive habitat region around Slate Lake and in upper Slate and Elliston Creeks. Effectiveness of the proposed restrictions would be dependent upon improved enforcement (the details of which are not part of the current proposal).

Alternative 5 is similar to alternative 2 in creating a motor trail through Slate Lake area. It would also create a new motor trail across upper Elliston Creek, resulting in a summer open route density of 1.5 mi/mi², similar to alternative 2. These routes would be closed during the big game hunting season and they would not be designated as snowmobile routes.

Lower Sweeney Creek – Blue Cloud

Area Characteristics and Wildlife Issues

The Sweeney Creek road/trail system covers about 2,000 acres of often rough, bouldery terrain on the north side of lower Sweeney Creek about seven miles west of Helena. A little of the system laps over into the Blue Cloud Creek drainage to the northeast. Because of its proximity to Helena and U.S. Highway 12, it receives considerable recreational use, motorized and non-motorized. Helena NF system roads are limited to a couple four-wheel-drive tracks totaling about 1.6 miles: The remaining 11.7 miles consist of ATV/motor bike routes that are also used by day-hikers, mountain bikers and equestrians. Most routes are user-created and some are ill-defined and ephemeral. While snowmobiles are allowed on the trail system, its low elevation and overall south-facing aspect retards snow accumulation and combined with the rugged terrain, tends to ward off snowmobilers. Most local snowmobilers park at the lot further up Sweeney Creek and run up Forest road #335 to Priest Pass and primary sledding areas along the Divide.

Much of the road/trail system runs through dry ponderosa pine/Douglas-fir forest, but parts of it extend into primary big game winter range to the northwest. This extensive foraging area, created by fire in the 1950s, now supports some of the most productive bitterbrush and aspen habitat in the Divide landscape. Mule deer and moose and to a lesser extent, elk, zero in on the area in winter and early spring, sometimes using adjacent forest for cover. Conifer colonization is occuring but is not yet a major issue and this remains key winter range.

Because of its proximity to subdivisions, major roads and other human activity, as well as the density of motorized trails, the lower Sweeney Creek drainage does not provide big game security or long-term refuge for species wary of human presence. While deer are present in the area year-round, the primary value of this area is as winter range at a time of year when local human activity is minimal. Goshawks may also be present in lower Sweeney Creek throughout the year, as are a variety of other birds and small mammals.

Figure 56 - Photo 40. Northeast Sweeney Creek
High quality big game winter range. The combination of aspen, bitterbrush and other palatable browse attract mule deer and moose. Bunchgrass is plentiful and provides forage for elk as well.

Old Four-Wheel-Drive Route into Sweeney Creek

Figure 57 - Photo 41. Old Four-Wheel-Drive Route into Sweeney Creek
An old four-wheel-drive route, emerging onto big game winter range. This view, from mid-January in a modest snow year (2014), shows signs of ATVs but no snowmobiles. In alternative 2, this route would be open to trail bikes and ATVs from mid-spring to late-summer. In alternatives 3, 4 and 5, it would be closed to vehicles yearlong.

Effects of Alternatives

Alternative 1: Existing Condition

Alternative 1 would preserve this status quo. Currently, there are no restrictions as to which of the user-made routes ATVs, trail bikes and sometimes, four-wheel-drive vehicles may use. There are over 12 miles of these tracks, some well-etched into the landscape, others poorly defined, weaving through an area of about four square miles. Resulting motor trail/open road density is 3.5 mi/mi^2 , very high.

While white-tailed deer and mule deer may frequent the area throughout the spring, summer and fall, the bulk of the big game use (elk, moose and deer) occurs during the winter and early spring and is focused in the browse-rich burned habitat in the northwest part of the area. Most recreational use occurs in spring, summer and fall and is confined to the road and trail system, which penetrates only the eastern end of the winter browsing area. As a result, disturbance of big game animals is relatively light, most of it coming in early spring from antler hunters and wildlife watchers. Snowmobile use is a potential disruptive factor; but in most years, snow conditions are too marginal for all but a few reckless individuals. In deep-snow winters, the winter range can pick up some limited use from snowmobilers who would normally launch toward the Divide from the nearby Sweeney Creek/Priest Pass road.

Alternative 2

This alternative would retain much of the current motorized use, establishing a system of designated trails slightly less extensive than the existing network. However, only vehicles less than 50 inches wide (ATVs and motor bikes) would be allowed on the trails and all vehicles, including snowmobiles, would be prohibited from October 15 to May 15. Open route density from mid-spring through mid-fall would drop from 3.5 mi/mi^2 to 3.2 mi/mi^2, still quite high. This level of motorized activity would continue to discourage the more cautious wildlife species (elk, black bears, etc.) from late spring through early fall. But, the absence of all vehicle disturbances from mid fall through mid spring would enhance the value of the area as prime winter range. It may also improve hunting opportunity for hunters on foot.

Alternative 3

Alternative 3 would convert the current trail and road network to non motorized uses all year. The only open route would be a short segment of the Sweeney Creek road on the southwest edge of the area. Resulting open route density would be 0.1 mi/mi^2. The snowmobile closure from alternative 2 would apply here as well. Conversion to completely non-motorized activity would reduce the magnitude and intensity of disturbance to wildlife, although human presence, via hiking, mountain biking, horseback riding, hunting, cross-country skiing and so on, would continue to weigh in. While lessened disturbance levels might make the area more attractive to some of the more wary species, it is unlikely that any would find long-term habitat security here. As in alternative 2, potential for human disruption of key winter range functions would be much less than at present.

Alternative 4

Alternative 4 is identical to alternative 3, eliminating all motorized use of trails and four-wheel-drive routes. Open route density would be 0.1 mi/mi^2 (all from the adjacent Sweeney Creek road). As with alternative 3, the magnitude and intensity of human disturbance would decline significantly from current levels, benefiting both local wildlife and non-motorized recreation.

Alternative 5

Alternative 5 is identical to alternatives 3 and 4. All motorized use of trails, four-wheel-drive routes and off-route areas would be prohibited year-round. This would include snowmobiles. The only motorized use would occur on Road #335, which brushes the southwest border of the area. As with alternatives 3 and 4, disruption caused by motor vehicles would be all but eliminated, although human presence from hikers, mountain bikers and equestrians would remain. Use of the area by wildlife species wary of humans is likely to increase, but not to the extent that the area would serve as a security refuge for big game animals during the hunting season.

Summary and Conclusions

Alternative 1 would support a low open road density but would retain a maze of motor trails, totaling over 12 miles: Open route density would be 3.5 mi/mi² year-round. There would continue to be no seasonal restrictions: snowmobiles could use the trails when snow was adequate (although this would remain an uncommon occurrence). The potential for motorized activity as a disruptive influence on prime big game winter/spring range in the northwestern end of the area and adjacent slopes beyond would remain in place.

Under Alternative 2, local open trail/road density would drop slightly to 3.2 mi/mi² with the closure of a few erosive and duplicative trail sections. Trails would be closed to all vehicles, including snowmobiles, from October 15 to May 15 to improve habitat effectiveness for big game and other species wary of motorized activity. Since this low-elevation area is important primarily as big game winter range, the winter and early spring restrictions would result in much less motorized disturbance to these animals than alternative 1.

Under Alternative 3, open route density would drop dramatically to 0.1 mi/mi². All local trails would be reserved for non-motorized users yearlong. Big game use would probably not increase noticeably, as human presence (though non-motorized) would remain high. As in alternative 2, the intensity of winter range disturbance would remain much lower than in alternative 1.

Alternative 4 is identical to alternative 3. Open route density would be 0.1 mi/mi², a result of the proximity of the Sweeney Creek road. From a wildlife standpoint, it would represent a substantial improvement over the existing condition.

Alternative 5 is identical to alternatives 3 and 4. All motorized use within the area would be eliminated, allowing it to provide for non-motorized recreation.

Priest Pass

Area Characteristics and Wildlife Issues

This area between MacDonald and Mullan Passes on the Continental Divide encompasses a network of roads and trails that converges on Priest Pass and the adjacent area immediately to the east. The only primary Forest route in the area is Road #335, which comes through Priest Pass on an east-west trajectory and is a well-used connector between Sweeney Creek east of the Divide and Dog Creek to the west. Most remaining roads in the area, though carrying Forest system road numbers, are primitive and rough, some of them difficult even for four-wheel-drive vehicles. The exception is the modest #355-A1/A2 road network two miles east of the pass, created for the Porcupine timber sale in the 1970s and still in decent condition, in large measure because it is gated to public motorized use yearlong.

The Helena Snowmobile Trail map (HELENA NATIONAL FOREST, MFWP, BLM 2003) shows no groomed or marked trails in the Priest Pass area; but in winter, snowmobilers park at a site in lower Sweeney Creek and ride Helena NF roads through the pass in order to connect to the groomed trails at Mullan Pass to the north. The current travel plan allows snowmobile travel on all open roads in the area.

Priest Pass is a local center of wildlife activity. As a low point on the Continental Divide at the origins of two drainages, it is a natural crossing point. The drainage-head basins on either side provide productive habitat, both forested and non-forested. The pass lies at the interface of extensive mature forest and grassland communities. In addition, the broad ridge just south of the pass supports old-growth forest overlaying and interspersed with a variety of wet sites, an environment that is attractive to many species. MFWP seasonal range maps (2004, 2010) show Priest Pass within the margins of east-side elk winter range. This, however, appears to be an artifact of using April and May elk locations to help delineate "winter" use. In fact, the area is summer range for elk, mule deer and moose: They arrive with spring green-up, typically in May and remain in the high country, often through the hunting season, until driven out by snow. Grizzly bears, wolves, lynx and wolverines have all been identified along this part of the Divide in recent years.

Figure 58 - Photo 42. Mature Logepole Pine Forest South of Priest Pass
Mature logepole pine forest south of Priest Pass, with robust ground vegetation and wet sites scattered throughout (as indicated by the tall shrubs in the background). This is good forested wildlife habitat in a key cross-over area atop the Continental Divide. This photo pre-dates the mountain pine beetle outbreak: most of these overstory pine trees are now dead.

Effects of Alternatives

Alternative 1: Existing Condition

This option preserves the existing condition, as outlined above. Roads #355-A1 and #355-A2 would remain gated to vehicles (for wildlife habitat effectiveness and security). The user-made route (#U-205) that heads north nearly opposite this gated system would remain in use, as would road #1846, which diverges northeast from Priest Pass. Also remaining open to motorized use would be "road" #1802-B2, which follows the Continental Divide National Scenic Trail (CDNST) route south of the pass. This route is especially steep, tortuous and eroded, but it would continue to be negotiated by an assortment of ATVs, motor bikes and four-wheel-drive vehicles. This would remain a problem both for big game security during the hunting season and habitat integrity in summer. The CDNST north of the pass would remain closed to wheeled motor vehicles (although it would probably continue to pick up some illegal use). Local open routes would total 8.9 miles in alternative 1, producing open route density of 1.3 mi/mi².

Figure 59 - Photo 43. Primitive Road #1802-B2
Primitive Road #1802-B2, an old four-wheel-drive route that follows the Continental Divide National Scenic Trail (CDNST) along the Divide ridge and eventually drops down into Priest Pass from the south. This route would be closed to motorized use under all action alternatives.

Alternative 2

Alternative 2 would eliminate some motorized routes but would open up a currently-restricted area to motor vehicles during the hunting season. The two primitive motorized tracks coming through Priest Pass on the CDNST (Road #1802-B2, #335-B1, #335-B2) would be closed to vehicles yearlong, as would the user-created route heading northward off the Priest Pass road about two miles east of the pass (#U-205). These restrictions would enhance local big game security and habitat effectiveness. On the other hand, alternative 2 would open now-gated roads #335-A1 and #335-A2 to motorized use during the big game rifle season (October 15 to December 1). While this would provide hunters easy access to new country, it is unlikely to

have a real impact on elk security. This area is close to a major Forest road and is heavily worked by hunters on foot. The influx of vehicles on the newly opened roads is likely to quickly displace any elk that might be present.

In the end, alternative 2 would maintain 7.7 miles of road open to vehicles at some time of the year. Local open road density would be 1.1 mi/mi² during the hunting season (slightly less than at present) and 0.7 mi/mi² the rest of the year. Snowmobile use would be eliminated on route #1805-E1/#U-205, but otherwise would remain the same.

Alternative 3

Alternative 3 would implement all of the new closures proposed in alternative 2 (routes #1802-B2, #335-B2, #U-205) but, like alternative 1, it would retain the yearlong closure for roads #335-A1 and #335-A2, resulting in 4.9 miles of local roads open throughout the year. Year-round open route density would be 0.7 mi/mi² (the same as alternative 2 outside the hunting season). Snowmobile use would be the same as in alternative 2.

Alternative 4

Alternative 4 is identical to alternative 3 and would have the same implications for wildlife. Elimination of 3.8 miles of strategically located primitive roads/trails and retention of the hunting season closure on Roads #335-A1, A2 would substantially lower the potential for motorized disturbance of wildlife.

Alternative 5

Alternative 5 is nearly identical to alternatives 3 and 4. It maintains the closure on Roads #335-A1 and A-2 and eliminates all other motorized routes except for the main route coming through Priest Pass (Road #335) and the initial 0.4 mile of Road #1846 just east of the pass. Year-round open route density would be 0.6 mi/mi².

Summary and Conclusions

Under Alternative 1, local open road/motor trail density would remain at 1.3 mi/mi². The CDNST south of Priest Pass would remain open as a primitive four-wheel-drive road. Illegal use of closed routes and user-created trails is likely to continue for the time being, complicating wildlife use of this focal habitat area.

Under Alternative 2, local open route density would decline to 1.1 mi/mi² in all but the big game rifle season. No motor trails would be retained. Four-wheel-drive roads along the CDNST would be closed to all vehicle use. These restrictions would improve local habitat effectiveness of the Priest Pass area in spring, summer and early fall. A short road system two miles east of the pass, currently gated year-round, would be opened to vehicles during the big game rifle season. This is not an area frequented by elk in mid-late fall and the change is unlikely to have much effect on big game security.

Alternatives 3 and 4 are identical. They would establish all of the road and trail closures proposed in alternative 2 but would also retain the year-round closure on the two miles of gated road east of the pass. These measures would improve both habitat effectiveness and fall security for big game and a variety of other species that move through and linger in the Priest Pass area. Like alternative 2, these alternatives would remove motorized use from the CDNST.

Alternative 5 is identical to alternatives 3 and 4, except that it leaves open only 0.4 mile of Road #1846 rather than 1.3 miles as in other alternatives.

Black Mountain (North) – Meyers Hill – Ophir Creek

Area Characteristics and Wildlife Issues

This area lies at the northwestern tip of the Divide landscape, just south of the Nevada Mountain Roadless area on the Lincoln Ranger District and the Little Prickly Pear area closure on the Helena District (established in 1999). Most of the area around Black Mountain itself is unroaded and most (though not all) of the roads in the southern half of the area in the Ophir Creek drainage are closed to wheeled motorized use year-round (although snowmobiles make use of the gated road systems in winter). Forest road #136, the primary (though often difficult) connecting route across the Divide in this area, runs along the southern border of the area.

Primary motorized access into the area is via primitive "road" #136-D1, a historic route that ascends the southeast ridge of Black Mountain from Forest road #136. At its lower end, the first 0.5 mile of the old road, from its junction with road #136 to a worn kellihump and impromptu parking lot at the edge of the timber, is a designated road for full-sized vehicles. The next two miles are designated for ATVs and motor bikes. The route once provided vehicle access to the broad forested summit of Black Mountain, but now, the four-wheel-drive track ends about 0.4 mile below the summit at a point where the CDNST, which has followed the old road to this point, diverges around the slope to the northeast.

Figure 60 - Photo 44. Forest Road #136-D1
Forest Road #136-D1, which provides legal access for wheeled vehicles to a point about ½ mile below the summit of Black Mountain. The road is rough, but is driven by four-wheel-drive vehicles as well as by ATVs and trail bikes. Alternatives 2, 3 and 4 would close off the upper two miles of the road to motor vehicles. Alternative 5 would close the entire 2.5 miles of the road from its junction with Road #136.

Some time after 1999, motor bike and ATV users cut out and blazed a trail that follows the abandoned final 0.4 mile of the road to the top of Black Mountain. From this point, they

pioneered a new route down the southwest slope and out through unroaded country to private roads in Georgia Creek, with an alternate route into the closed Forest road system in the North Fork of Ophir Creek. This illegal route, although not shown on the alternative maps, totals 5.0 miles and has been regularly ridden, mostly by trail bikes. It has been used almost entirely for recreational riding in summer and not as a motorized access route for hunters in the fall. Most hunters park at the impromptu parking lot at the 0.5 mile mark of road #136-D1 and hike up the old road (although the road is technically open to vehicles during the rifle season).

Figure 61 - Photo 45. User-Made Motor Trail Between Black Mountain and Ophir Creek
User-made motor trail, cut out and blazed through unroaded country between the end of Road #136-D1 on Black Mountain and road systems in Ophir Creek.

The largely unroaded country around Black Mountain is a *de facto* extension of the Roadless Area to the northwest and the motorized area closure to the northeast. It is heavily forested, for the most part and provides spring, summer and fall habitat for elk, deer and moose. It is also occupied by back bears, grizzly bears, lynx, wolverine, fishers, bobcats, mountain lions and other species, rare and abundant. In particular, the broad benchland southwest of Black Mountain provides complex, productive habitat and a secure movement corridor. It supports lodgepole pine/subalpine fir/whitebark pine/Engelmann spruce old-growth forest as well as a number of productive wet sites. The area provides refuge for hunted species in the fall (much of it falling within an extensive elk security area). The user-made motor trail, however, threatens to subvert summer habitat integrity throughout the area and it holds the potential to undermine big game security if it begins to pick up motorized use during the hunting season.

Figure 62 - Photo 46. Overview Looking onto Meyers Hill
Overview of the area traversed by Road #136-D1 and the user-created motor trail, looking west northwest from Road #136 on Meyers Hill. The road and CDNST trail run up the slope in the mid foreground to the top of Black Mtn (on the skyline). The user-made motor trail runs to the left (south) along the long forested ridge on the skyline and into the grassland parks ("Airplane Park") above the clearcuts at the left edge of the photo. This area is contiguous with the Nevada Mountain Roadless Area to the northwest. This photo pre-dates the mountain pine beetle epidemic: Much of the mature green forest seen here on Black Mountain consists of lodgepole pine and a large proportion of it is now dead.

Effects of Alternatives

Alternative 1: Existing Condition

This alternative would preserve the existing condition. Route #136-D1 would remain open to highway vehicles for its first 0.5 mile and to ATVs and motor bikes for the next two miles. The primary problem with this arrangement is that the dead-end trail allows recreational riders to get well up into the high country but then, does not provide them with a loop route. As a result, there is a real incentive for some riders to continue along the illegal user-made route over the top of Black Mountain and out through unroaded country to connecting routes in Ophir Creek and Georgia Creek. Effective closure of this route has been complicated by its remoteness, which makes enforcement difficult. This would continue to be the case. With the trail in regular use, open route density would remain at 1.1 mi/mi^2.

Current snowmobile use patterns would remain in place, with "allowed" use on all open roads and "sanctioned" use on most gated roads. The long-standing "play area" on the ridge between Ophir and Georgia Creeks (Airplane Park) would remain, as no conflicts with big game, lynx, wolverines, denning bears, or other wildlife have been noted.

Alternative 2

Alternative 2 would retain the first 0.5 mile of the Black Mountain road (#136-D1) as a yearlong motor route. An existing parking site at the edge of the timber at the 0.5 mark would serve as a

trailhead for the Black Mountain segment of the CDNST. The remainder of the route would be closed to all motorized use year-round. With an effective closure on the road at the bottom of the slope, the likelihood of recreational riders attempting the clandestine loop route over Black Mountain would be substantially reduced. Likewise, monitoring and enforcement of the closure would be much simpler. This would improve habitat effectiveness of the key wildlife zone atop and southwest of Black Mountain. Density of routes available to wheeled vehicles would drop from the current 1.1 mi/mi² to 0.4 mi/mi², most of the route mileage stemming from border road #136 and some dead-end roads in Ophir Creek.

The first two miles of Road #136-D1 would be open to snowmobiles, up to the start of the user-made trail. The trail beyond there is steep, narrow and winding, often in dense timber and is generally unattractive to snowmobiles. Other snowmobile use patterns would remain as they are now, although usage of the gated road systems in Ophir Creek would be clarified by specifically designating these routes as snowmobile trails, rather than allowing them to be used without designation as at present.

Alternative 3

Like alternative 2, alternative 3 would cut off motorized use of road #136-D1 after 0.5 mile, allowing the remainder of the route to serve as a non-motorized segment of the CDNST and reducing potential for ATVs and motor bikes to exploit the trail as an illegal loop route through wildland wildlife habitat. The only difference between these two scenarios is that alternative 3 would close a user-made motor trail that runs around the north side of Meyers Hill, connecting to road #136 at both ends. The closure would not be enough, however, to drop open route density below 0.4 mi/mi².

Alternative 4

Alternative 4 is identical to alternative 2. It would close two miles of the Black Mountain road (#136-D1) and close down the user-made Black Mountain-Ophir trail. It would leave open the 0.6 mile user-made trail at Meyers Hill. As in alternative 2, open route density for wheeled vehicles would be 0.4 mi/mi² year-round. Snowmobile use patterns and trail designations would be the same as in alternative 2.

Alternative 5

Alternative 5 would close down the entire 2.5 mile length of Road #136-D1 to motorized uses, beginning at its junction with Road #136. It would also close the user-made trail at Meyers Hill and two dead-end roads runing north from Road #136 in Ophir Creek. Implications for wildlife on Black Mountain would be essentially the same as in other action alternatives. The only motorized routes remaining open would be the main through-route (#136) along the southern border of the area and a short spur (#4045) leading to a dispersed camping site. Open route density for wheeled vehicles would be 0.2 mi/mi². Road #136 would be a designated snowmobile route.

Summary and Conclusions

Under Alternative 1, local open route density would remain at 1.2 mi/mi². The Black Mountain road would remain open to all vehicles for 2.5 miles. There would be no legally open motor trails, but the user-made trail off the end of the Black Mountain road would remain accessible to motor bikers. This trail disrupts a key habitat enclave and linkage area for wildlife south of Black Mountain, including elk, deer, black bears, grizzly bears, mountain lions, wolverines and lynx and allows motorized access into the closed road system behind the gate in North Fork Ophir Creek.

Under Alternative 2, local open route density for wheeled vehicles would decline to 0.4 mi/mi². Closure of the Black Mountain road at the 0.5 mile mark would make access to the illegal motor trail at its upper end difficult and enforcement of the closure much easier to accomplish. The result would be improved effectiveness of the key wildlife refugium and linkage zone south of Black Mountain and of the North Fork Ophir Creek road closure.

Alternative 3 is the same as alternative 2 with the exception of the closure of a user-made route on the north side of Myers Hill. Open route density for wheeled vehicles would be 0.4 mi/mi².

Alternative 4 is identical to alternative 2 and would provide the same benefits to wildlife that result from more effective closure of the Black Mountain user-made trail. Retention of the short user-made motor trail at Meyers Hill would be of little import to wildlife, given its proximity to main road #136.

Alternative 5 would close the entire length of Black Mountain road (2.5 miles) and all other motorized routes except for #136 (the main road) and a short road leading to a dispersed camping site. Overall open route density would be 0.2 mi/mi².

Forestwide Standards

The following tables summarize consistency of the five project alternatives with *Helena Forest Plan* wildlife standards [HFP (1986), p. II/17 through II/21]. All alternatives are in compliance with all Forest Plan standards and guidelines for wildlife.

Table 124 - Forest Plan Standards for Management Indicator Species

Forestwide Management Indicator Species Standards	If the standard applies, how is it being met and where in the project file is the documentation?
Populations of wildlife "indicator species" will be monitored to measure the effect of management activities on representative wildlife habitats with the objective of ensuring that viable populations of existing native and desirable non-native plant and animal species are maintained. See Chapt. IV, part D Monitoring and Evaluation for specific monitoring requirements. Indicator species have been identified for those species groups whose habitat is most likely to be changed by Forest management activities. The mature tree dependent group indicator species is the marten; the old growth dependent group is represented by the pileated woodpecker and the goshawk; the snag dependent species group is represented by the hairy woodpecker; the threatened and endangered species include grizzly bear, gray wolf, bald eagle and peregrine falcon; commonly hunted indicator species are elk, mule deer and bighorn sheep.	Habitat has been modeled for many of the MIS for which there are potential effects; the documentation is in the project file. No alternatives propose new road or trail construction: As a result, there is no habitat modification directly associated with the Travel Plan. Indirectly, habitat components in the road corridors, primarily snags and logs, will be removed by firewood cutters. This removal is insufficient to influence local population structure or regionwide viability. For species directly influenced by road density (grizzly bear, elk, mule deer, marten), no alternative increases density and the four action alternatives decrease it.

Table 125: Forest Plan Standards for Big Game Species

<table>
<tr><th>Forestwide Big Game Standards</th><th>If the standard applies, how is it being met and where in the project file is the documentation?</th></tr>
<tr><td>On important summer and winter range, adequate thermal and hiding cover will be maintained to support the habitat potential.</td><td>Not applicable: thermal and hiding cover habitat are not affected under any alternative.</td></tr>
<tr><td>An environmental analysis for project work will include a cover analysis. The cover analysis should be done on drainage or elk herd unit/area basis.</td><td>A hiding cover analysis was conducted to determine compliance with hiding cover/open road density standard. See Elk in Affected Environment and Environmental Consequences.</td></tr>
<tr><td>Subject to hydrologic and other resource constraints, elk summer range will be maintained at 35 percent or greater hiding cover and areas of winter range will be maintained at 25 percent or greater thermal cover in drainages or elk herd units.</td><td>Not applicable: thermal and hiding cover are not affected. See “Environmental Consequences: Elk Summer Range”; “Elk Winter Range”</td></tr>
<tr><td>Implement an aggressive road management program to maintain or improve big game security. To decide which roads, trails and areas should be restricted and opened, the Forest will use the following guidelines developed with the Montana Department of Fish, Wildlife and Parks (MFWP). The Forest visitor map will document the road management program. Road management will be implemented to at least maintain big game habitat capability and hunting opportunity. To provide for a first week bull elk harvest that does not exceed 40 percent of the total bull harvest, roads will be managed during the general big game hunting season to maintain open road densities with the following limits.
<table>
<tr><th>Percent Hiding Cover (using the USFS definition) (1)</th><th>Percent Hiding Cover (using the MFWP definition (2)</th><th>Maximum Open Road Density</th></tr>
<tr><td>56%
49%
42%
35%</td><td>80%
70%
60%
50%</td><td>2.4 mi/mi²
1.9 mi/mi²
1.2 mi/mi²
0.1 mi/mi²</td></tr>
<tr><td>(1) A timber stand which conceals 90% or more of a standing elk at 200 feet</td><td>(2) A stand of coniferous trees having a crown closure of greater than 40%</td><td></td></tr>
</table>
The existing hiding cover to open road density ratio should be determined over a large geographic area, such as a timber sale analysis area, a third order drainage, or an elk herd unit.</td><td>See Tables in the Elk Analysis Section, particularly under “Environmental Consequences”.
Only one of six elk herd units currently complies with this Forest Plan Big Game Security Index. In spite of substantial open road closures in some elk herd units under all four action alternatives, compliance/non-compliance with the standard does not change in any case.</td></tr>
<tr><td>Elk calving grounds and nursery areas will be closed to motorized vehicles during peak use by elk. Calving is usually in late May through mid-June and nursery areas are used in late June through July.</td><td>No new road closures specifically target elk calving areas, but some calving sites will benefit from the closures that focus on productive areas known to be important in multiple ways to big game. MFWP has not indicated a need for new closures to protect elk calving areas. The nature of local wildlife resources is discussed in detail in “Local Effects in Key Areas”.</td></tr>
</table>

Forestwide Big Game Standards	If the standard applies, how is it being met and where in the project file is the documentation?
All winter range areas will be closed to vehicles between December 1 and May 15. Exceptions (i.e., access through the winter range to facilitate land management or public use activities on other lands) may be granted.	Roads designated as "crossing routes" through winter range to facilitate access to areas outside winter range will remain stable under all alternatives. A number of existing snowmobile routes intrude into the upper reaches of winter range: These routes do not increase under any alternative. See "*Environmental Consequences: Elk Winter Range".*
At restricted roads, trails and areas, signs will be posted which tell: (1) type of restriction; (2) reason for the restriction; (3) time period of restriction; and (4) cooperating agencies.	Signing is not a part of this phase of travel planning (which is concerned only with the rationale and decisions to open or close roads).
Roads that will be closed will be signed during construction or reconstruction telling the closure date and the reason for closure.	Signing is not a part of this phase of travel planning.
Enforcement is a shared responsibility. Enforcement needs will be coordinated with the MDFWP.	The need for enforcement has been discussed with MFWP. The details of enforcement are not part of this phase of travel planning.
Opened Forest roads will normally have a designed speed of less than 15 miles per hour. Exact design speeds will be determined through project planning. Loop roads are not recommended and will be avoided in most cases.	Alternative 1 preserves existing loop routes. Both alternatives 2 and 3 close some loop routes. Speed limit designations are not part of this phase of travel planning.
The Forest Road Management Program will be developed in conjunction with MFWP and interested groups or individuals. The Road Management Program will contain the specific seasonal and yearlong road, trail and area restrictions and will be based on the goals and objectives of the management areas in Chapter III of the *Forest Plan.*	Meetings have been held with MFWP over a period of years during Travel Plan Development. More will be held to discuss specific details of the current proposals. Meeting notes in the project file.
Representatives from the Helena Forest and MFWP will meet annually to review the existing Travel Plan.	Coordination meetings have taken place for travel planning efforts as well as general program of work. Implementation phase.
On elk summer range the minimum size area for hiding cover will be 40 acres and the minimum size area on winter range for thermal cover will be 15 acres.	Not applicable: hiding and thermal cover will not be affected.
Montana Cooperative Elk-Logging Study Recommendations, in appendix C, will be followed during timber sale and road construction projects.	Some of the recommendations are applicable to project implementation, but not this phase of Travel Planning.
Inventorying and mapping important big game summer/fall and winter ranges will continue.	Ongoing
Any proposed sagebrush reduction programs will be analyzed on a case-by-case basis for the possible impact on big game winter range.	Not applicable: No sagebrush is proposed for removal.

Forestwide Big Game Standards	If the standard applies, how is it being met and where in the project file is the documentation?
Occupied bighorn sheep and mountain goat range will be protected during resource activities. Project plans for livestock, timber, or other resource development will include stipulations to avoid or mitigate impacts on their range. Conflicts between livestock and these wildlife species will be resolved in favor of the big game.	Not applicable: No proposals to affect or modify habitat in occupied bighorn sheep and mountain goat range.
Moose habitat will be managed to provide adequate browse species diversity and quantity to support current moose populations.	Not applicable: No habitat will be modified.

Table 126: Forest Plan Standards for Threatened and Endangered Species

Forestwide Threatened and Endangered Species Standards	If the standard applies, how is it being met and where in the project file is the documentation?
A biological evaluation will be written for all projects that have potential to impact any T&E species or its habitat. All evaluations will address each projects potential to adversely modify a listed species habitat or behavior. If an adverse impact is determined, mitigation measures will be developed to avoid any adverse modification of a listed species habitat or behavior. If all possible mitigation measures do not result in a no affect determination, then informal and/or formal consultation with the U.S. Fish and Wildlife Service will be initiated.	The analysis of TES species in the Wildlife Specialist's Report serves as the Biological Evaluation for this travel planning effort. A separate Biological Assessment of T&E species will be prepared and submitted to the USFWS for consultation.
Grizzly bear, Apply the guidelines in appendix D of the wildlife specialist report to the Management Situation 1 and 2 (referred to essential and occupied prior to 1984) grizzly bear habitat on the Forest (see map in appendix D of the wildlife specialist report). Initiate field studies in undesignated areas known to be used by grizzlies, to determine if the areas should be designated as grizzly habitat. Until sufficient evidence is available to determine the status of these areas, manage them according to appendix E of the wildlife specialist report, Grizzly Management Guidelines Outside of Recovery Areas.	Guidelines in *Forest Plan* appendix D of the wildlife specialist report are for Recovery zones and do not apply to the Travel Plan Area. Guidelines in appendix E of the wildlife specialist report, which do apply to this area, have been used. Discussion is in the Wildlife Specialist's Report under sections on "*Grizzly Bear*" and in the Biological Assessment.
In occupied grizzly habitat, to minimize man-caused mortality the open road density will not exceed the 1980 density of 0.55 miles per square mile, which was determined to have little effect on habitat capability.	The "Grizzly Bear Distribution Zone" is a modified version of "occupied grizzly habitat" outside a Recovery Zone not contemplated by the *Forest Plan.* Unweighted road density in the Distribution Zone is 1.8 mi/mi². There is no *Forest Plan* "occupied habitat" in the Travel Plan Area. See the discussion under "*Environmental Consequences: Grizzly Bear*".
Research activity on grizzly bears or their habitat will be reviewed by the Research Subcommittee of the Interagency Grizzly Bear Committee.	Not applicable to this effort.

Forestwide Threatened and Endangered Species Standards	If the standard applies, how is it being met and where in the project file is the documentation?
Bald Eagle and Peregrine Falcon – Continue working with the MFWP, the USFWS and the BLM to identify nesting and wintering areas. Identify nest territories and roost sites and protect both from adverse habitat alteration. [Guidelines for identifying bald eagle habitat are in the Wildlife Planning Records.] Powerlines constructed in bald eagle or peregrine falcon habitat will be designed to protect raptors from electrocution.	Monitoring of peregrine falcon eyries and bald eagle nests has been ongoing on the HELENA NATIONAL FOREST since the late 1980s. Both species have been removed from the endangered species list in recent years and neither is affected in any measurable way by Travel Plan alternatives. See discussion under "*Sensitive Species".*
Gray Wolf – With the USFWS and MDFWP, investigate reported gray wolf observations to confirm or deny gray wolf presence. If presence of gray wolf is confirmed, determine if the habitat is necessary for the wolves' recovery. If the habitat is necessary, coordinate with MFWP and the USFWS to implement the Wolf Recovery Plan.	The wolf is no longer listed as a threatened or an endangered species. Effects on wolves and communications with the USFWS and MFWP are discussed in sections on the "*Wolf"* under "*Sensitive Species".*

Table 127: Forest Plan Standards for Old Growth

Forestwide Old Growth Standards	If the standard applies, how is it being met and where in the project file is the documentation?
An old growth stand is generally characterized by a high level of standing and down, dead and rotting woody material; two or more levels of tree canopies and a high degree of decadence indicated by heart rot, mistletoe, dead or broken tree tops and moss. Five percent of each third order drainage should be managed for old growth. The priority for old growth acres within each drainage is: first, land below 6,000 feet in elevation; second, riparian zones and mesic drainage heads; and third, management areas emphasizing wildlife habitat. These areas will normally be managed on a 240 year rotation and will range from 10 acres to several hundred acres. Management areas other than T-1 through T-5 will be the primary source for old growth. However, if adequate old growth area cannot be achieved then the T management areas will be considered to meet old growth objectives.	Old-growth is discussed under the section on "*Forest Habitats"* toward the beginning of this report. But, these guidelines are not applicable to this travel planning effort.

Table 128: Forest Plan Standards for Snags

Forestwide Snag Standards	If the standard applies, how is it being met and where in the project file is the documentation?
To keep an adequate snag resource (standing dead trees) through the planning horizon, snags should be managed at 70 percent of optimum (average of two snags/acre) within each third order drainage.	The effects of travel management on dead trees are discussed in detail in sections on "*Snags*" and MIS and TES species dependent on snags and logs. Since no new roads or trails will be constructed, all effects will be indirect, stemming from the access that open roads give to firewood cuttters and magnified currently by the ongoing bark beetle epidemic.
Snag management guidelines need not be applied within a quarter mile of riparian areas, because riparian standards should provide for adequate snags.	See sections addressing *Riparian Habitats* for a discussion of snag management in riparian areas.
Larch, ponderosa pine, Douglas-fir, spruce and subalpine fir, in that priority, are the preferred species for snags and replacement trees (live trees left to replace existing snags).	Not applicable to travel management
Management areas other than T-1 should be the primary source for snag management. However, if adequate snags cannot be found outside of T-1, then the following numbers and sizes of snags should be retained in cutting units, if available. In units with snags, keep a minimum of 20 snags and 10 replacement trees per 10 acres, if available. If 20 snags are not available, then any combination totaling 30 should be left, by the following diameter-at-breast-height classes: 13 snags and 6 replacement trees from 7 to 11 inches 5 snags and 3 replacement trees from 12 to 19 inches 2 snags and 1 replacement trees 20+ inches In units, except those of pure lodgepole, without snags keep a minimum of 30 wind firm trees per 10 acres, if available, by the following dbh classes: 21 trees from 7 to 11 inches 7 trees from 12 to 19 inches 2 trees from 20+ inches If wildlife funds are available, a third of the replacement trees should be girdled or otherwise killed to provide snags, by the following dbh classes: 7 trees from 7 to 11 inches dbh 2 trees form 12 to 19 inches dbh 1 tree form 20+ inches dbh	See sections on *Snags* for a discussion of how travel management is likely to indirectly affect snag distribution. These guidelines are essentially inapplicable to this travel planning effort.

Viability Determination

None of the five Travel Plan alternatives will negatively affect the population viability of any of the species analyzed in the main body of this report or those identified in the Wildlife Analysis Approach Table in *appendix A of the wildlife specialist report*, as long as the alternative is implemented as described in the *EIS* and as will be described in the *Record of Decision*. The assessment of threatened, endangered, sensitive and management indicator species in the

wildlife specialist's report provides the rationale for the viability determinations. Population viability is discussed in more detail in *appendix E of the specialist report.*

Monitoring and Mitigation

Monitoring is documented in the Project File and in the *Record of Decision*. The following mitigation items apply:

- Any road may be considered for appropriate seasonal closure if future monitoring indicates a need.
- Firewood retrieval will be addressed via the permit process.

Road closure effectiveness will be monitored as described in the *Record of Decision* Monitoring Plan.

FOREST PLAN PROGRAMMATIC AMENDMENT

Public Involvement

The Divide Travel Plan DEIS included a proposal to replace the existing Forest Standard 4a with a new standard. Public input was solicited on that proposal and used to inform a new amendment which was also released for public comment prior to the FEIS. The comments received on these efforts and the Forest's response, are summarized in appendix D of the FEIS.

Purpose and Need for Amendment

The Helena National Forest Plan (Forest Plan) (USDA 1986) established standards for managing National Forest Service road systems as a method to maintain or improve big game security[5] during the hunting season. Under the 1986 Forest Plan, big game security is based on the relationship between open road densities during big game rifle season and the amount of hiding cover within an elk herd unit (EHU). Meeting this Forest Plan standard has been problematic for several reasons. The Forest Plan was based on research conducted for the most part off-Forest in other locations (USDA 1983, p. 10). Much of the hiding cover research upon which the standard was crafted was conducted in forests that tended to be more heavily forested than the HELENA NATIONAL FOREST. While several of these studies acknowledge the more open terrain the further east one goes in Montana, the numeric determinant was primarily based on west side models.

Furthermore, the original analysis unit was intended to be a "habitat analysis unit" (HAU) that approximated the home range of elk during the summer-fall period (10 to 40 square miles) (USDA 1978, p. 21). The HAU scale generally approximated a timber compartment unit (*Ibid*). Forest Plan Standard 4a provides for an analysis unit that is a "large geographic area, such as a timber sale analysis area, a

[5] Big game security in the Forest Plan is defined according to the existing hiding cover to open road density ratio and is intended to "maintain big game habitat capability and hunting opportunity" (Standard 4a, USDA 1986, p. II/17). Security in the amendment to the existing Forest Plan Standard 4a is generally defined as "the area that will, during periods of hunting stress, hold elk because of geography, topography, vegetation, or a combination of those features" (Lyons and Christensen 1992) and specifically is measured as large blocks $\geq$ 250 acres in size, $\geq$ ½ mile from an open motorized route during the hunting season which is defined as 10/15 through 12/1. Security and vulnerability are often used interchangeably but actually reflect a causal relationship: when security is high vulnerability tends to be low and vice-versa. Vulnerability is generally described as *"a measure of elk susceptibility to being killed during the hunting season"* (Lyons and Christensen 1992). See the section *Concept of Elk Security* for more information.

third order drainage, or an elk herd unit" (USDA 1986 p. II/18). In the Divide landscape, herd unit sizes range from 55 to 136 square miles; areas much larger than the original intent. Legal interpretations have confounded the Forest's ability to apply Standard 4a at the intended geographic scope. It's impractical to apply a standard at an area many times greater in size than the intended scope.

In the twenty nine years since the development of the Forest Plan, a substantial amount of scientific studies, surveys and other information have been accrued. These studies have suggested other measures that are also appropriate for measuring big game security and are more closely tied to open motorized route densities during times of elk stress and increased vulnerability (i.e. hunting season). In addition, the elk harvest metrics used by the Montana Department of Fish, Wildlife and Parks (MFWP) to evaluate and manage elk vulnerability during the hunting season (the reason for providing security) have evolved, leaving part of the standard as currently written useless because it relies on data methods no longer available or in practice. As a result, public access is being constrained without the clear benefits for elk envisioned by the standard.

This programmatic Forest Plan amendment for the Divide Travel Plan project area is needed to more closely align current science, local conditions and other information with the needs of big game, particularly elk, which meet the intent of the Forest Plan. The amendment considers the impacts of open motorized routes on elk security, establishes blocks of secure habitat and can be measured regardless of changes in hiding cover. While the proposed amendment decouples hiding cover from security during the hunting season, several Forestwide and Management Area standards remain in place that govern management of hiding cover.

The assumptions built into the existing (1986) Forestwide Standard 4a (hereafter Standard 4a) have not proven useful in gauging or guiding management activities under the Forest Plan. Actual elk populations and trends as monitored over the last twenty nine years simply do not correlate with this existing standard or its assumptions. Elk numbers have consistently increased during this time period and the existing standard needs to be revised to address recent elk management challenges.

Background

Overview

Elk serve as a management indicator for hunted species for the Forest (USDA 1986, p. II/17). As such, the Forest Plan contains Forestwide and Management Area specific goals, objectives and standards. The Forest Plan also provides a description of the desired future condition which would result from carrying out planned management practices (*Ibid*, pp. II/12-14). These big game goals, objectives and standards were designed to provide habitat on the Forest to support an elk population of 6400 elk by the year 2000 in support of State of Montana goals for harvestable elk (*Ibid*, p. V/5). There were an estimated 4900 elk on the Forest in 1981 (*Ibid,* p. V/5).

Many of the factors affecting elk numbers and distribution are beyond the control of National Forest managers. Examples include hunting regulations/pressure, nonhuman predation, winter kill, disease, climate change, stochastic events and lack of public access to hunt big game on private land (MFWP and USDA 2013 p. 3). The intent of Forest Plan goals, objectives and standards are to guide habitat management on National Forest System lands.

Forest Plan goals, objectives and desired future conditions for wildlife, including big game are:

- *Goal*: Maintain and improve the habitat over time to support big game and other wildlife species (USDA 1986, p. II/1).
- *Objective*: To maintain elk habitat capacity, an annual program of habitat improvement will be implemented (*Ibid*, p. II/4).

- *Desired future condition*: By the end of the first decade, wildlife range will be improved to increase forage production; the wildlife potential on winter range should increase slightly while the potential on summer range should remain at current [1986] levels. By the end of the fifth decade, the Forest's ability to support elk on winter range will increase, while the ability to support elk on summer range will decrease slightly (*Ibid,* pp. II/12-14)

The Forest Plan contains Forestwide big game standards and big game standards specific to the management areas identified in the Forest Plan. These standards are summarized in the following table which includes only those management areas within the Divide Travel Plan project area for which a big game standard is in place.

Table 129 - Forestwide and Management Area Specific Standards Relevant to Big Game

Forest Plan Reference	Standard
Forestwide p. II/17	Subject to hydrologic and other resource constraints, elk summer range will be maintained at 35 percent or greater hiding cover and areas of winter range will be maintained at 25 percent or greater thermal cover in drainages or elk herd units.
Forestwide, pp. 11/17-18	Road management will be implemented to at least maintain big game habitat capability and hunting opportunity.
Forestwide p. II/18	Elk calving grounds and nursery areas will be closed to motorized vehicles during peak use by elk. Calving is usually in late May through mid-June and nursery areas are used in late June through July.
Forestwide p. II/18	All winter range areas will be closed to vehicles between December 1 and May 15. Exceptions (i.e., access through the winter range to facilitate land management or public use activities on other lands) may be granted.
Forestwide p. II/19	The Forest Road Management Program will be developed in conjunction with MFWP and interested groups or individuals. The Road Management Program will contain the specific seasonal and yearlong road, trail and area restrictions and will be based on the goals and objectives of the management areas in Chapter III of the Forest Plan.
Forestwide p. II/19	Representatives from the Helena Forest and MFWP will meet annually to review the existing Travel Plan.
Forestwide p. II/19	On elk summer range the minimum size area for hiding cover will be 40 acres and the minimum size area on winter range for thermal cover will be l5 acres.
Forestwide p. II/19 and C/1 – C/11	Montana Cooperative Elk-Logging Study Recommendations, in Appendix C, will be followed during timber sale and road construction projects. These recommendations include the following considerations, among others: Security during logging operations can be provided by confining logging to a single drainage at a time and completing all work within the shortest possible time frame; Openings associated with clearcuts should be small, even though openings up to 1000 acres may be acceptable where the adjacent forest edge supplies adequate security.
Forestwide p. II/19	Inventorying and mapping important big game summer/fall and winter ranges will continue.
Forestwide p. II/19	Any proposed sagebrush reduction programs will be analyzed on a case-by-case basis for the possible impact on big game winter range.
H-1, p. III/17	Wildlife habitat improvement practices, including road management, prescribed fire and other techniques, will be used to maintain and/or enhance the diversity of wildlife habitat. Maintain adequate thermal and hiding cover adjacent to forage areas as determined by a wildlife biologist. Generally this means providing at least 25 percent thermal cover, on identified winter range.
H-2, p. III/20	Wildlife habitat improvement practices, including road management, prescribed fire and other techniques, will be used to maintain and/or enhance the diversity of wildlife

Forest Plan Reference	Standard
	habitat. Maintain adequate thermal and hiding cover adjacent to forage areas as determined by a wildlife biologist. Generally this means providing at least 25 percent thermal cover, on identified winter range.
L-1, p. III/11	Specific wildlife and fisheries needs will be identified and considered when developing allotment management plans, provided the needs are compatible with area goals.
L-2, p. III/14	Wildlife habitat improvement practices, including road management, prescribed fire and other techniques, may be used to maintain and/or enhance the quality of big game winter range. Projects will be coordinated for livestock and big game needs. Maintain adequate thermal and hiding cover adjacent to forage areas. Generally this means providing at least 25 percent thermal cover, where available, on identified winter range.
M-1, p. III/5	Management practices to maintain or improve wildlife habitat will be permitted where necessary to meet the objectives of adjacent management areas.
P-3, p. III/73, Electric Peak	Wildlife habitat improvement projects will conform to Forest Service wilderness policy.
R-1, p. III/24	Habitat improvement projects, such as prescribed fire and water developments, may be used to maintain or improve the fish and wildlife habitat, if the projects are compatible with the area's goals.
T-1, p. III/31	Wildlife and fisheries habitat improvement projects may be implemented, provided they are compatible with the management area goals.
T-3, p. III/39	Maintain a minimum of 35 percent hiding cover for big game. Maintain thermal cover adjacent to forage areas. Appendix C provides guidance for thermal cover. Wildlife habitat improvement practices, including road management, prescribed fire and timber harvest, may be used to maintain and/or enhance the quality of big game summer habitat.
T-4, p. III/43	Where elk habitat exists, project design will incorporate management practices to maintain or enhance summer and winter habitat to the extent that the VQOs for the area are met.
T-5, p. III/47	Wildlife and fisheries habitat improvement projects may be implemented, provided they are compatible with the management area goals. Maintain adequate thermal and hiding cover adjacent to forage areas, provided timber harvest volumes are not significantly reduced over the rotation period.
W-1, p. III/50	Wildlife habitat improvement practices, including road management, prescribed fire and other techniques, will be used to maintain and/or enhance the quality of big game and nongame habitat. Maintain adequate thermal and hiding cover adjacent to forage areas. Generally this means providing at least 25 percent cover, where available, on identified winter range.
W-2, p. III/53	Most new roads and about 50% of existing roads will be closed, at least seasonally. Wildlife habitat improvement practices, including road management, prescribed fire and other techniques, will be used to maintain and/or enhance big game calving and summer habitat. Maintain adequate thermal and hiding cover adjacent to forage areas.

The standard that is the subject of this programmatic amendment is:

Forestwide Standard 4a (USDA 1986, pp. II/17 – II/18)

"Road management will be implemented to at least maintain big game habitat capability and hunting opportunity. To provide for a first week bull elk harvest that does not exceed 40 percent of the total bull

harvest, roads will be managed during the general big game hunting season to maintain open road densities with the following limits.

Table 130: Hiding Cover Percentages for Standard 4a

Existing Percent Hiding Cover (1)	Existing Percent Hiding Cover (2)	Max Open Road Density mi/mi^2
56	80	2.4
49	70	1.9
42	60	1.2
35	50	0.1

(1) Forest Service definition - a timber stand which conceals 90 percent or more of a standing elk at 200 feet.
(2) MFWP definition - a stand of coniferous trees having a crown closure of greater than 40 percent.

The existing hiding cover to open road density ratio should be determined over a large geographic area, such as a timber sale analysis area, a third order drainage, or an elk herd unit."

Big game security, according to this standard, is based on the relationship between the amount of hiding cover in an EHU and the open road density during big game rifle season. Hiding cover is defined as either a timber stand which conceals 90 percent or more of a standing elk at 200 feet, which can only be measured in the field, stand by stand; or as stands of coniferous trees having a crown closure greater than 40 percent, which can be determined by aerial photo interpretation and satellite imagery[6] (USDA 1986, p. II/18). Under the Forest Plan, either method is acceptable (USDA 1986, p. II/18). Open road densities include all motorized routes open during the big game rifle season, October 15 through December 1 and are calculated at 100 percent the length of all public roads and 25 percent the length of private roads. This relationship is based on research that indicates roads with less use have reduced impacts to elk (Perry and Overly 1976, Witmer and deCalesta 1985 and Rowland et al. 2000).

The Standard 4a security index is calculated for EHUs that include all lands, public and private, within the respective EHU. This means that elk security as determined by this index is also a function of road densities and timber harvest on private lands outside management control of the HELENA NATIONAL FOREST. Elk may use habitat differently relative to hiding cover and motorized routes on private land which often has different hunting pressure levels than public land.

Big game security in the Divide Travel Plan project area, as currently measured by Standard 4a, will not improve in the foreseeable future because hiding cover will decline as trees killed by the ongoing bark beetle epidemic begin to fall *en masse* over the next few years. Motorized route density management on the Forest cannot entirely compensate for this loss of cover, so the standard as currrently written will remain unmet in some of the EHUs in the project area. At the same time, elk numbers and bull/cow rations in the project area vary in terms of MFWP's objectives depending on the respective HD.

[6] This analysis utilizes the MDFWP definition of hiding cover – i.e. stands of coniferous trees having a crown closure greater than 40 percent. The 40 percent canopy cover metric is an acceptable 'proxy' for mapping hiding cover as it is generally assumed that stands with 40 percent canopy cover or greater would in turn provide adequate screening cover that would hide 90 percent of an elk at 200 feet, the functional definition of hiding cover . This relationship of canopy cover and stand structure is based on modeling done by Lonner and Cada (1982) and others that used canopy cover to predict the relationship between hiding cover (as estimated by canopy cover), road densities and harvest rate the first week of the general hunting season.

Relationship of Forest Plan Standard 4a and Elk Management

Forest Plan Elk Population Goals

Elk numbers have been increasing across the west and in Montana since the early to mid- 1900s. Statewide, elk numbers have increased from 8,000 in 1922 to 55,000 in 1978 to about 160,000 in 2004 (MFWP 2005, pp. 4-5). Thus, there are no viability concerns for Rocky Mountain elk in Montana or on the Forest. This is also supported by their global status of "G5' and the statewide status of 'S5' which are both defined as *"common, widespread and abundant…"*[7] However, elk remain a management indicator species on the Forest and are an economically and socially important species, with large public interest. They continue to provide hunting, wildlife viewing and photography opportunities, as well as fill the ecological roles associated with having this native species on the landscape. Forest Plan direction related to big game is in place to ensure that sufficient habitat is available to maintain elk on public land in order to provide those consumptive and non-consumptive uses (USDA 1986, pp. II/17-18).

The big game standards found in the Helena National Forest Plan are based on state population goals outlined in *The Northern Regional Plan* (USDA 1981, pp. 4-16 and B-3). The Montana goals were derived from the *1978 Montana Statewide Comprehensive Outdoor Recreation Plan* (SCORP 1978). Big game goals and objectives embodied in the Montana plan included maintaining *"an available supply of big game to meet demand for all types of big game oriented recreation while insuring the protection and perpetuation of all big game species and their ecosystems"* (*Ibid*, p. 3). Statewide goals for elk in particular included protecting and perpetuating *"elk and their habitat and to increase the supply of available, harvestable elk to meet demands for hunting and non-hunting recreation"* (*Ibid*, p. 35). The Montana Plan delineated goals and objectives by the respective 'Fish and Game Regions', the same regions in place today.

According to the *Northern Regional Plan* there were approximately 70,000 elk on the National Forests in Montana around 1981 (USDA 1981, p. 4-16 Table IV-4). State population goals projected for 1995 were intended to satisfy the growing demand for hunting and aesthetic purposes. The *Nothern Regional Plan* identified desired population goals by State (*Ibid,* p. 4-17 Table IV-5) and National Forest based on those statewide goals *(Ibid,* p. B-3 Table B-3). The disaggregated total for the Helena National Forest was 6,400 by year 2000.

The Helena National Forest is located within several hunting districts identified by MFWP (Figure 63). The total number of elk that have been observed in these hunting districts through the 2014 aerial surveys is 14,736 (MFWP aerial survey data). Some of these hunting districts barely overlap with the Helena National Forest. Discounting those HDs, the total number of elk that have been observed on and around the Forest is 11,349 – although this is probably an underestimate because elk that occur in the 'discounted' HDs do spend some time on the Forest. Nevertheless, the number of elk associated with the Helena National Forest is well in excess of the 6,400 population target identified in the Helena National Forest Plan (USDA 1986, p. V/5).

Montana has maintained the longest general elk-hunting season (5-weeks) of all western states; a tradition that has been in place for several decades. When the Forest Plan was crafted in 1986, Standard 4a was established to facilitate that longer hunting season while maintaining and/or improving big game security that would ensure that elk populations post-harvest remained aligned with MFWP objectives (USDA 1986, pp. 11/17-18 and V/5). At that time, MFWP collected data to determine the

[7] (See http://fieldguide.mt.gov/displayClasses.aspx?Kingdom=Animalia)

percentage of bulls harvested during the first week of the general big game hunting season, as reflected in Standard 4a. However, MFWP no longer collects that data. Rather, MFWP now relies on bull to cow ratios measured through aerial survey trend counts. These trends are used to determine and adjust harvest regulations that allow MFWP to achieve their elk population objectives (MFWP 2005).

MFWP Elk Management

Elk management during the hunting season focuses on maintaining population numbers well above viability thresholds, protecting certain sex and age classes from over-harvest, providing public hunting opportunity and attempting to balance elk distribution across public and private lands. While these functions are a responsibility of Montana Fish, Wildlife and Parks, the Helena National Forest strives to complement their efforts by managing elk habitat on the National Forest. The Forest Service goal has been to provide habitat conditions that allow a reasonable number of elk to escape hunters so that MFWP does not have to reduce the allowable harvest or shorten the hunting season (USDA 1986). Hunting pressure can affect both elk numbers and distribution and is partially determined by the hunting regulations (season length and structure – i.e. cow tags, either sex, brow-tined only, spikes, limited draw, etc.). The current five-week season "permits a diversity of choice [for hunters] with regard to time, weather conditions, hunter density and area…" (Lonner and Cada 1982 cited in Hillis et al. 1991).

The State of Montana manages elk populations on an Elk Management Unit basis and establishes elk harvest regulations on a hunting district basis, which are sub-divisions of Elk Management Units (MFWP 2005). Hunting districts are further sub-divided into EHUs, which are the units used by the Helena National Forest to analyze security under Standard 4a (USDA 1986, p. II/18). Depending upon location, EHUs contain varying amounts of National Forest System land, which complicates elk security analyses for National Forest projects and limits the amount of influence management on National Forest System lands can actually have on overall security within an individual EHU and/or larger management unit. Elk may use habitat on private land differently where hunting pressure can be much different than that found on public land.

The Divide Travel Plan project area includes two elk management units (EMU) and their respective hunting districts (HD) as defined by the state-wide *Montana Final Elk Management Plan* (MFWP 2005):

- Deerlodge EMU (HDs 215, 335)
- Granite Butte EMU (HDs 293, 343);

Table 131 and Figure 63 illustrate the nested relationship among EMUs, HDs and EHUs.

Table 131 - Elk Management Units (EMU), Hunting Districts and Elk Herd Units (EHU) within the Divide Travel Project Area

EMU	Hunting Districts containing National Forest System Land within the Project Area	Associated EHUs
Deerlodge	215	Jericho[1], Spotted Dog/Little Blackfoot[1]
	335	Black Mountain/Brooklyn Bridge[1], Greenhorn, Jericho[1], Spotted Dog/Little Blackfoot[1], Quartz
Granite Butte	293	Greenhorn, Jericho[1], Little Prickly Pear – Ophir, Spotted Dog/Little Blackfoot[1]
	343	Black Mountain/Brooklyn Bridge[1], Greenhorn, Jericho[1], Little Prickly Pear-Ophir
[1] Elk Herd Units currently meeting Standard 4a (1)		

Table 132 provides information relative to MFWP population objectives in the Hunting Districts overlapping the Divide Travel Plan project area. There are four hunting districts that overlap with the Plan area. Three of the four HDs are at or above population objectives; one (HD 293) is below.

Table 132 - MFWP Population Objectives

Hunting District[1]		Population Objectives Based on Aerial Surveys Post-Harvest (MFWP 2005)	Recent Trend Data (Year of Data)	Summary
215	Number of Elk	800-1,200 elk	2,234 (2014)	Elk numbers above objective and bull/cow ratio at objective. Management challenges in this HD include housing development and mining activity, access, extensive motorized use and wolf establishment (MFWP 2005, pp. 190-193).
	Bull/ Cow Ratios	At least 10 bulls/100 cows	12 bulls/ 100 cows (2013)	
293	Number of Elk	750 elk	264 elk (2014)	Elk numbers and bull to cow ratio below objectives. Management challenges in this HD include development, access, noxious weeds, predation and elk security in terms of cover and road densities (MFWP 2005, pp. 197-198).
	Bull/ Cow Ratios	At least 10 bulls/100 cows	5 bulls/100 cows (2014	
335	Number of Elk	480-720 elk	1,187 elk (2014)	Elk numbers and bull/cow ratio at objective. Management challenges in this HD include housing development and mining activity, extensive motorized use and wolf establishment (MFWP 2005, pp. 190-193).
	Bull/ Cow Ratios	At least 10 bulls/100 cows	10 bulls/ 100 cows (2014)	
343	Number of Elk	560-840 elk	650 elk (2014)	Elk numbers and bull/cow ratio at objective. Management challenges in this HD include housing development, access, noxious weeds, predation and elk security in terms of cover and road densities (MFWP 2005, pp. 197-198).
	Bull/ Cow Ratios	At least 10 bulls/100 cows	14 bulls/100 cows (2014)	

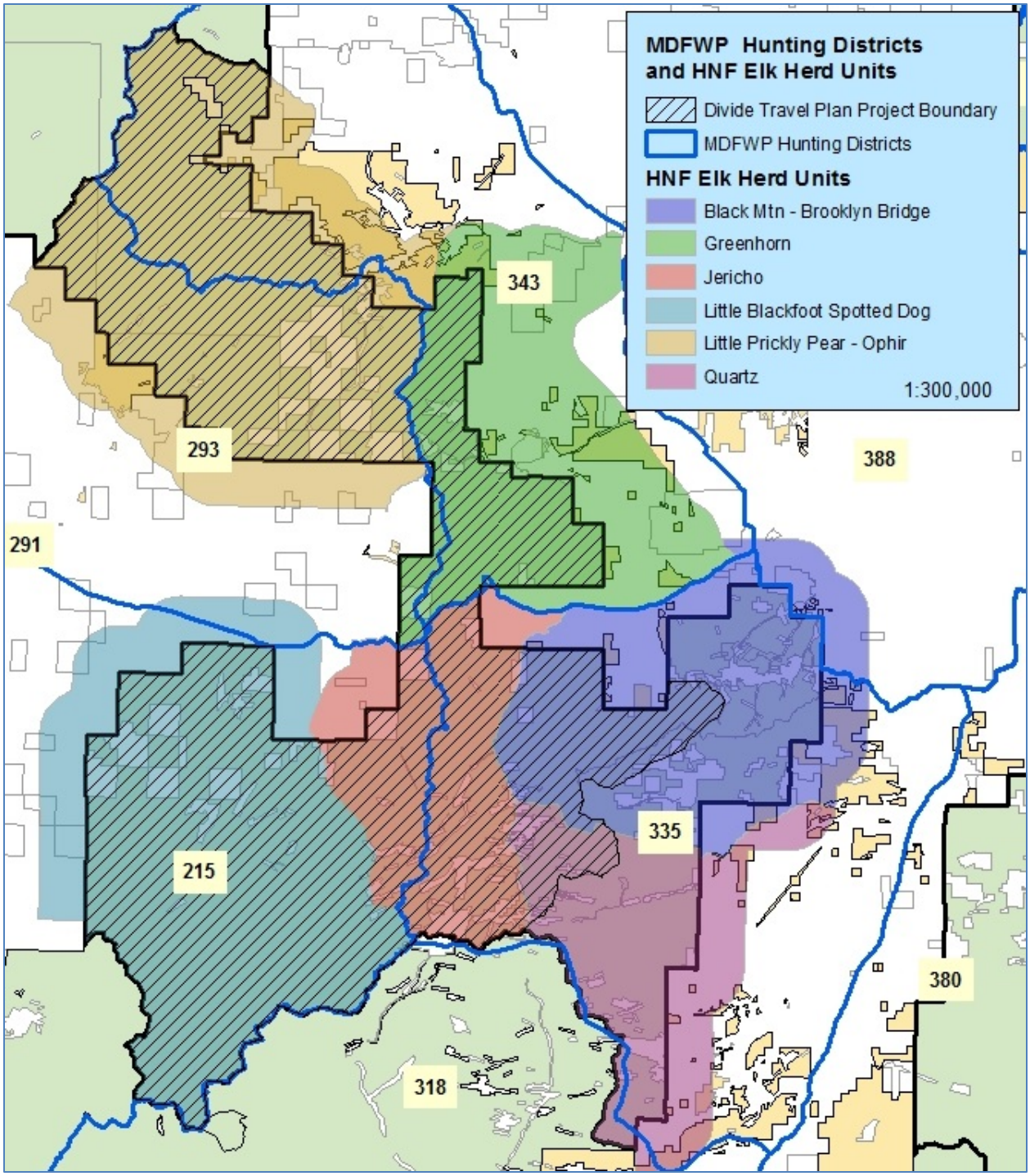

Figure 63 - MFWP Hunting Districts and HNF Elk Herd Units

Factors Influencing Elk Management

Each Elk Management Unit and associated Hunting District(s), has its unique challenges that relate to management of elk. Although varied by Hunting District, overall challenges include the impacts of predation on elk populations, the amount of public land in the EMU, the level of restricted hunting access on private land and extent of motorized use. Refer to the *Montana Final Elk Management Plan*

(MFWP 2005) for more information and Table 132. There are also inherent differences in habitat amongst EMUs. Following is a brief synopsis of the factors influencing elk management in the four HDs within which the Divide Travel Plan project area occurs. *(See also the Wildlife Specialist Report and Biological Evaluation, North American Elk section, for more analysis regarding these HDs.)*

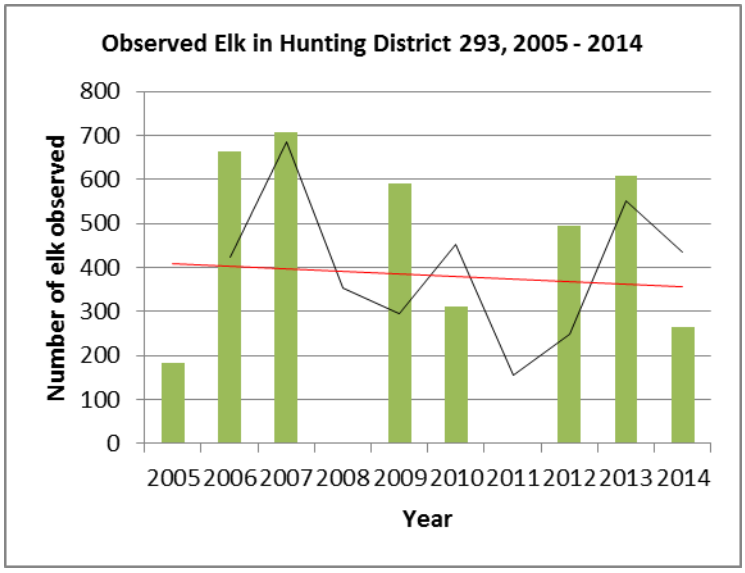

Figure 64 - Observed elk in HD 293, 2005-2014.
The black line represents the annual fluctuations in numbers of elk observed; the red line indicates trend.

Hunting District 293

Elk numbers have fluctuated over the past several years in HD 293 (*MFWP HD 293 Elk Surveys 2005-2007, 2009, 2010, 2012-2014*) (Figure 64). However, the number of animals observed and calf survival in the northern half of the HD has noticeably declined in recent years. Much of the decline has been attributed to rising predation from mountain lions, wolves, black bears and grizzly bears, whose populations have all burgeoned at the same time, due to a variety of circumstances [J. Kolbe, quoted in the Helena Independent Record, Feb. 26, 2012]. Other factors, including several years of drought, changes in vegetation patterns from large fires and hunting quotas over the last decade, may be contributing to the observed shifts in elk (and deer) population size and structure. But predation appears to be the primary limiting factor in the northern half of HD 293. Meanwhile, in the south half of the district (the Avon Valley south of the Ogden Mtn–Dalton Mtn ridge), predation has not been an obvious problem for big game populations. MFWP objectives for elk populations continue to be met in the southern half of HD 293.

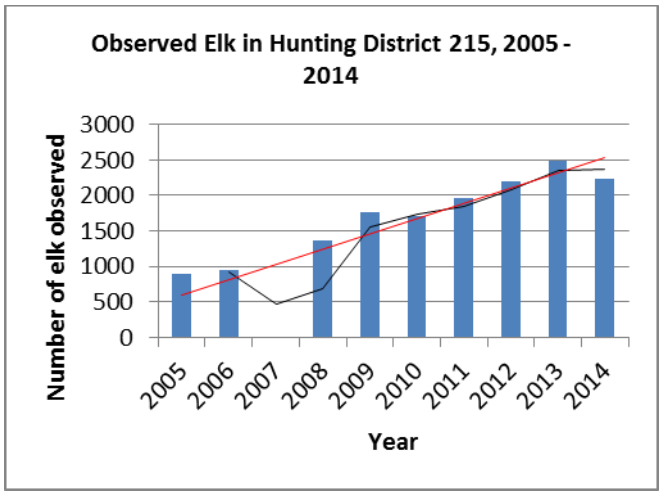

Figure 65 - Observed elk in HD 215, 2005-2014.
The black line represents the annual fluctuations in numbers of elk observed; the red line indicates trend.

Hunting District 215

Elk numbers have steadily increased in HD 215 over the last several years while bull/cow ratios have tended to be erratic (*MFWP HD 215 Elk Surveys 2005, 2006, 2009-2014*) (Figure 65). The percentage of mature bulls in the population has decreased which may be an indication of hunting pressure too heavy for the available security during the hunting season. Calf numbers have also been down in the past two years; the reason for the drop off in calf production/ survival is unknown but does not appear to be a result of an increase in predation pressure. A number of wolf packs have centered their activity along the western edge of the Forest and in the adjacent ranchlands since 1995, but until 2012, calf/cow ratios remained in the range of 30 to 40 calves/100 cows year after year (and the overall population continued to increase). With the removal of wolves from the Endangered Species List and the advent of the State wolf hunting season in 2010, the ability of wolves to impact livestock and big game populations in this area has been minimal. Wolves attacking livestock have been dispatched quickly and there has been no evidence of their having built up sufficient strength to measurably affect the local elk population.

Until recently, elk moving off the Forest to the west had been able to settle in a large block of private ranchland in the Spotted Dog country, which was been off-limits to public hunting. Elk began moving to this winter range area as early as the start of the bow season in September. The move may be a direct response to pressure from bow hunters and motorized recreation on the Forest, but it may also reflect an established pattern of migration down to secure and benign valley habitat regardless of other circumstances. MFWP felt that the refuge provided by this private land suppressed hunting opportunity and allowed the elk population to maintain itself well in excess of Motana Elk Management Plan objectives (although mature bull numbers remained low) (MFWP 2005). In August 2010, the State was able to purchase most of this land and convert it to a Wildlife Mangement Area. Public hunting is now allowed, but most of the area is off-limits to motor vehicles, which tempers the effect. In spite of the change in ownership and management, elk continue to move to this off-Forest area and recent population trends in HD 215 still hold.

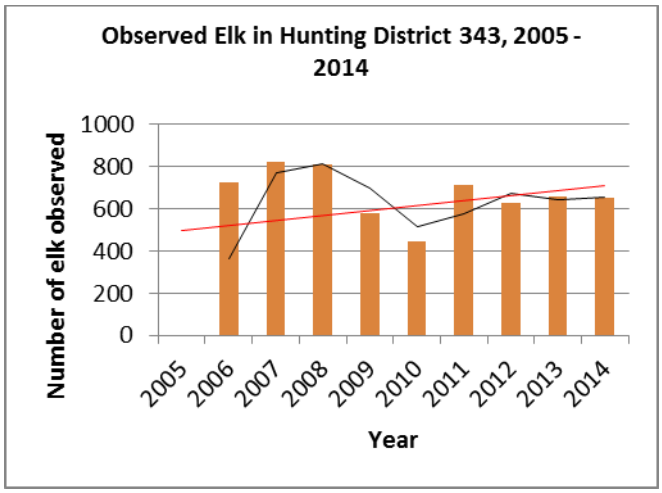

Figure 66 - Observed elk in HD 343, 2005-2014.
The black line represents the annual fluctuations in numbers of elk observed; the red line indicates trend.

Hunting District 343

Elk trend counts in HD 343 have been relatively stable with the exception of 2009 and 2010 (*MFWP HD 343 Elk Surveys 2006* to *2014*) (Figure 66). Given the absence of a commensurate increase in hunter success and natural mortality (although mortality due to wolf kills has increased somewhat over the last decade), or a drop in calf production and survival, MFWP suspects that the lower winter counts reflected the switch to a less effective survey method and movement of elk off winter range prior to survey flights rather than a large population decline. The 2014 count however was within objectives.

Hunting District 335

Elk trend counts in HD 335 have also been within population objectives in terms of elk counted during aerial surveys with the exception of 2009 and 2010 (below objective) and 2012 to 2014 (above objective) (*MFWP HD 335 Elk Surveys 2005-2014*) (Figure 67). MFWP believes that the lower counts were a function of a less effective survey method and of elk having moved off winter range by the time surveys were conducted [see *MFWP HD 335 Elk Surveys* for 2010 and 2011]. There was no evidence of a sudden increase in hunter success, elevated natural mortality, or decreased calf production/survival that might initiate a downward trend in local elk numbers. MFWP biologists felt that the increase in elk numbers may have been a function of mild winters, increased travel restrictions in the Clancy-Unionville area of the Forest and fewer hunting permits for antlerless elk.

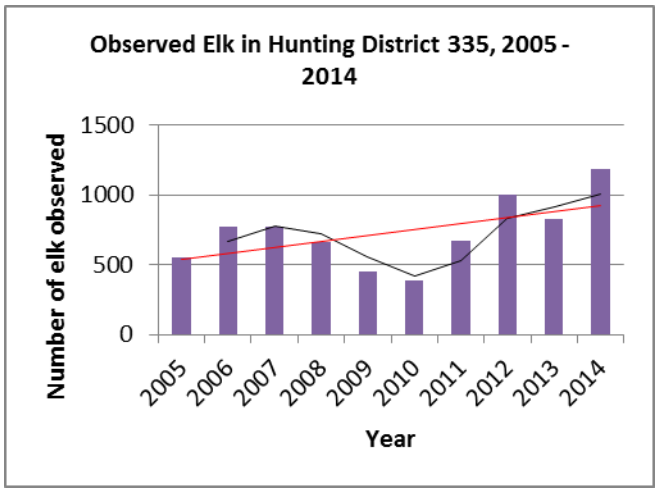

Figure 67 - Observed elk in HD 335, 2005-2014.
The black line represents the annual fluctuations in numbers of elk observed; the red line indicates trend.

MFWP feels that elk in HD 335 are being impacted by livestock grazing, partly on the Forest, but more so on privately-owned winter ranges. In addition, MFWP believes that the big Montana Tunnels mine east of the Forest on Clancy Creek has reduced winter range opportunity for elk (and more so for mule deer) in the area southwest of Jefferson City east of the Forest boundary. Because native forage is limited, elk turn to agricultural fields and haystacks stockpiled for winter livestock feed. This, in turn, has led to ranchers requesting special hunts to trim elk numbers. Elk numbers have been particularly high over the last three years, in spite of deficient elk security in the Quartz Creek EHU on the Forest. As with some other local hunting districts, elk are taking advantage of closed private lands off the Forest for security, allowing the population to expand.

Correlation between Standard 4a and Elk Numbers

Helena Forest Plan standards and guidelines for big game are designed to maintain habitat conditions on the Forest that help MFWP meet its goals for local elk populations. MFWP's primary tool in managing elk is the manipulation of hunting regulations. The Forest Service is able to influence the equation by managing vegetation (cover and forage) and controlling hunter vehicle access on different parts of the Forest. In spite of this reasonably well-defined division of responsibility, there remain some challenges in coordinating management between agencies.

The quality of aerial survey data on which MFWP bases much of its annual population estimates can vary widely from year to year and from one hunting district to another. This is a function of weather conditions, snow cover, variable elk movement patterns and inherent viewing difficulty imposed by topography and vegetation.

The scale of analysis units between MFWP and the Forest also presents some challenges. MFWP sets its elk population objectives for elk management units (EMUs) and hunting districts (HDs) while the Forest sets its elk habitat standards at the elk herd unit scale. EMUs and HDs are generally much larger than an elk herd unit; as such, it's difficult to correlate population trends at that larger scale to habitat changes on a smaller scale.

Additionally some population metrics such as overall elk population levels may be as determined outside of the hunting season as by what happens during the hunting season. For example, body fat condition,

pregnancy rates and recruitment into the population may be determined outside of the hunting season, but have dramatic effects on populations.

Table 133 summarizes the current status of each EHU in the Divide Travel Plan project area relative to this index and includes reference to MFWP's population objectives. There is not a strong correlation between consistency with Standard 4a for a particular EHU and the actual performance of the elk population within the relative Hunting District. For example, the Greenhorn EHU, which currently does not meet Standard 4a, is located within HDs 293, 335 and 343. HD 293 is currently below objectives for elk numbers and bull/cow ratios while HD 335 and 343 meet both objectives. Yet hiding cover is subpar relative to Standard 4a in that EHU. Another example includes the Jericho and Little Prickly Pear/Ophir EHUs both of which are partially located within HD 293. The Jericho EHU meets Standard 4a while the Little Prickly Pear/Ophir EHU does not. Compliance, or lack thereof, with Standard 4a is not a good indicator of elk population performance given the patterns of land ownership and other factors affecting elk security and/or population levels.

Table 133 - Standard 4a - Hiding Cover Relative to Open Road Density

Elk Herd Unit (Associated Hunting District – HD)	Total Square Miles	Acres Hiding Cover[1]	Percent Hiding Cover[1]	Miles of Open Road (10/15-12/1)	Open Road Density (10/15-12/1)	Meets Forest Plan Standard 4a	MFWP HD Population Objectives[2]	Current Status of Population Objectives based on MFWP Aerial Survey Data
Black Mountain/ Brooklyn Bridge (HDs 335, 343)	84	30,608	57%	69	0.82	Yes	HD 335 480-720 elk At least 10 bulls/ 100 cows	Elk numbers and bull/cow ratio at objective.
							HD 343 560-840 elk At least 10 bulls/ 100 cows	Elk numbers and bull/cow ratio at objective.
Greenhorn (HDs 293, 335, 343)	88	23,059	41%	121	1.38	No	HD293 750 elk At least 10 bulls/ 100 cows	Elk numbers and bull/cow ratio below objectives
							HD 335 480-720 elk At least 10 bulls/ 100 cows	Elk numbers and bull/cow ratio at objective.
							HD 343 560-840 elk At least 10 bulls/ 100 cows	Elk numbers and bull/cow ratio at objective.
Jericho (HDs 215, 293, 335, 343)	55	25,810	73%	70	1.27	Yes	HD 215 800-1,200 elk At least 10 bulls/ 100 cows	Elk numbers above objective and bull/cow ratio at objective.
							HD293 750 elk At least 10 bulls/ 100 cows	Elk numbers and bull/cow ratio below objectives.
							HD 335 480-720 elk At least 10 bulls/ 100 cows	Elk numbers and bull/cow ratio at objective.
							HD 343 560-840 elk At least 10 bulls/ 100 cows	Elk numbers and bull/cow ratio at objective.
Little Prickly Pear/ Ophir (HDs 293, 343)	136	52,754	61%	203	1.49	No	HD293 750 elk At least 10 bulls/ 100 cows	Elk numbers and bull/cow ratio below objectives.

Elk Herd Unit (Associated Hunting District – HD)	Total Square Miles	Acres Hiding Cover[1]	Percent Hiding Cover[1]	Miles of Open Road (10/15-12/1)	Open Road Density (10/15-12/1)	Meets Forest Plan Standard 4a	MFWP HD Population Objectives[2]	Current Status of Population Objectives based on MFWP Aerial Survey Data
							HD 343 560-840 elk At least 10 bulls/ 100 cows	Elk numbers and bull/cow ratio at objective.
Quart Creek (HD 335)	57	20,849	57%	63	1.11	No	HD 335 480-720 elk At least 10 bulls/ 100 cows	Elk numbers and bull/cow ratio at objective.
Spotted Dog/ Little Blackfoot (HDs 215, 293, 335)	129	53,149	65%	138	1.07	Yes	HD 215 800-1,200 elk At least 10 bulls/ 100 cows	Elk numbers above objective and bull/cow ratio at objective.
							HD293 750 elk At least 10 bulls/ 100 cows	Elk numbers and bull/cow ratio below objectives.
							HD 335 480-720 elk At least 10 bulls/ 100 cows	Elk numbers and bull/cow ratio at objective.

[1] Cover as defined by MFWP – - a stand of coniferous trees having a crown closure of greater than 40 percent
[2]See Table 131 Elk Management Units (EMU), Hunting Districts and Elk Herd Units (EHU) within the Divide Travel Project Area for the relationship between the EHUs and MFWP hunting districts.

Recent Science regarding Elk Management

The Forest Plan direction found in the original Forest Plan is 29 years old and does not reflect the subsequent 29 years of relevant science and data, changing issues with regards to elk, or changing elk numbers and distribution. The original Forest Plan standard for measuring elk security in the hunting season uses an index that combines open road density and hiding cover. While this relationship can be informative, it does not account for the spatial arrangement and size of unroaded patches, topography as a mediator of hunter access, the distribution of forage and other factors that influence the ability of elk to survive the hunting season. Research since the crafting of the Helena Forest Plan emphasizes, among other factors, the effects of open motorized routes on elk security.

Effects of roads on wildlife have been widely studied for years (Trombulak and Frissell 2000, Switalski 2006, among others). Fahrig and Rytwinski (2009, at page 3) summarized research related to the effects of roads and traffic on 130 species of wildlife; these studies concluded that roads negatively affect wildlife, particularly large mammals. Rowland et al. (2004, pp. 2-3) documented similar results with regards to elk: (1) elk avoid areas near open roads; (2) elk vulnerability to mortality from hunter harvest increases as open road density increases; and (3) elk exhibit higher levels of stress in areas of higher road density.

More recently, in *A Brief Review of the Scientific Literature on Elk, Roads and Traffic*, McCorquodale (2013) synthesized the published research across a broad geographic range on the effects of roads and traffic on elk. These studies overwhelmingly concluded that high road densities and traffic negatively affect elk use and where hunted, elk vulnerability to excessive mortality.

Although the body of scientific literature strongly indicates that road density is the primary factor influencing elk distribution, cover may be important for bull elk survival during the hunting season. McCorquodale (2003) found that bull elk in the Cascade Range of Washington tended to select for mature forests more than cow elk. Unsworth and others (1998) found that in Idaho, cows and bull elk older than 2 years selected for timbered habitats in roaded areas (~3 mi/mi^2) and more open timbered habitat in non-roaded areas (~0.5 mi/mi^2) with older bulls showing the strongest preference for timbered types. Still, other studies indicate that hiding cover may not be a factor in explaining elk mortality if hunting pressure overwhelms an otherwise secure landscape (Hayes et al. 2002 at 497, Weber (1996) as cited in Skovlin et al. 2002 at 552) or if elk exhibit certain behavioral patterns that affect the probability of being harvested during the hunting season (Ciuti et al. 2012).

Still, forest stands that do not meet the definition of hiding cover may prove to be secure areas for elk where local conditions of topography, remoteness and environmental barriers impede hunter access. Conversely, blocks of hiding cover situated in areas with high levels of motorized use may be highly insecure. Hiding cover has a role to play but it is not necessarily synonymous with security (Lyon and Canfield 1991; Unsworth and Kuck 1991; Lyon and Christensen 1992; Christensen *et al.* 1993, Stubblefield et al. 2006 p. 1068, Montgomery et al. 2013, p. 322, Proffitt et al. 2013).

In summary, the big game security index, as currently formulated, could be difficult to meet throughout most of and possibly all of, the Divide landscape in the foreseeable future (25-50 years), not necessarily because of deficiencies in travel management, but because of the natural loss of hiding cover associated with the mountain pine beetle related tree mortality and because of travel management decisions outside of the Forest's jurisdiction. The current standard also has an objective based on elk management metrics (percent of bull harvest occurring during the first week of the general big game hunting season) that are no longer being collected by MFWP. Additionally, despite declines in cover, elk numbers continue to exceed the Forest Plan benchmark (6,400 elk by the year 2000), indicating that the link between cover on National Forest System lands and elk security, as reflected by stable or increasing

elk populations and/or bull to cow ratios, is not as strong as envisioned when the Forest Plan was developed. As a result, attempts to implement the current standard are placing impractical constraints on Forest management and on the ability of the public to use the Forest and may not be having the effect on elk as it was understood twenty nine years ago.

The Concept of Elk Security Areas

Standard 4a addresses big game security. It was developed in response to concerns about both big game habitat capabilities as well as hunting opportunity and to address one key factor in overall elk vulnerability during the hunting season – the proportion of bull elk harvest occurring during the first week of the (general) hunting season (USDA 1986 at II-17). Elk vulnerability during the hunting season is defined as *"a measure of elk susceptibility to being killed during the hunting season"* and is generally considered to be the opposite of security (Lyon and Christensen 1992, Stalling et al. 2002). It is a concept that is the sum of many factors including security, hunter opportunity and elk behavior. Security is defined as *"the protection inherent in any situation that allows elk to remain in a defined area despite an increase in stress or disturbance associated with the hunting season or other human activity"* (Lyon and Christensen 1992, Stalling et al. 2002). Security is the result of a combination of factors that allow elk to remain in a specific area while under stress from hunting (Christensen et al. 1993). The components of security may include vegetation, topography, road density, size of vegetation blocks and hunter density, among others (Lyon and Christensen 1992).

Lonner (1991) outlined three key aspects of elk vulnerability during the hunting season:

- Maintaining good habitat security that would protect elk from becoming easy prey during the hunting season;
- Preserving or recovering desired elk population characteristics and distributions in the face of intensifying land management practices; and
- Satisfying the growing demand for quality elk hunting and non-hunting experiences.

Thomas (1991) provided even more detail, stating that elk vulnerability during the hunting season, particularly of bull elk, during the hunting season, is consistently related to the following factors:

- Increasing densities of roads open to traffic hunter access and numbers;
- Increasing numbers and densities of hunters;
- Decreasing amounts of cover;
- Fragmentation of cover into smaller patches;
- No restrictions on bull harvest – i.e., all antlered animals are legal game;
- Setting of open seasons that include the rutting period;
- Improving "technology" of hunting including weapons, vehicles, calls and training tools; and
- Longer hunting season;
- Relatively gentle terrain;
- Increasing number of hunter days.

Although the terms elk security and elk vulnerability during the hunting season are strongly related and are often used interchangeably, it is important to remember that they are actually inversely related – as security declines elk vulnerability during the hunting season increases (Stalling et al. 2002 – citing Youmans 1992).

In the Divide landscape (as on much of the Helena National Forest), elk security during the hunting season is an important determinant of elk abundance and population structure. While the ability of elk to survive the hunting season is influenced by a number of environmental circumstances, the status of the local Forest road system – and subsequent hunter access - is often the key factor (Proffitt et al. 2009). Several studies have documented the effect of roads on elk security, population structure and hunter success (Edge and Marcum 1991; Leptich and Zager 1991; Unsworth and Kuck 1991; Gratson and Whitman 2000, Gucinski et al. 2001, Grigg 2007). While most studies demonstrate that open roads influence elk distribution during the hunting season and that road closures can lower the kill rate in a given area, at least one study indicates that in certain circumstances road closures do not alter hunter success (Burbridge and Neff 1976 cited in Gratson and Whitman 2000). In some cases, displacement of elk from roaded public land into more remote terrain (or to inaccessible private land) early in the hunting season can serve to depress the kill rate throughout the remainder of the season. Obviously hunting season and structure can have a direct effect on hunting pressure and the resulting situation for elk in addition to habitat management.

Since the release of the Helena Forest Plan in 1986, field research in Montana and Idaho has led to the concept of "elk security areas" as a basis for assessing elk vulnerability during the hunting season. The degree to which elk are able to survive the fall hunt is seen, in large part, to be a function of the size and pattern of habitat blocks, amply forested in some cases, to which hunter access is limited. Hillis and others (1991) developed an analysis procedure (generally referred to as the "Hillis Paradigm") based on the availability of large non-linear blocks of habitat (≥250 acres) at least ½ mile from open roads. As a rule of thumb, Hillis et al. recommended that at least 30 percent of the "hunting season home range" within a "standardized habitat analysis unit" be held in security areas (Hillis et al. 1991, p. 39). Hillis cautioned, however, that this set of parameters was designed for densely-forested western Montana elk habitat and that, particularly for areas further eastward where forest cover may be limited, security requirements should be evaluated on a site-specific basis and the guidelines adjusted so that the results make biological sense in a local setting (Hillis et al. 1991, p. 40; Christensen et al. 1993, p. 5). The underpinnings of this methodology – i.e. elk tend to avoid open motorized routes during the hunting season - has been well documented in the scientific literature and reinforced through the work of Unsworth and others (1991, 1993), Rowland and others. (2000, 2005) and Proffitt and others (2013), to name just a few.

It's important to keep in mind that the Forest Plan Standard 4a was designed to address MFWP elk objectives in place at the time of Forest Plan development and to support existing hunting regulations. These objectives were tallied up to a Forestwide level with the intent to provide habitat sufficient for 6,400 elk. The standard addressed the need for distribution of elk across the landscape by setting the standard at the herd unit level; however, the objectives were intended to be realized Forestwide.

Alternative Description

Alternative A – No Action Alternative

Alternative A, the No Action Alternative, is the existing Forest Plan Standard. In this case, 'no action' means no amendment to the existing Forest Plan. The analysis of effects associated with Alternative A describes the effects of the current Forest Plan standard. The exact language of the current standard is as follows:

Forestwide Standard 4a (USDA 1986, pp. II/17 – II/18)

Road management will be implemented to at least maintain big game habitat capability and hunting opportunity. To provide for a first week bull elk harvest that does not exceed 40 percent of the total bull harvest, roads will be managed during the general big game hunting season to maintain open road densities with the following limits. (See Table 130*)*

The existing hiding cover to open road density ratio should be determined over a large geographic area, such as a timber sale analysis area, a third order drainage, or an elk herd unit.

Alternative A is considered in detail in this analysis *(See Comparison of Alternatives, below).*

Alternative B

Alternative B was designed to address best science and local knowledge. It also expanded consideration to all open motorized routes (whereas Alternative A technically only applies to roads as originally envisioned in the Forest Plan). Alternative B would replace the existing Forest Plan Standard 4a.

The Divide Travel Plan project area encompasses only about three-quarters of the Divide landscape (portions of the Quartz, Black Mtn – Brooklyn Bridge and Little Prickly Pear – Ophir EHUs falling into areas covered by previous travel management plans); however, the proposed amendment applies to all the portions of the herd units within the Forest administrative boundary that overlap with the Divide Travel Plan project area.

Under the Forest Plan amendment proposed as part of the Divide Travel Plan and applicable to future projects in the Divide landscape , the "security area" approach replaces the "road density/hiding cover index" as the Forest Plan standard for gauging the vulnerability of elk to hunting. The amendment derives from the "Hillis Paradigm" (1991) and adopts specific guidelines for its application from the *U.S. Forest Service and Montana Department of Fish, Wildlife and Parks Collaborative Recommendations for Big Game Habitat Management on the Custer, Gallatin,Helena and Lewis and Clark National Forests* (MFWP and USDA Working Group 2013). The exact language of the standard is as follows[8]:

Standard

Road management will be implemented to maintain or improve big game security and hunting opportunity.

Road management will also be implemented to maintain or improve big game intermittent refuge areas.

This standard applies only to the National Forest System lands within those portions of the following elk herd units that are within the Helena Ranger District, Helena National Forest administrative boundary – Black Mountain-Brooklyn Bridge, Greenhorn, Jericho, Little Prickly Pear-Ophir, Quartz Creek and Spotted Dog-Little Blackfoot.

[8] Note that the standard in its final form will include those security and intermittent refuge area percentages associated with the alternative selected in the Divide Travel Plan decision.

Table 134 - Public Motorized Use and Elk Herd Units

Percentage of Elk Security within that Portion of an Elk Herd Unit within the Helena Ranger District Administrative Boundary by Travel Plan Alternative					
Herd Unit	Alt 1 Security %	Alt 2 Security %	Alt 3 Security %	Alt 4 Security %	Alt 5 Security %
Black Mountain–Brooklyn Bridge	16	16	16	16	16
Greenhorn	7	10	23	25	30
Jericho	12	12	16	16	17
Spotted Dog - Little Blackfoot	30	29	39	34	44
Little Prickly Pear—Ophir	23	25	26	25	28
Quartz	0	0	0	0	0

Table 135 – Public Motorized Use and Intermittent Refuge Areas

Percentage of Intermittent Refuge Areas within that Portion of an Elk Herd Unit within the Helena Ranger District Administrative Boundary by Travel Plan Alternative					
Herd Unit	Alt 1 % Intermittent Refuge Area	Alt 2 % Intermittent Refuge Area	Alt 3 % Intermittent Refuge Area	Alt 4 % Intermittent Refuge Area	Alt 5 % Intermittent Refuge Area
Black Mountain–Brooklyn Bridge	5	5	5	5	5
Greenhorn	4	7	4	4	1
Jericho	3	3	0	0	0
Spotted Dog - Little Blackfoot	4	1	2	2	2
Little Prickly Pear—Ophir	0	0	0	1	1
Quartz	5	5	5	5	6

Other Use*: Administrative use for travel on routes that are closed to public motorized use is permitted subject to existing authorization procedures (i.e. variances approved by line officers are required prior to use of motorized routes closed to the public).*

Temporary reductions associated with management activities in security blocks and intermittent refuge areas between 9/1 and 12/1 are allowed as long as impacts to elk or elk security are mitigated at the project level. Temporary reductions will be evaluated and effects analyzed (including cumulative effects) at the project level and reviewed by a wildlife biologist. It is at this scale and time when project design features and/or mitigations would be applied to ensure that impacts to elk or elk security during hunting season are addressed and reduced during implementation of the project. Temporary reductions are managed at the project scale and at the herd unit (or across herd units where security blocks cross into one or more herd units) to ensure big game security during the 9/1 to *12/1 hunting season is maintained or improved over the long term.*

Permanent changes (e.g. reduction in overall secure acres) are allowed in elk security areas as long as the overall percent of elk security in a herd unit does not decrease and a site-specific analysis indicates that elk are unlikely to be negatively impacted by that change.

Permanent changes are allowed in intermittent refuge areas as long as the overall percent of intermittent areas in a herd unit does not decrease and a site-specific analysis indicates that elk are unlikely to be negatively impacted by that change OR if the decrease is due to those acres becoming part of a security area.

Exceptions to the Standard

Emergency situations are not subject to this standard.

Standard Definitions

Security *is defined as a proportion of an elk herd unit within the administrative boundary of the Helena Ranger District that consists of an area of at least 1000 acres in size that is at least ½ mile from a motorized route open to the public between 9/1 and 12/1. Security blocks are adjusted for constrictions less than or equal to ½ mile in width. Security is calculated across all ownerships within the administrative boundary.*

Intermittent Refuge Areas *are defined as those areas at least 250 acres in size and less than 1000 acres in size that are greater than or equal to ½ mile from a motorized route open to the public between 9/1 and 12/1. Intermittent Refuge Areas are adjusted for constrictions less than or equal to ½ mile in width. Intermittent Refuge Areas are calculated across all ownerships within the administrative boundary.*

Administrative use *for travel on motorized routes is defined as vehicle use associated with management activities or projects on National Forest land administered by the Forest Service or under authorization of the Forest Service. Management Activities include but are not limited to, law enforcement, timber harvest, reforestation, cultural treatments, prescribed fire, watershed restoration, wildlife and fish habitat improvement, private land access, allotment management activities and mineral exploration and development that occur on National Forest land administered by the Forest Service or under authorization of the Forest Service.*

Mitigation *is defined as design elements and/or constraints applied to project level activities that reduce project impacts on elk or elk security. Mitigation measures may include but are not limited to one or more of the following: timing restrictions of activities in security blocks, confining activities to one security block at a time, completing as much of the preparatory work as possible prior to the hunting season, reducing the size/acres/intensity/magnitude of the activity, allowing activities that benefit elk (particularly in management areas with a wildlife emphasis), limiting activities to one season, temporarily closing roads open to the public to compensate for the activity, etc.*

Alternative B also includes cover guidelines as follows:

Guidelines

1. *Cover should be distributed in a manner that mimics or approximates a natural range of variation (NRV). NRV is generally defined as the spatial and temporal variation in ecosystem characteristics under historic disturbance regimes during a reference period. A reference period should be sufficiently long to include the full range of variation produced by dominant natural disturbance regimes. Fire, wind and insect/disease outbreaks are examples of disturbances.*
2. *Subject to Guideline #1, provide cover, if available, between elk security areas to maintain habitat connectivity and facilitate seasonal movement. Saddles, low divides and heads of drainages are examples of important landscape features within which cover should be retained when possible in order to provide habitat connectivity.*
3. *Subject to Guideline #1, vegetation management projects should be planned to recruit or improve cover, where such habitat is limited or not available.*
4. *Subject to Guideline #1, provide cover, if available, in elk security areas to maintain and/or improve elk security in areas known to be used by elk or that have the potential to be used by elk. The upper third of the slope in moderate to large drainages and lower third of slope in drainage heads are examples of areas that have the potential to be used by elk.*
5. *Frequent, continuous dense cover, if available, should be provided adjacent to system roads within and between elk security areas to maintain habitat connectivity and elk security. 'Dense'*

cover may include trees, shrubs and/or topography among other factors and is site-specific in nature; as such it is purposefully not defined here.

6. *Design management activities to avoid reducing hiding cover where recruitment of hiding cover is an objective.*

Guidelines Definitions

Cover is defined as vegetation that provides elk with a means of escape from the threat of predation or harassment and reduces the chance of detection. Here, the definition of cover may include hiding cover, screening cover, or concealment cover. Hiding cover is defined in the Helena National Forest Plan as either (1) vegetation capable of hiding 90 percent of an elk at 200 feet or (2) a standoff coniferous trees having a crown closure of greater than 40 percent or concealment cover which consists of vegetation dense enough to aid animals in escaping from predation or harassment. Screening cover may include conifers and other vegetation that afford longer sight distances then hiding cover but that can obstruct a clear view toward standing or moving elk. Concealment cover may include small conifers, shrubs, boulders, or dead fall that can hide calves/fawns and bedded adults and may service to impede hunter movement. Concealment cover is generally more open than hiding cover.

Habitat connectivity consists of an adequate amount of hiding or screening cover arranged in a way that allows elk to move around.

System Road is defined as a road that is part of the Forest development transportation system.

Alternative B also includes a goal as follows:

Goal

Maintain or, where opportunities arise, improve big game security in those portions of an elk herd unit within the administrative boundary of the Helena Ranger District during the 9/1 – 12/1 hunting season where security is less than 50 percent. Maintain big game security in those portions of an elk herd unit within the administrative boundary of the Helena Ranger District between 9/1 and 12/1 where security is greater than or equal to 50 percent.

Discussion

The Forest Plan Standard 4a - Alternative A - was crafted to provide big game security during the hunting season and largely reflected work by Coggins (1976), Basile and Lonner (1979) and Lyon et al. (1985) that was based on a focused road building and timber management program on National Forests in Montana. While this provision remains relevant – i.e. maintaining big game security during the hunting season - the method by which big game security is measured needs to be updated to reflect more recent scientific deliberations and to address shortfalls in the application of the current standard, primarily the fact that the current standard is not a particularly sensitive indicator of changing elk security conditions (See the *Purpose and Need and Background/Overview sections*). To that end, Alternative B was developed to include consideration of recommendations outlined in the *U.S. Forest Service and Montana Department of Fish, Wildlife and Parks Collaborative Overview and Recommendations for Elk Habitat Management on the Custer, Gallatin, Helena and Lewis and Clark National Forests* (MFWP and USDA Forest Service 2013).

Alternative B is based on the concept of identifiable security areas. Security areas are intended to reduce elk vulnerability during the elk hunting season and to provide animals the opportunity to meet their biological needs without making large range movements (e.g. to private land where hunting is not allowed or to lower quality habitats) (Lyon and Canfield 1991). This also allows for a more ethical, fair

chase hunting experience and for the hunting public to have the ability and real opportunity to effectively hunt and harvest a public resource on public lands.

The concept of security areas is embodied by the "Hillis paradigm", a paper compiled by Hillis et al. in 1991 as part of an elk vulnerability symposium. The basic tenets of security areas under the "Hillis paradigm" include areas at least ½ mile from an open motorized route and at least 250 acres in size. The authors cautioned that in some cases, distance from open routes and the size of security area blocks may need to be increased depending on local conditions. They also recommended that at least 30 percent of an analysis unit be comprised of security areas.

Although Hillis et al. (1991) define security as "non-linear blocks of hiding cover", they also suggest that effective security areas may consist of several different cover –types if the block is relatively un-fragmented. The studies considered by Hillis et al. were conducted in areas of contiguous forest cover. In their discussion of security areas, Christensen et al. (1993, pp. 4, 5) speak to the significance of cover in this equation and note that where cover is ubiquitous, security can be controlled by road management alone. They recommend that in the more naturally open elk habitat in central Montana cover considerations should extend beyond the hunting season and therefore be assessed at a landscape level (See also Edge et al. 1987). Their data suggest that "elk are less selective about the specific vegetative characteristics of coniferous cover and more responsive to the size of units, connectiveness with adjacent units and the scale of cover on the landscape" (Lyon and Canfield as cited in Christensen et al. 1993, p. 5).

In contrast to the Hillis et al. study areas, the landscape on the Helena Ranger District tends to include both open and closed forested habitat and areas where forests and grasslands are interspersed in a mosaic pattern. As such, consideration of the quantity and quality of forested cover across the entire EHU would be better than defining security areas as "blocks of hiding cover". This would allow for recognition of those situations where a mosaic of forest and/or open habitats exists, but which operationally are secure. In addition, recent analyses of elk habitat selection during the hunting season in Montana (Proffitt et al. 2013) did not show a significant selection for security areas comprised totally of coniferous cover. In addition, the analysis by Proffitt and others showed that security areas as a variable in habitat selection during the hunting season are strongly related to the motorized route variable.

Hillis et al. only speak to "open roads" and "closed roads". They suggest that hunting pressure is concentrated along open roads, but that closed roads located within security areas may increase elk vulnerability by providing walking and shooting lanes. Hayes and others (2002) found that elk mortality in their study area in Idaho was positively correlated with both open and closed road densities. Basile and Lonner (1979) reported that when vehicular travel was restricted, hunters spent more time walking, saw more elk and had greater success which may have been a function of elk staying in the area longer and in greater numbers due to the travel restrictions. Unsworth and Kuck (1991) noted that road closures may have varied effects on animal distribution and hunter use and success. They cite to several studies where road closures allowed elk to remain in more preferred sites for longer periods of time which in turn affected elk mortality by providing easier access to hunters (Irwin and Peek 1979). This may be because elk and hunters were more likely to be in the same places – i.e. areas of low open road densities (Millspaugh et al. 2000).

Still, the bulk of research indicates that elk tend to avoid ***open*** motorized routes during the hunting season (Marcum 1975, Lyon 1979, Irwin and Peek 1983, Unsworth et al. 1991, 1993; Canfield et al. 1999, Rowland et al. 2000, 2004, 2005; McCorquodale 2013, McCorquodale et al. 2003, Proffitt et al. 2013, to name just a few). Based on these studies, the Hillis et al. (1991) recommendation to "minimize" closed roads within security areas has been deemed unnecessary in this definition of elk security.

Hillis et al. (1991) also recommend identifying security areas within the hunting season home range. In practice on the Helena Ranger District, elk have the potential, depending on weather and other conditions, to use the entire breadth of elevations within their home range during the big game archery and general rifle hunting seasons. Therefore, it is not necessary or possible to identify a consistently "separate" fall use area within an EHU.

Despite these specific recommendations, Hillis et al. emphasize that "strict adherence to the guidelines should be avoided" (Hillis et al. 1991). To that end, the parameters in Alternative B reflect the broader collaborations outlined in MFWP and USDA Forest Service (2013).

The Hillis Paradigm was tested on the Bighorn National Forest which has landscape conditions similar to the eastside of the Helena National Forest but not necessarily within the Divide landscape, which resides both west and east of the Continental Divide under more favorable growing conditions. The Rocky Mountain Elk Foundation and Wyoming Game and Fish Department (described in Jellison 1998 and Wyoming Game and Fish Department 2004) attempted to modify the security parameters identified in Hillis et al. to include larger forested patches and greater distances from open roads. They found that few areas met the 30 percent security levels identified in the Hillis Paradigm., most likely due to the open nature of the landscape. They concluded that the 30 percent recommended threshold may not be applicable to some landscapes and that other factors need to be considered in determining if an area is secure (Jellison 1998, p. 5).

In the *U.S. Forest Service and Montana Department of Fish, Wildlife and Parks Collaborative Overview and Recommendations for Elk Habitat Management on the Custer, Gallatin, Helena and Lewis and Clark National Forests* MFWP biologists advocated for a 'hunting season' that included the archery season as well as the general rifle season when analyzing elk security. They cited a consistent increase in the number of archery hunters (doubling between 1990 and present) (see also Proffitt et al 2013 and Grigg 2007) and subsequent increased levels of motorized use during the archery season. Through collaboration with MFWP and review of public comments it was recognized that vehicle traffic associated with the archery season displaced elk and compromised elk security. MFWP cited a consistent increase in the number of archery hunters (doubling between 1990 and present) and subsequent increased levels of motorized use during the archery season. This is supported by recent studies that documented the effects of archery season on elk movement (Conner et al. 2001, Vieira et al. 2003) and on elk pregnancy rates (Davidson et al. 2012).

Factors that increase the effectiveness of security areas include large size, plentiful forest cover, minimal trails and old roadways, rugged terrain and heavy deadfall and so on. All of these factors may influence the ability of an area to hold elk through the hunting season; through collaboration with MFWP, the key component was determined to be size. Accordingly, the minimum size of an "elk security area" was set at 1,000 acres, considerably larger than the 250 acre minimum recommended by Hillis et al. (1991) for "westside" forests. This is an adjustment for "eastside" cover conditions and it also aligns with the 1,000-acre security area minimum recently established for the Blackfoot Non-Winter Travel Plan Area on the Lincoln Ranger District just to the north (USFS 2014).

A number of smaller habitat blocks (between 250 and 1,000 acres) that have been classified as security areas in past analyses are now designated as "intermittent refuge areas". While most of these areas are probably too small to hold elk securely throughout the hunting season, they serve as temporary refuges for hunted animals and in parts of the Divide landscape, they represent the only escape areas available (Figure 68 to Figure 72). While their acreages are not added into the security area total for a given elk herd unit, they have been mapped and noted as areas that need to be managed for elk security.

While the new Forest Plan Programmatic Amendment does not require that elk security areas provide a particular level of hiding cover, it does recognize forest cover as an important component of security and includes a set of guidelines for managing cover. The guidelines focus on maintaining cover to the extent practicable where it exists within security areas and in travel lanes between them. Where cover is not available, the guidelines emphasize managing for its recruitment. Abundant cover is most valuable in areas known to be frequented by elk: saddles, low divides, drainage-heads, riparian/ wetland sites and the upper third of slopes in large drainages. These guidelines do not apply to areas where hiding cover has not been abundant historically because of intrinsic environmental conditions (primarily in dry grasslands and shrublands and in dry Douglas-fir and ponderosa pine forests).

The guidelines also recognize that forest cover that is not dense enough or tall enough to provide classic hiding cover may still provide screening or concealment in certain circumstances or otherwise allow animals to elude hunters.

The goal of the standard is to maintain or improve elk security in herd units where security/refuge areas occupy less than 50 percent of the unit. Where percent security is greater than 50 percent, the goal is to keep it above that level. Any decrease in security acreage in herd units that are under 50 percent, would represent non-compliance with the standard. Herd units would remain in compliance as long as security acreage holds steady or increases. The 50 percent security area level (considerably higher than the 30 percent recommended by the Hillis group) is based on what has been deemed desirable and achievable in the Blackfoot landscape just to the north [Blackfoot Non-Winter Travel Plan FEIS, 2014]. For the sake of consistency, the 50 percent goal has been applied to the Divide landscape as well, although it's recognized that, given the entrenched nature of the State, County and Forest road system in the landscape west of Helena, this percentage is unachievable on all but perhaps two of the 6 Divide herd units. The fact that herd units are below 50 percent security does not necessarily mean that they are out of compliance with the standard.

Alternative B would confine the security analysis to that portion of the EHU that occurs within the Helena National Forest administrative boundary and includes private land within that confine. This analysis boundary reflects transitional range and in some EHUs the upper edge of winter range and is biologically meaningful (Edge et al. 1986, Lyon and Christensen 1990, Hillis et al. 1991) for the purposes of this amendment. The portion of the herd unit within the administrative boundary ***is*** that area where MFWP and the Forest would like to retain elk in the hunting season – i.e. public land open to all hunters (where the Forest Service has management control and the ability to close roads). By excluding from the security calculation those portions of the herd units that lie outside the Forest boundary, we have omitted security provided by private lands on which public hunting is barred and on which elk have been learning to seek refuge with increasing frequency. MFWP and the Forest feel that relying on these sanctuaries for security is undesirable since it decreases public hunting opportunity. In addition, the status of private lands can be in flux over the long term, depending on landowner decisions that may have little consideration for the welfare of elk. However, for the purposes of analyses and cumulative effects of past, ongoing and reasonably foreseeable activities, the herd unit will continue to serve as the basis for those analyses.

Furthermore, current herd units in the Divide landscape are quite large; even the portion of the herd unit within the administrative boundary tends to be larger than average home range sizes reported for elk in a variety of studies. Craighead et al. (1973, p. 20) reported an average composite home range of 16 square miles or 10,240 acres in the Madison Range in Montana. Edge et al. (1985) reported home ranges of approximately 10,900 11,100 acres in western Montana. Unsworth et al. (1998) reported home ranges of approximately 17,000 acres in Idaho. The portions of the herd units within the administrative boundary in the Divide landscape range from 21,000 acres to over 60,000 acres (See

Table 137).

Because elk serve as an indicator species and often management for elk serves as a proxy for other big game species, the retention of other Forestwide and Management Area big game cover standards will address cover needs of other species.

Findings Required by Laws, Regulations and Policies

National Environmental Policy Act

Comparison of Alternatives

This section describes the effects of the two amendment alternatives (A and B) relative to the five Travel Plan alternatives (1 through 5). It discusses relative changes in the way elk security is enumerated between Alternatives A and B. Effects of the Travel Plan alternatives on other pertinent aspects of elk ecology and management are discussed in the *Wildlife Specialist Report and Biological Evaluation* and in the FEIS.

Alternative A (Existing Condition)

Alternative A is the No-Action Alternative, the current Forest Plan standard. Table 136 summarizes the status of each EHU in the Divide Travel Plan project area by Travel Plan alternative relative to this index (Standard 4a (USDA 1986, p. II/17 – II/18).

Table 136 - Hiding Cover, Open Road Density and Standard 4a Compliance by Alternative

Elk Herd Unit	% Hiding Cover	Open Road Density (mi/mi²)					Complies with *Forest Plan* Standard 4a?				
		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Black Mountain – Brooklyn Bridge	57%	0.82	0.82	0.82	0.82	0.82	Yes	Yes	Yes	Yes	Yes
Greenhorn	41%	1.38	1.07	1.03	1.02	0.84	No	No	No	No	No
Jericho	73%	1.27	1.31	1.24	1.24	1.07	Yes	Yes	Yes	Yes	Yes
Little Prickly Pear—Ophir	61%	1.49	1.39	1.38	1.36	1.11	No	No	No	No	Yes
Quartz	57%	1.11	1.11	1.11	1.11	1.04	No	No	No	No	No
Spotted Dog – Little Blackfoot	65%	1.07	1.19	1.00	1.04	0.76	Yes	Yes	Yes	Yes	Yes

Three of the six elk herd units (EHUs) in the Divide Travel Plan project area meet Standard 4a under Alternatives 1 through 4. In Alternative 5, 4 out of six EHUs would meet Standard 4a.

Discussion

Although open road densities decrease in most EHUs under the action alternatives - particularly in Alternative 5 - as compared to existing conditions (Alternative 1), application of the existing Standard 4a to the Travel Plan alternatives reveals no change relative to the existing standard except in Alternative 5. These proposed reductions in hunting season open motorized route access (with consequent benefits for elk) only result in one of the sub-standard EHUs moving into compliance with Standard 4a (Little Prickly Pear – Ophir) and only in Alternative 5. This illustrates the concern that the big game security index, as currently defined in the Forest Plan, is not a particularly sensitive indicator of changing elk

security conditions. For example the Greenhorn EHU will never be able to meet the existing standard as long as available cover is below the minimum 50 percent threshold. No amount of road management will improve that condition. Even though all the action alternatives are expected to maintain or improve existing elk security in each EHU through reductions in open motorized route densities, this improvement cannot be reflected in the simplistic yes/no results used to report compliance with the current standard. Furthermore, Alternative A does not provide a measure on how unroaded areas are distributed within a respective herd unit. Several authors describe the importance of distribution of large unroaded areas for security (e.g. Lyon et al. 1985, pp. 7-8; Lyon and Canfield 1991, pp. 104-105; Canfield 1991, pp. 50-51; Christensen et al. 1993 p. 4, 5; McCourquodale 2013, p. 9). Road density data alone does not address distribution of 'unroaded' areas.

The pattern under Standard 4a is that, in spite of shifts in open road density between alternatives, herd units that currently comply with the standard tend to remain in compliance and those that do not comply with the standard tend to remain out of compliance. The only exception is the rise to compliance of the Little Prickly Pear-Ophir EHU under Alternative 5, due to the closure of 52 miles of Forest roads combined with ample hiding cover (60 percent).

On the other hand, in the Greenhorn EHU, road closures of 47 miles in Alternative 5 are insufficient to bring the herd unit into compliance with Standard 4a because of hiding cover that remains at 41 percent. The hiding cover/road density index masks this improvement in elk security, simply indicating that the herd unit remains out of compliance. Likewise, the Spotted Dog–Little Blackfoot EHU is simply credited with remaining in compliance with the standard, in spite of 40 miles of road closures in Alternative 5. The Black Mountain–Brooklyn Bridge EHU is also credited with remaining in compliance, but with no decline in road miles. This herd unit is clearly different from the previous two in terms of elk security improvement, but the current Forest Plan standard recognizes no difference between them. In sum, the standard does not accurately indicate to what degree the changes in road density improve or degrade the habitat situation for elk.

In the analysis of alternatives considered but not carried forward in the Divide Travel Plan (See FEIS, Chapter 2 and the *Alternative Considered but not Carried Forward - Closing All Forest System Routes during the Hunting Season* report), all Forest System open motorized routes were considered closed during the hunting season in order to determine if the Forest had management discretion over sufficient route miles for all EHUs to meet Standard 4a. In that scenario, 5 out of 6 EHUs would meet Standard 4a (compared with 4 out of 6 in Alternative 5, the most aggressive Alternative in terms of road closures during the hunting season). Although that analysis indicates that it's possible for the Forest to close enough roads in the Quartz Creek EHU to achieve compliance with Standard 4a, several of those road miles over which the Forest has discretion are located outside of the Travel Plan project area and have already been subject to a travel plan decision (i.e. *Clancy Unionville Vegetation Manipulation and Travel Management Project*). The few miles of open roads in Quartz Creek EHU that could be closed as part of the Divide Travel Plan decision access private land. The Greenhorn EHU would remain out of compliance with Standard 4a because the Forest simply does not have sufficient road closure discretion. Even if it were possible to close all of the roads in the project area (several miles of roads are outside of the Forest Service's jurisdiction), some of the concerns identified by MFWP in the *Montana Final Elk Management Plan* (MFWP 2005) would not be ameliorated especially in those HDs where access to elk is a management concern.

In a word, the hiding cover/ open road density index, as now formulated, is insensitive to real changes in elk security and it places impractical constraints on Forest management and on the ability of the public to use the Forest (even though the allowed use is not detrimental to elk security). The standard will be impossible to meet throughout most of and possibly all of, the Divide landscape for the foreseeable

future (25 to 50 years), not because of deficiencies in travel management, but because of natural loss of hiding cover.

Alternative B – (Proposed Alternative)

Security and Intermittent Refuge Areas

Alternative B utilizes the concept of the percentage of an area in security or as an intermittent refuge area to enumerate the resulting elk security (or intermittent refuge area) differences between the Travel Plan alternatives. The actual on-the-ground results regarding the Forest's road management and the changes in elk security are the same as under Alternative A, only the method of describing those results has changed.

Table 137 displays total acres and percent of elk security by herd unit for Alternative B. The results apply only to that portion of the EHU that is within the administrative boundary of the Forest and are based on blocks greater than or equal to 1000 acres located greater than or equal to ½ mile from motorized routes that are open during the hunting season (9/1 through 12/1). Table 138 displays the total acres and percent of intermittent refuge areas by herd unit for Alternative B. As with elk security, the results apply only to that portion of the EHU that is within the administrative boundary of the Forest and are based on blocks 250-999 acres in size located greater than or equal to ½ mile from motorized routes that are open during the hunting season (9/1 through 12/1).

Among the four Travel Plan action alternatives, Alternatives 3, 4 and 5 generally serve to consolidate security areas into larger contiguous blocks resulting in an increase in total overall acres of security and a larger average size of security areas as compared to the existing condition (Figure 68 to Figure 72). In turn, this could reduce bull mortality and subsequently can improve bull: cow ratios (Leptich and Zager 1991, p. 129, 130) as well as serve to retain more elk on public land (Wertz et al. 2004).

Security and intermittent refuge areas in all alternatives range from approximately 4500 feet in elevation to beyond 8000 feet in elevation. This elevational distribution should accommodate seasonal fluctuations in weather patterns within and between years. There are some areas within the Divide Travel Plan area that do not have security or intermittent refuge areas (See Figure 68 to Figure 72). The lack of security in these areas is generally due to past decisions that preclude travel management options today (i.e. Clancy Unionville Vegetation Manipulation and Travel Management Project).

As can be seen in Table 137 and Table 138, elk security and intermittent refuge areas provide a means of gauging elk security that is sensitive to changes in open motorized route configuration. This allows a more realistic assessment as to potential impacts of travel management proposals in different herd units than the current Forest Plan Standard (the Big Game Security index), which shows little to no difference between any of the alternatives in terms of Forest Plan compliance. The difference between the two methods is largely a function of eliminating hiding cover as a primary determinant of elk security and focusing on the size and distribution of large habitat blocks to which vehicle access is limited. This is particularly appropriate in this case, as Travel Plan alternatives deal with changes in open road patterns and generally have no impact on hiding cover. However, Forest Plan standards remain in place that recognize the importance of elk hiding cover (i.e. Forestwide Big Game Standards 3, 5 and several management area specific standards – See Table 129).

Table 137 - Elk Security during the Hunting Season (9/1 – 12/1) under Alternative B by Travel Plan Alternative

Elk Herd Unit	Total Acres within Administrative Boundary	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Acres of Elk Security	% of EHU (within boundary)	Acres of Elk Security	% of EHU (within boundary)	Acres of Elk Security	% of EHU (within boundary)	Acres of Elk Security	% of EHU (within boundary)	Acres of Elk Security	% of EHU (within boundary)
Black Mountain – Brooklyn Bridge	35,874	5,781	16	5,785	16	5,785	16	5,785	16	5,788	16
Greenhorn	21,693	1,494	7	2,134	10	4,892	23	5,323	25	6,563	30
Jericho	29,364	3,435	12	3,463	12	4,791	16	4,791	16	5,070	17
Little Prickly Pear - Ophir	59,311	13,863	23	15,069	25	15,195	26	15,069	25	16,566	28
Quartz Creek	23,036	0	0	0	0	0	0	0	0	0	0
Spotted Dog/ Little Blackfoot	63,561	18,880	30	18,645	29	25,064	39	21,879	34	28,019	44

Table 138 - Elk Intermittent Refuge Areas during the Hunting Season (9/1 – 12/1) under Alternative B by Travel Plan Alternative

Elk Herd Unit	Total Acres within Administrative Boundary	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Acres Inter. Refuge Area	% of EHU (within boundary)	Acres Inter. Refuge Area	% of EHU (within boundary)	Acres Inter. Refuge Area	% of EHU (within boundary)	Acres Inter. Refuge Area	% of EHU (within boundary)	Acres Inter. Refuge Area	% of EHU (within boundary)
Black Mountain – Brooklyn Bridge	35,874	1,738	5	1,738	5	1,738	5	1,738	5	1,738	5
Greenhorn	21,693	970	4	1,473	7	803	4	803	4	308	1
Jericho	29,364	923	3	886	3	0	0	0	0	0	0
Little Prickly Pear - Ophir	59,311	0	0	0	0	0	0	422	1	588	1
Quartz Creek	23,036	1,124	5	1,124	5	1,124	5	1,124	5	1,396	6
Spotted Dog/ Little Blackfoot	63,561	2,400	4	661	1	1,397	2	1,100	2	1,090	2

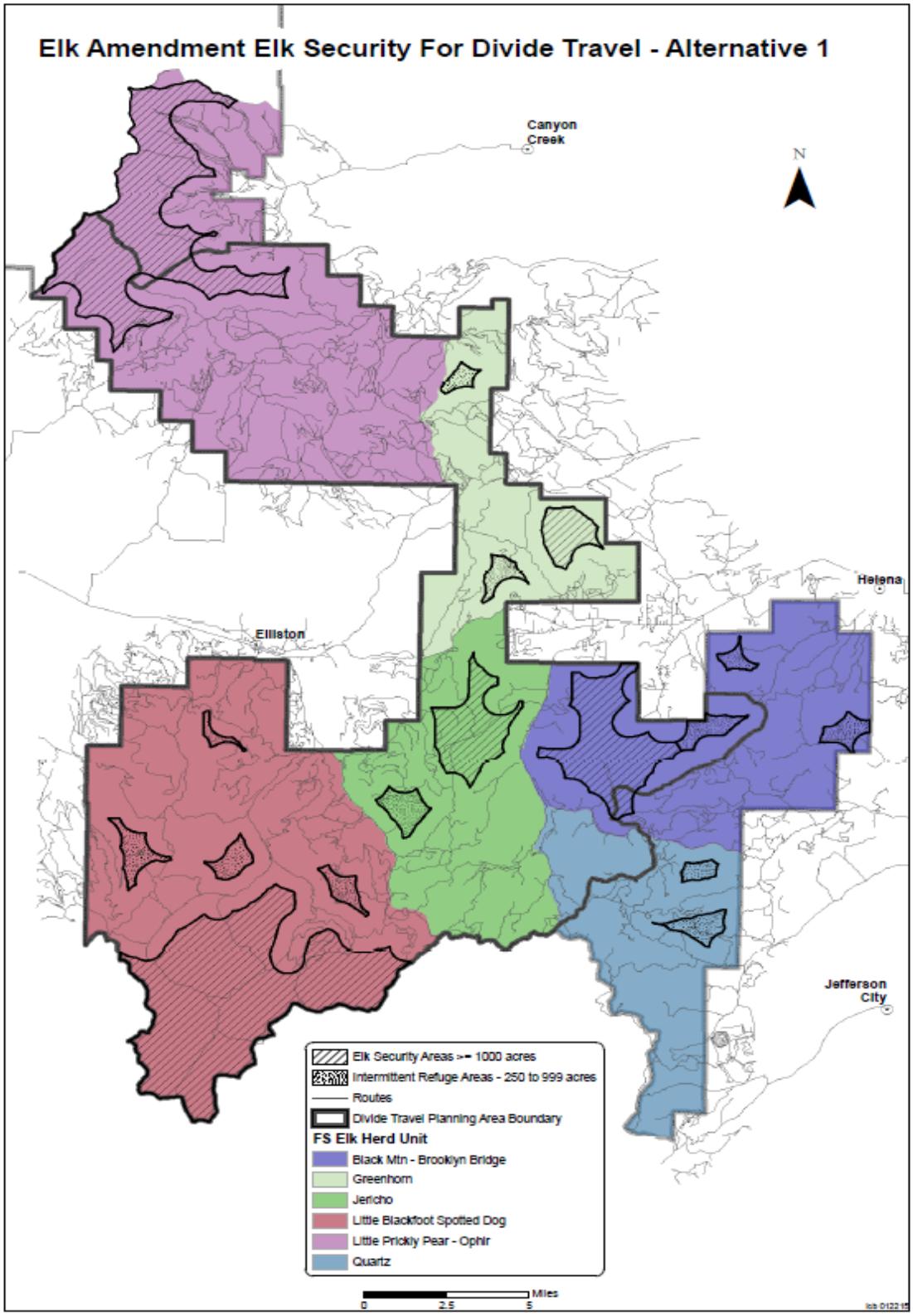

Figure 68 - Elk security and intermittent refuge areas, Alternative 1

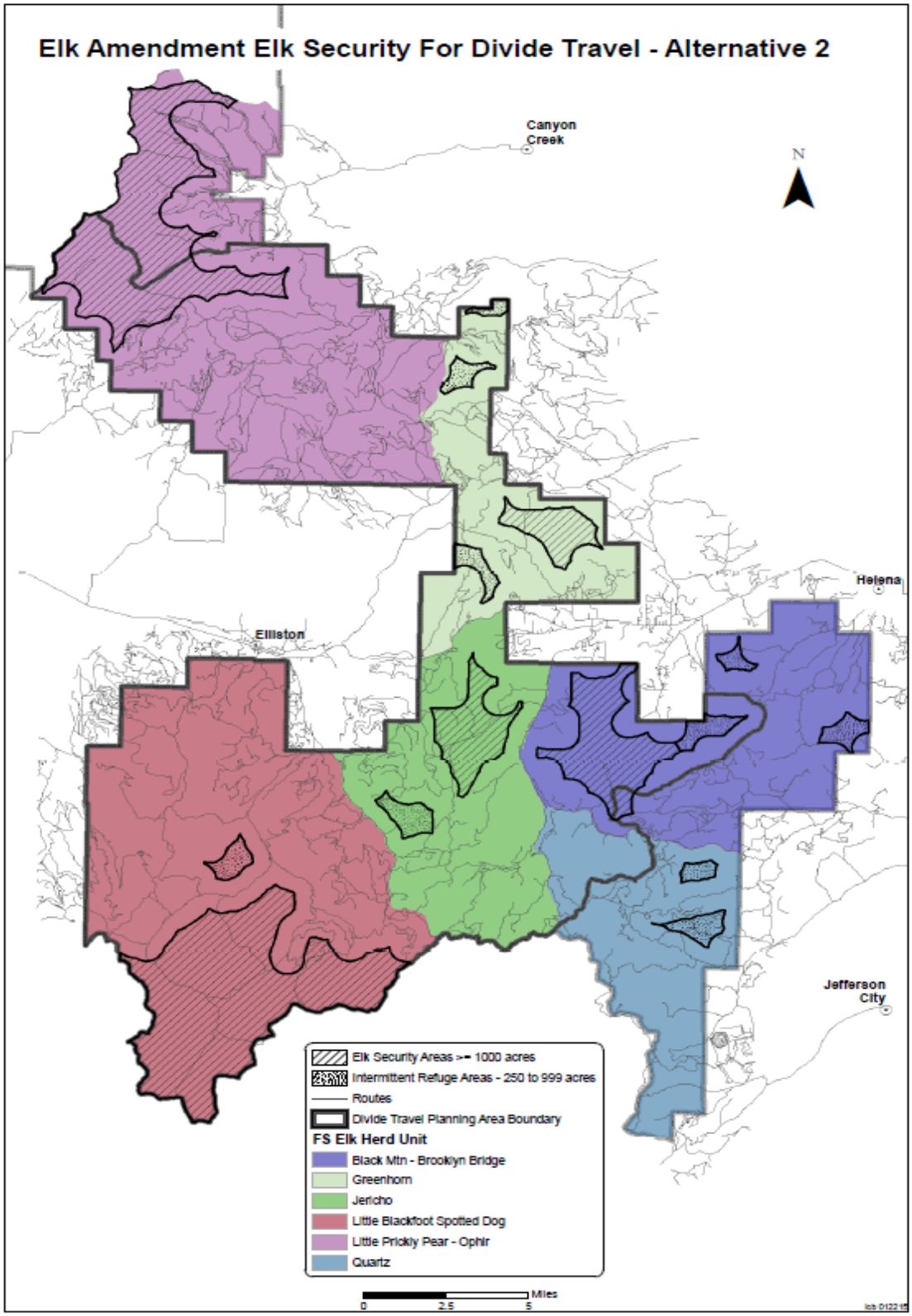

Figure 69 - Elk security and intermittent refuge areas, Alternative 2

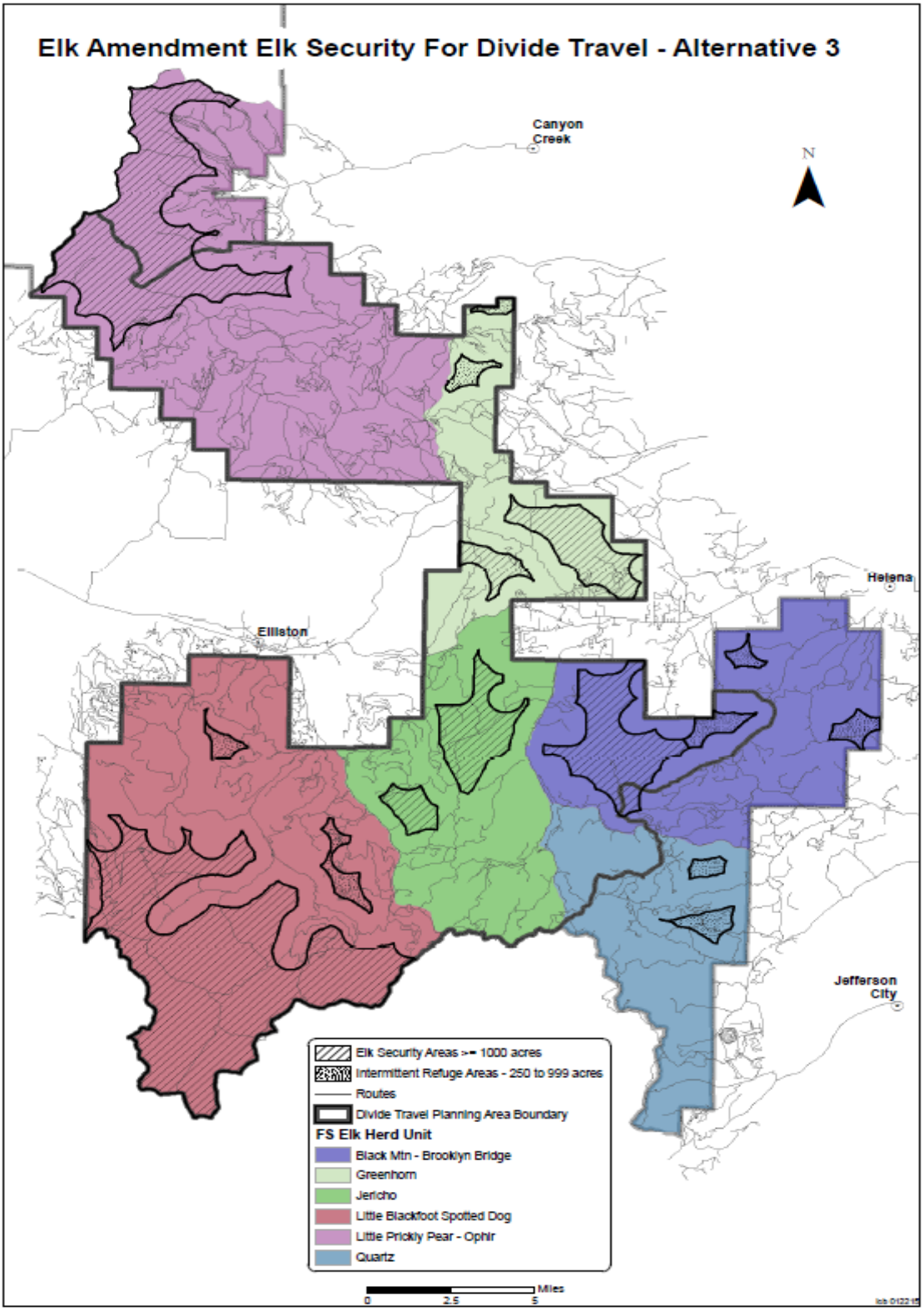

Figure 70 - Elk security and intermittent refuge areas, Alternative 3

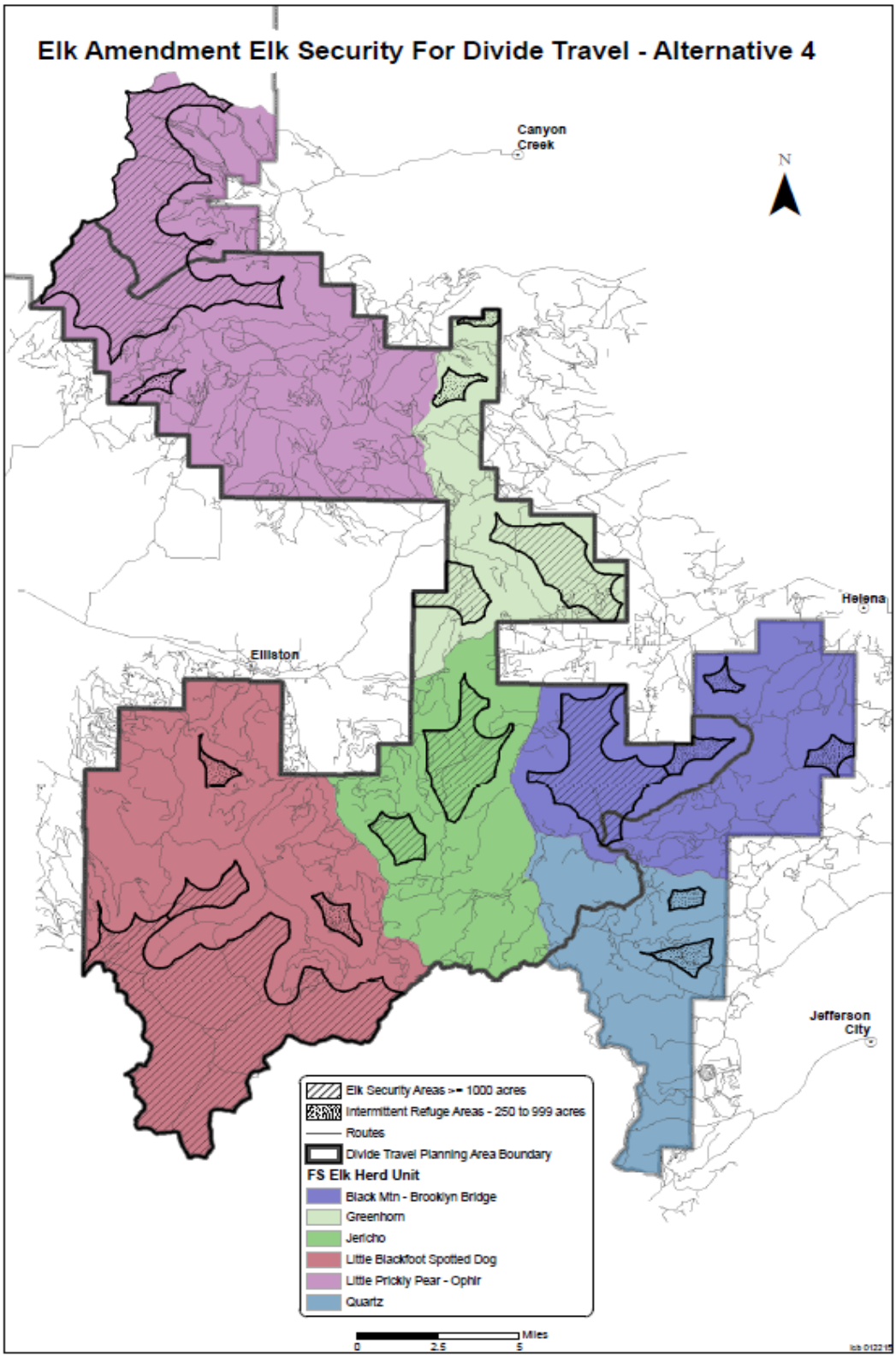

Figure 71 - Elk security and intermittent refuge areas, Alternative 4

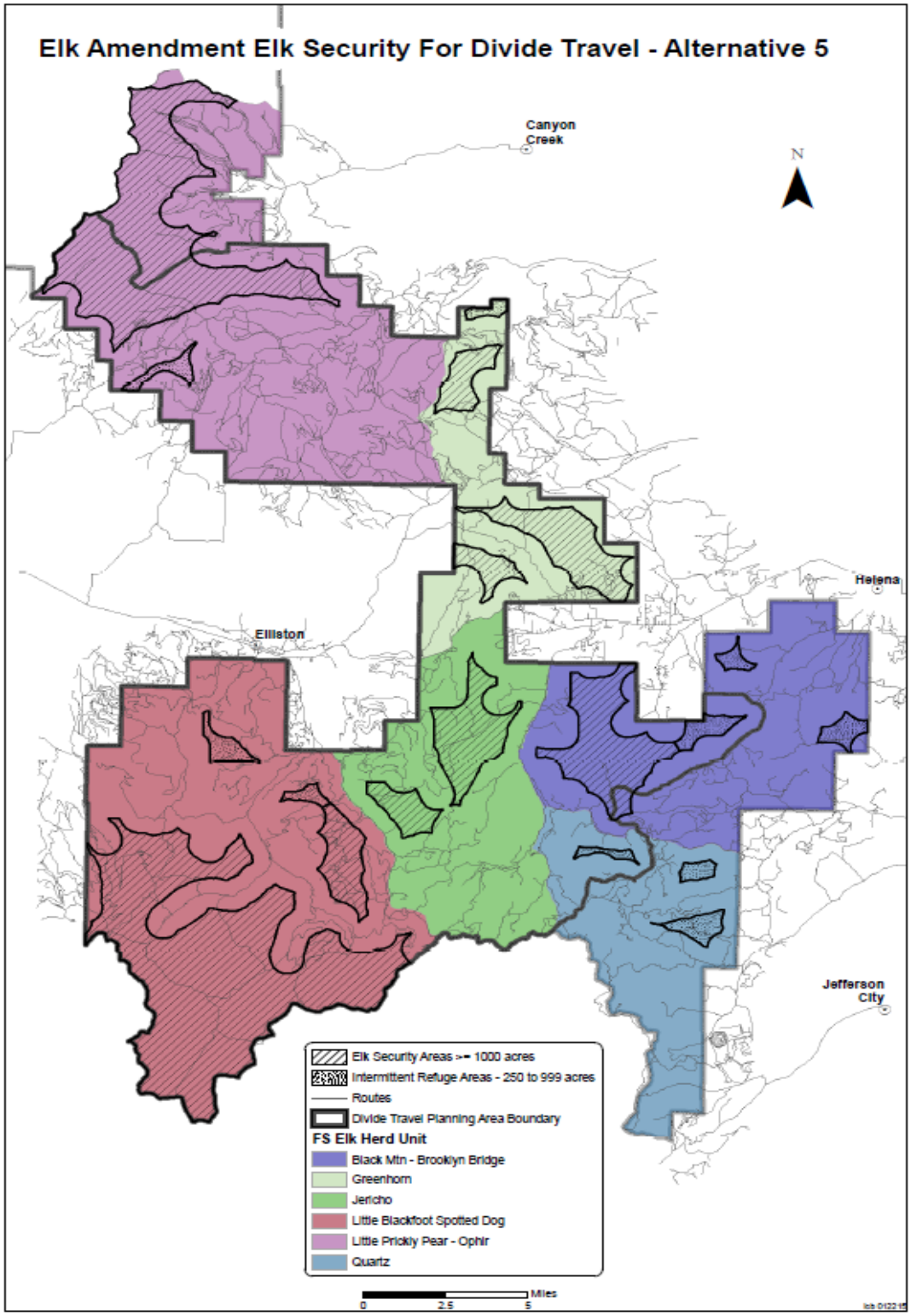

Figure 72 - Elk security and intermittent refuge areas, Alternative 5

Cover

The following table summarizes percent of hiding cover within security areas and intermittent refuge areas defined by each travel plan alternative. Hiding cover comprises greater than 80 percent of the security and intermittent refuge areas combined in all alternatives. Figure 73 indicates that hiding cover is well distributed in the Divide Travel Plan Area. Table 139 depicts the extent of hiding cover in the Divide Travel Plan Area .

Table 139 - Acres of hiding cover in security and intermittent refuge areas by Alternative

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Security					
Security Acres	43,452	45,096	55,726	52,846	62,005
Hiding cover Acres	37,753	39,063	47,170	44,763	52,300
Percent Hiding Cover	87%	87%	85%	85%	84%
Intermittent Refuge Areas					
Intermittent Refuge Area Acres	7,155	5,883	5,062	5,186	5,119
Hiding Cover Acres	6,062	5,022	4,285	4,352	4,415
Percent Hiding Cover	85%	85%	85%	84%	86%

In addition to the cover guidelines, several cover standards remain in place. Of the 13 management areas in the Divide Travel Plan area, two have a timber emphasis with no associated measurable wildlife standards (T1 and T5), six have measurable wildlife standards (H1, H2, L2, T3, W1 and W2) and the remaining MAs are somewhat neutral with regards to wildlife (Table 140).

Table 140 - Acres of security and intermittent refuge areas by Management Area and Alternative

Management Area Emphasis	MA Acres/Percent of Divide Travel Plan Area	Security and Intermittent Refuge Area Acres					Percent MA in Security and Intermittent Refuge Area				
		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Timber Emphasis (no measurable wildlife standards)	102,198/50%	15,189	14,482	19,529	17,014	24,736	15%	14%	19%	17%	24%
Wildlife Emphasis (measurable wildlife standards)	33,226/16%	9,239	10,293	11,147	10,954	11,729	28%	31%	34%	33%	35%
Remaining MAs	67,185/33%	26,112	26,137	30,045	29,997	30,574	39%	39%	45%	45%	46%

As shown, 35 percent of the elk security and intermittent refuge areas in Alternative 5 are within management areas for which there is a measureable cover standard. Twenty-four percent are located within timber emphasis management areas. Forty-six percent are within MAs that are somewhat neutral with regards to measurable wildlife standards; however, even these MAs require some wildlife consideration. For example, standards in MA L-1 provide for the following: "[s]*pecific wildlife and fisheries needs will be identified and considered when developing allotment management plans, provided the needs are compatible with area goals*" (USDA 1986, p. III/11).

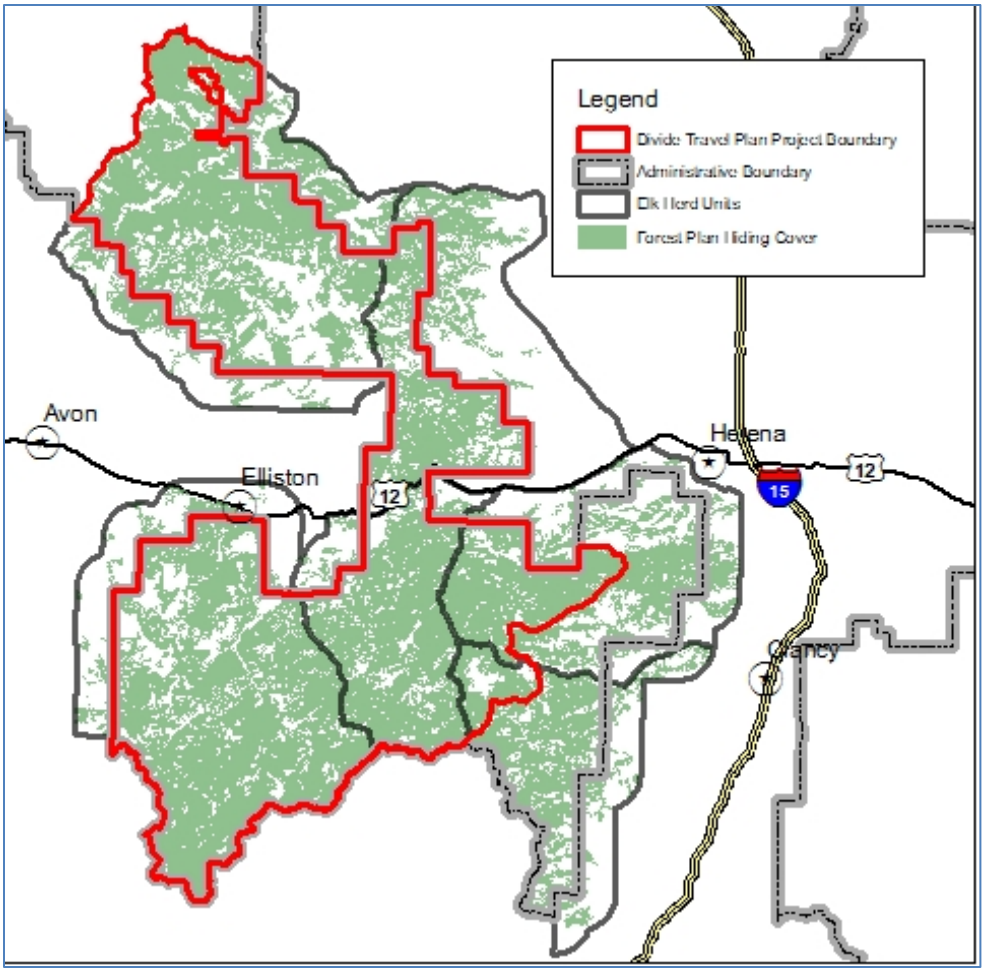

Figure 73 - Distribution of Forest Plan Hiding Cover

Discussion

Alternative B allows for temporary reductions in elk security provided impacts to elk security are mitigated at the project level. Mitigations include but aren't limited to one or more of the following: timing restrictions of activities in security blocks, confining activities to one security block at a time, completing as much of the preparatory work as possible prior to the hunting season, reducing the size/acres/intensity/magnitude of the activity, allowing activities that benefit elk (particularly in management areas with a wildlife emphasis), limiting activities to one season, temporarily closing roads open to the public to compensate for the activity, etc.

The provision for administrative use of motorized routes that are closed to the public during the hunting season and the allowance of management activities within security blocks during the hunting season could result in temporary reductions in elk security regardless of the selected travel plan alternative. The temporary loss of security associated either with vehicular use on closed routes or activities within security blocks could result in displacement of elk to non-secure areas which could lead to increased vulnerability during the hunting season. Elk could also be displaced to private land which could render management of and access to, elk difficult. Several studies have documented the displacement effects of management activities on elk (USDA 1978, Edge and Marcum 1985, Lyon et al. 1985, Wertz et al. 2004). However, in several other studies, displacement of elk associated with logging activity tended to be temporary with some elk returning during nights and weekends when logging activity was suspended

(Beall 1974 and Edge 1982 as cited in Lyon and Christensen 2002, p. 562). Other research found that logging activity did not significantly alter elk home range size (Edge et al. 1986). Forest Plan standards and recommendations remain in place to minimize these impacts to elk during the hunting season. These include:

- Representatives from the Helena Forest and MFWP will meet annually to review the existing Travel Plan (USDA 1986, p. II/19);
- Montana Cooperative Elk-Logging Study Recommendations, in Appendix C, will be followed during timber sale and road construction projects (Ibid, p. II/19);
    - Disturbance by heavy equipment can be completed in the shortest possible time (Ibid, Appendix C, p. C/2);
    - Logging activity can be confined to a single drainage at a time and all work completed in the shortest possible time frame (Ibid).

Administrative use of motorized routes closed to the public and allowing management activities during the hunting season has been in practice – and mitigated at a project level - since the crafting of the Forest Plan and is consistent with the existing Standard 4a. Meanwhile, elk numbers have increased steadily since the crafting of the Forest Plan which suggests that displacement associated with this use – as long as mitigation is in place to minimize this displacement - has not depressed elk numbers. Remaining standards as well as design features and/or mitigation measures will continue to be applied at the project level under Alternative B such that displacement of elk is expected to be temporary and should not compromise the ability of the Forest and MFWP to realize our management goals relative to elk and elk security.

Several studies found that elk may find more complete security during hunting seasons by moving to private lands that restrict hunter access or prohibit hunting which limit is MFDWP ability to manage herd sizes through harvest (Burcham et al. 1999, Proffitt et al. 2013, Haggerty and Travis 2006). Implementation of Alternative B should reduce elk displacement from public land prior to normal migration events. This addresses a primary management goal for MFWP: maintaining or enhancing elk presence on National Forest System lands so that elk are available to the hunting public on public land. In a study conducted in Oregon, Wertz and others (2004) were able to influence elk migration patterns through road closures, among other habitat improvements. Elk in that study area had been increasingly shifting use to private land in part due to lack of security on public land. The authors project that as elk re-establish their traditional migratory patterns, they may be imprinting their calves to remain on public land as well. Elk distribution can be affected through road management and establishment of security areas over time (Rowland et al. 2005 and McCorquodale 2003) in turn providing MFWP the flexibility to achieve their population objectives. Implementation of Alternative B can also lead to improvements in bull: cow ratios (Leptich and Zager, p. 129, 130).

Security and intermittent refuge areas, as defined in Alternative B, are based on motorized routes open to the *public* between 9/1 and 12/1. The presence of a motorized route closed during this period did not disqualify an area from being considered a security area or intermittent refuge area. These closed routes could facilitate hunter access and improve hunter success; likely a function of elk remaining in the 'secure' area longer and in greater numbers (Basile and Lonner 1979, Hillis et al. 1991, Unsworth and Kuck 1991). However, if security and/or intermittent areas were determined by open *and* closed motorized routes, several areas that currently do provide security for elk – or could upon implementation of the Divide Travel Plan decision - would have been eliminated from consideration. Also, the Divide Travel Plan decision is an open/closed decision and does not include specific prescriptions for how roads closed through this decision will be managed. In the future, some roads

may be obliterated; others gated depending on Forestwide and management area standards and goals. Some of these closed roads in security/intermittent refuge areas may be obliterated in the future.

The cover guidelines, along with remaining hiding cover standards, should ensure that cover is provided as part of future management activities. The guidelines also provide flexibility to promote forest regeneration to offset cover losses associated with the mountain pine beetle epidemic. Although a majority of security and intermittent refuge areas currently contain hiding cover, this condition is expected to change over the next several years as trees killed by the mountain pine beetle fall (Keen 1955, Mitchell and Preisler 1998, Lewis and Hartley 2006, Page and Jenkins 2007, Klutsch et al. 2009). How these changes affect elk populations and distribution are uncertain; down trees may impede elk movement (Saab et al. 2014) while over-story mortality could improve forage opportunities (Stone 1995). Currently, a study is ongoing in the Elkhorn Mountains on the Forest to address this very topic. These data could be extrapolated Forestwide in similar forested conditions and used to influence management.

Avoidance of roads is presumed to be a behavioral response conditioned by vehicular traffic. Other factors, including better hiding cover, can be expected partially to mitigate the negative response by elk. However, the best method for attaining full use of habitat appears to be effective road closures (Lyon 1983, p. 4).

Cumulative Effects of Other Forest Plan Amendments

Cumulative effects are the impacts on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions, Federal or non-Federal. The cumulative effects analysis considers spatial and temporal boundaries, how past activities have contributed to the existing condition and whether the ecosystem can accommodate additional effects.

This section addresses cumulative effects in two ways: those associated with site-specific project amendments and those associated with programmatic amendments. The effects of site-specific project amendments are limited in time and space; programmatic amendments provide direction that would be applied to future management activities.

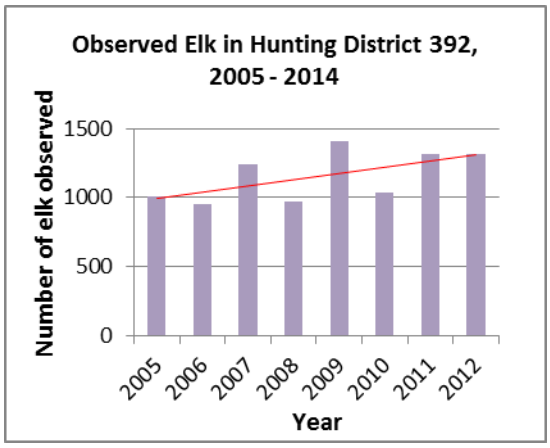

Figure 74 - Observed elk in HD 392, 2005-2014.
The red line indicates trend.

The scale of analysis – or the cumulative effects affected environment – is the entire Forest.

Site-Specific Amendments

Existing Amendments

There are currently 28 Forest Plan amendments of which five have had implications on Big Game standards. These five are described below.

Amendment #7 Miller Mountain Hard Rock Mineral Exploration Project

This site-specific amendment exempts the Miller Mountain hard rock mineral exploration project (1993) from Forest Plan Big Game Standards 3 and 4(a). Approximately 590 acres were exempted from these standards associated with the construction of new roads and drill sites. Most likely, these roads do not provide hiding cover; however, they remain closed to all use. There were additional closures in Jimmy's Gulch, an area adjacent to this 1993 project. The corporation that originally conducted mineral explorations in the area is no longer active.

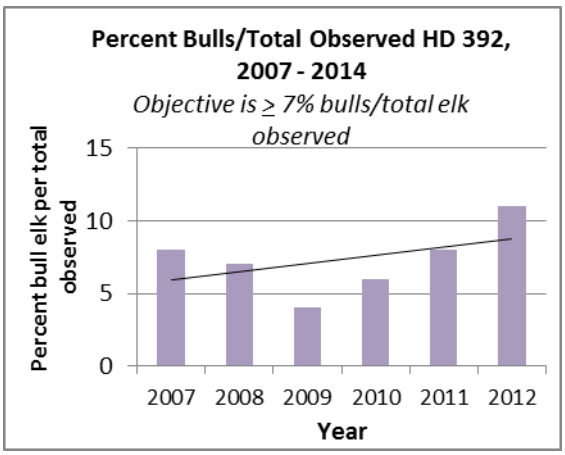

Figure 75 - Percent bulls per total elk observed in HD 392, 2005-2014.
The black line indicates trend.

This project is located in MFWP HD 392. Elk trends have been increasing in HD 392 since 2005; percent of bulls per total observed has also been increasing since 2007 (Figure 74 and Figure 75). The decision to exempt this project from compliance with Standards 3 and 4a and the subsequent removal of 590 acres of cover does not appear to have negatively impacted elk numbers in this HD. Management challenges identified for this HD include public access and noxious weeds and not necessarily loss of cover (MFWP 2005, p. 249).

Amendment #21 Jimtown Project

This site-specific amendment exempted the Jimtown Project (2001) from Standard 4a. The wildlife analysis concluded that the existing condition was not consistent with this standard. Effects associated with this project included the removal of approximately three percent of the hiding cover in the Hedges Mountain herd unit.

This project is also located in MFWP HD 392. The decision to exempt this project from Standard 4a and the subsequent removal of hiding cover does not appear to have negatively impacted elk numbers in this HD. This may be due to the fact that management challenges in this HD aren't necessarily related to loss of cover but rather to limited public access and noxious weeds.

Amendment #23 Cave Gulch Post-Fire Salvage Project

This site-specific amendment exempted the Cave Gulch Post-Fire Salvage Project from Standard 4a. The wildlife analysis for this project indicated that the existing condition was not consistent with Standard 4a. This was due in part to the loss of existing hiding cover from the Cave Gulch wildfire. Approximately 0.85 miles of temporary roads were built to implement the salvage sale and were subsequently decommissioned.

This project is also located in HD 392. As with the Miller Mountain Mine Exploration Project and the Jimtown Project, the impacts to elk as a result of the removal of hiding cover below Forest Plan thresholds appear minimal.

Amendment #26 Fuels Reduction and Hazardous Tree Removal Project

This site-specific amendment exempted the Fuels Reduction and Hazardous Tree Removal Project from Forest Plan Big Game Standards 3 and 4(a). The wildlife analysis for this project concluded that the existing condition for Forest Plan Standard 3 was not met within 17 of the 27 EHUs for hiding cover and none of the EHUs met Forest Plan Standard 3 for thermal cover. The existing condition for Forest Plan Standard 4a was not met within 22 of the 27 EHUs. Implementation of the Decision did not result in any additional EHUs being below these Forest Plan Standards. The Decision resulted in minimal reductions of hiding cover within those EHUs where existing conditions were already below Forest Plan Standard 3; a one percent reduction in two EHUs and less than a one percent reduction in all other EHUs. Twenty two EHUs did not currently meet Forest Plan Standard 4a. The open road densities however were not a part of this decision.

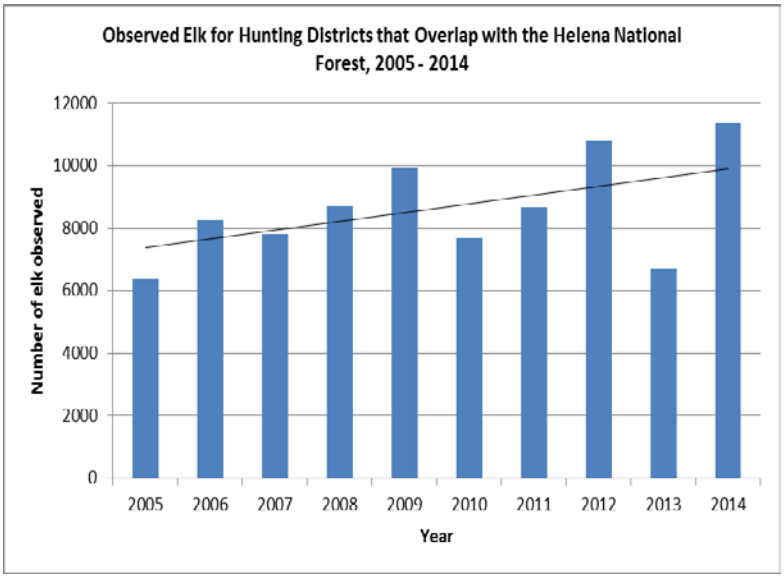

Figure 76 - Observed elk in all HDs that overlap with the Forest 2005-2014.
The black line indicates trend.

This project occurs within several HDs given that its scope is Forestwide. The trend in elk numbers continues to increase despite the fact that this decision resulted in several herd units dropping further below thresholds specified in Forest Plan standards (Figure 76). Management challenges in these HDs include limited public access, development and loss of cover and security.

Amendment #28 Cabin Gulch Vegetation Treatment Project

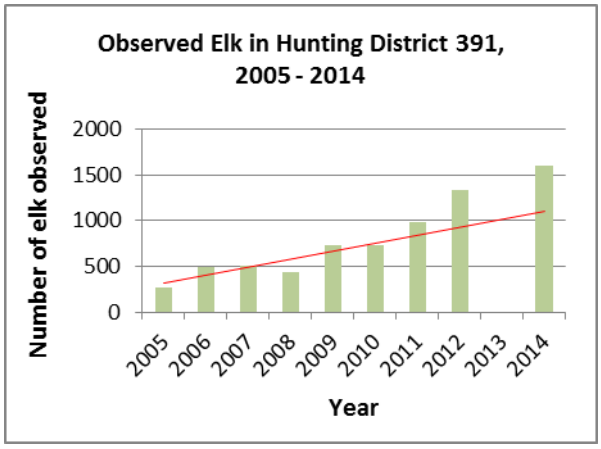

Figure 77 - Observed elk in HD 391 2005-2014.
The red line indicates trend.

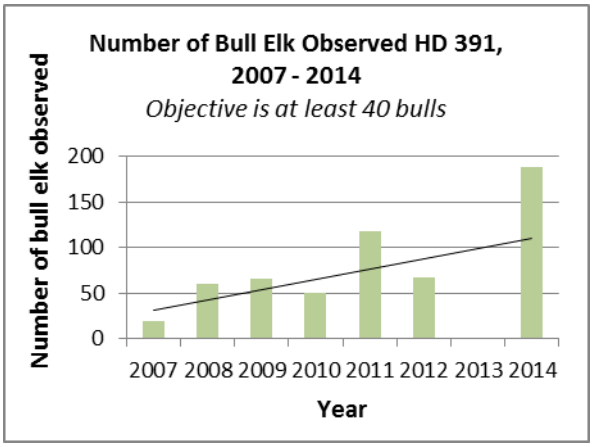

Figure 78 - Number of bull elk observed in HD 391 2005-2014.
The black line indicates trend.

This site-specific amendment exempts the Cabin Gulch Vegetation Treatment Project from the Forest Plan standards for hiding cover on summer range and the open road density standard during the hunting season (Big Game Standards 3 and 4(a) respectively, USDA 1986, p. II/17). Overall, this project will affect elk habitat to a limited extent by removing cover within the affected EHUs. Regardless of project implementation, this loss will occur naturally over the next few years due to extensive tree mortality and natural tree fall from the insect infestation. In addition, the selected treatments may be beneficial for elk over the current situation, as they could quicken the regeneration rate of new forests. The analysis concluded that through the life of the project and with the subsequent recovery of hiding cover over time, elk habitat will remain abundant and well distributed across the Forest. Approximately 2,313 acres of hiding cover will be removed in the Cabin Creek Herd Unit which is a reduction of 6 percent from the existing condition. Approximately 190 acres of hiding cover will be removed in the North Fork Herd Unit which is less than a 1 percent reduction from the existing condition.

The Cabin Gulch Project Decision did not result in any increases in open road density during the hunting season. However, due to the removal of hiding cover within the Cabin Creek and North Fork EHUs and because both EHUs are below Forest Plan Standard 4a in the existing condition, the Project Decision does not meet Standard 4a thresholds. Mitigation measures were included from the Montana Cooperative Elk-Logging Study that will minimize project-related disturbances.

This project is located in HD 391. It's currently in the implementation phase. Elk numbers and the number of bull elk observed have been increasing since 2005 and 2007 respectively (Figure 77 and Figure 78). The management challenges in this HD include limited public access and noxious weeds; not necessarily reductions in cover (MFWP 2005, pp. 255-257).

Amendment #29 Red Mountain Flume/Chessman Reservoir Project

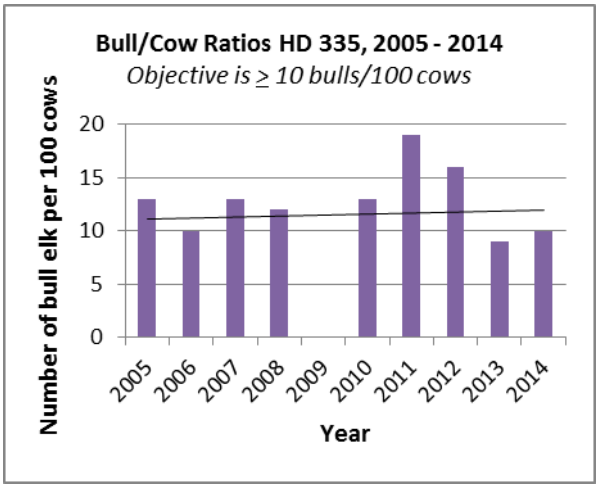

Figure 79 - Bull/cow ratios in HD 335 2005-2014.
The black line indicates trend.

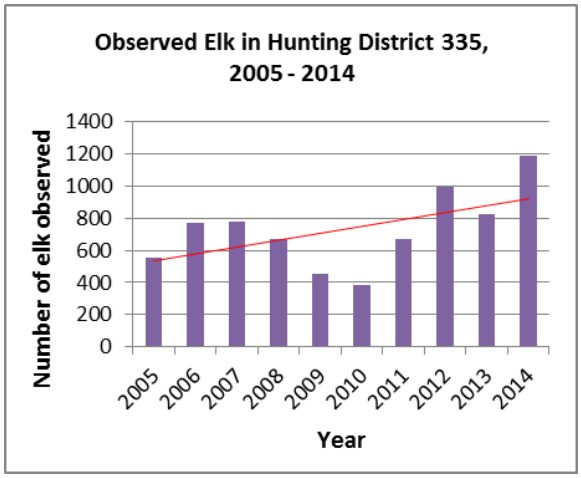

Figure 80 - Observed elk in HD 335 2005-2014.
The red line indicates trend.

This site-specific amendment exempts the Red Mountain Flume/Chessman Reservoir Project from Forest Plan Standard 3 for hiding cover on summer range (USDA 1986, p. II/17) for the Quartz Creek herd unit and from Forest Plan Standard 4a (*Ibi*d p. II/17-18) for both the Black Mountain-Brooklyn Bridge and Quartz Creek herd units. The decision to exempt this project from Standard 3 for the Quartz Creek EHU and 4(a) for both Black Mountain-Brooklyn Bridge and Quart Creek EHU may affect elk to some extent due to the removal of hiding cover from these EHUs. The project treats approximately 490 acres, removing all dead trees and woody debris from an approximate 450 foot wide corridor, along the Red Mountain Flume and removing mostly dead trees and woody debris from a broad swath around Chessman Reservoir and its meadows. All hiding cover within the units, currently 434 acres (includes 4 acres from Jericho Mountain EHU), has been removed. Approximately 0.5 mile of low-grade road has been constructed east of Chessman Reservoir and will be obliterated post-project implementation. Regardless of project implementation, this loss would occur naturally over the next few years due to extensive tree mortality and natural tree fall associated with the mountain pine beetle infestation.

The Red Mountain Flume/Chessman Reservoir Project does not result in any increases in open road density during the hunting season. However, due to the removal of hiding cover within the Black Mountain – Brooklyn Bridge and Quartz Creek EHUs and because both EHUs are below Forest Plan Standard 4a in the existing condition, the Project Decision does not meet Standard 4a thresholds. Mitigation measures have been included from the Montana Cooperative Elk-Logging Study that would minimize project-related disturbances.

This project occurs within HD 335. It is currently being implemented. Elk numbers have been increasing since 2005 while the bull/cow ratio has remained relatively static (Figure 80 and Figure 79). Management challenges in this HD include housing development and mining activity, extensive motorized use and wolf establishment (MFWP 2005, pp. 190-193).

Proposed Amendments

Telegraph Vegetation Project

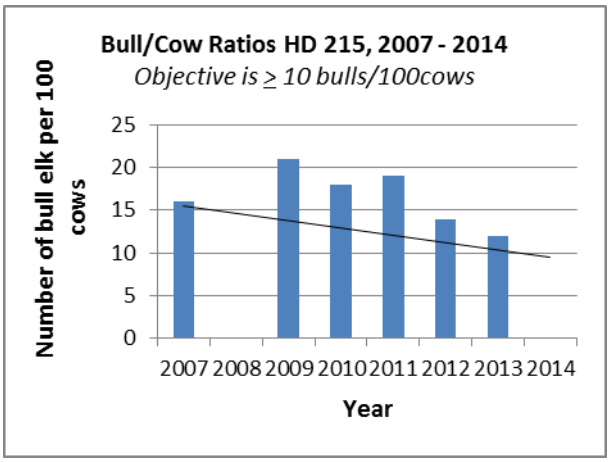

Figure 81: Bull/cow ratios in HD 215 2005-2014.
The black line indicates trend.

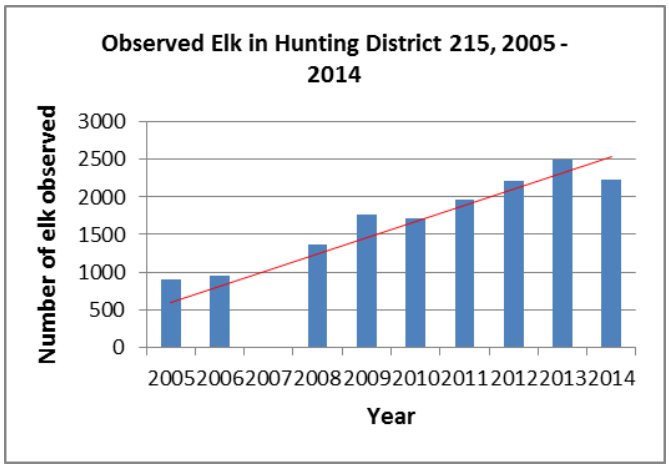

Figure 82: Observed elk in HD 215 2005-2014.
The red line indicates trend.

The Telegraph Vegetation Project area is approximately 23,669 acres in size and is located roughly 15 miles southwest of Helena and 5 miles south from Elliston, Montana, in the Little Blackfoot drainage west of the Continental Divide. The purpose of the project is to be responsive to the mountain pine beetle outbreak in this area, recover economic value of dead and dying trees, promote desirable regeneration, reduce fuels and the risk of wildfire and maintain diverse wildlife habitats. In order to meet the purpose and need, a site-specific amendment exempting the project from Forest Plan Standard Big Game Standards 3 and 4(a) may be required. This project is currently in the analysis phase.

This project occurs within HD 215. It is currently being implemented. Elk numbers have been increasing since 2005 while the bull/cow ratio has been declining (Figure 81 and Figure 82). Management challenges in this HD include housing development and mining activity, access, extensive motorized use and wolf establishment (MFWP 2005, pp. 190-193).

Stonewall Vegetation Project

The Stonewall Vegetation Project area is approximately 24,010 acres in size and is located on the Lincoln Ranger District, approximately 4 miles north and west of the town of Lincoln, Montana. The purpose of the project is to improve vegetative composition and structure across the landscape that is diverse, resilient and sustainable to wildfire and insects. In order to meet the purpose and need, a site-specific amendment exempting the project from the following standards would be required:

- Forestwide Standard 3 for hiding cover on summer range (USDA 1986, p. II/17) for the Beaver Creek and Keep Cool Creek elk herd units and thermal cover on winter range in the Beaver Creek herd unit
- Forestwide Standard 4a for open road densities during the big game hunting season (USDA 1986, p. II/17-18) for the Beaver Creek and Keep Cool Creek elk herd units
- Management Area T-2 standard for thermal cover on winter range (USDA 1986, p. III/35) within the management area
- Management Area T-3 standard for hiding cover (USDA 1986, p. III/39) within the management area
- Management Area T-2 and T-3 standards for hiding cover in timber harvest openings (USDA 1986, III/35 and III/39).

This project is currently in the FEIS analysis phase.

This project occurs within HD 281. Elk numbers and bull/cow ratios have been generally increasing since 2005 although bull/cow ratios have fluctuated (Figure 83 and Figure 84). Management challenges in this HD include access, disposition of Plum Creek Timber lands, predation and habitat conditions related to forage availability (MFWP 2005, pp. 113-115).

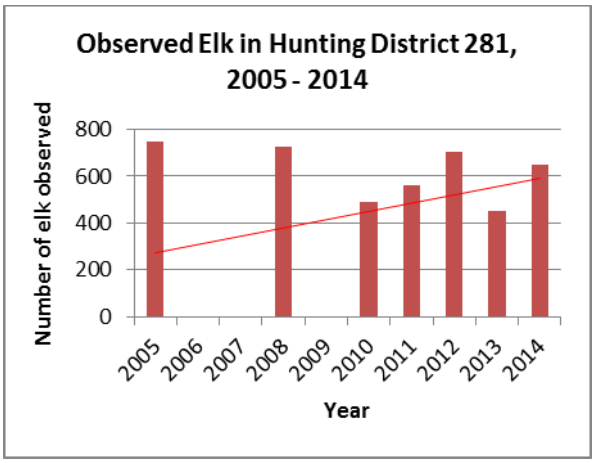

Figure 83 - Observed elk in HD 281 2005-2014.
The red line indicates trend.

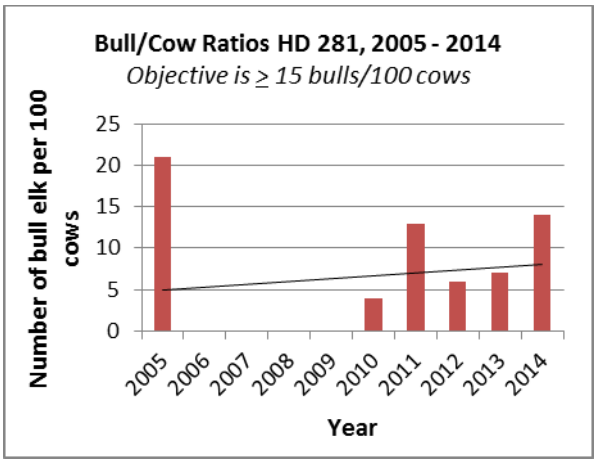

Figure 84 - Bull/cow ratios in HD 281 2005-2014.
The black line indicates trend.

Tenmile South Vegetation Project

The Tenmile – South Helena Project encompasses approximately 49,500 acres of National Forest System land west and south of Helena, Montana. The project area is located within the Upper Tenmile watershed, the primary source of municipal water for the City of Helena and extends east through Colorado Gulch and the South Hills area of Helena, Montana. The purpose of the project is to maintain consistent quantity and quality of water within the municipal watershed and improve conditions for public and firefighter safety across the landscape in the event of a wildfire. In order to achieve this purpose, there is a need to create a mosaic of vegetation and fuel structure more resilient to disturbance which would provide for safer, more effective fire suppression actions. Site-specific amendments to the Forest Plan may be necessary in order to meet the project's purpose and need. Possible amendments may be needed for Forest Plan Standards 3, 4a and 6 as well as for those management area standards listed in below.

- H1 - Maintain adequate elk thermal and hiding cover adjacent to forage areas as determined by a wildlife biologist. Generally, this means providing at least 25 percent thermal cover on identified winter range.
- H2 - Maintain adequate elk thermal and hiding cover adjacent to forage areas as determined by a wildlife biologist. Generally, this means providing at least 25 percent thermal cover on identified winter range.
- L2 - Maintain adequate elk thermal and hiding cover adjacent to forage areas as determined by a wildlife biologist. Generally, this means providing at least 25 percent thermal cover on identified winter range.
- T3 - Maintain a minimum of 35 percent hiding cover for big game. Maintain thermal cover adjacent to forage areas.
- T5 - Maintain adequate thermal and hiding cover adjacent to forage areas provided timber harvest volumes are no significantly reduced over the rotation period.

Specific design criteria and mitigations would be included in order to minimize effects to elk during project implementation. These include: restricting public use of temporary roads, prohibiting logging operations during the first two weeks of the general rifle season to maintain elk habitat capability and confining logging to a single drainage at a time with all work completed in the shortest time frame possible.

This project occurs within HD 335. Elk numbers have been increasing since 2005 while the bull/cow ratio has remained relatively static. Management challenges in this HD include housing development and mining activity, extensive motorized use and wolf establishment (MFWP 2005, pp. 190-193). See Figure 80 and Figure 79.

Site-Specific Amendment Analysis

MFWP elk population management focuses on maintaining numbers well above population viability thresholds, protecting certain sex and age classes from over-harvest, providing public hunting opportunity and attempting to balance elk distribution across public and private lands. The Forest Service strives to complement MFWP's efforts through management of elk habitat on National Forest System lands. However, within the multiple use mandate of the Forest Service, management for elk is only one of many considerations on National Forest System lands. Other multiple use considerations may be favored over elk in order to achieve management area goals of the Forest Plan. If these consideratons conflict with a Forest Plan standard, the Forest Supervisor may approve an exception to that standard (USDA 1986, p. II/14). Such has been the case with the site-specific amendments described here. However, despite these amendments and their associated impacts to cover (thermal and hiding), bull survival as measured by MFWP, is at objectives across a majority of the Forest (Figure 85). This is not to suggest that cover does not play a role in elk population dynamics. Rather, it indicates that cover alone may not be a predicator of elk numbers (Lyon and Canfield 1991; Unsworth and Kuck 1991; Lyon and Christensen 1992; Christensen *et al.* 1993, Stubblefield et al. 2006 p. 1068, Montgomery et al. 2013, p. 322, Proffitt et al. 2013).

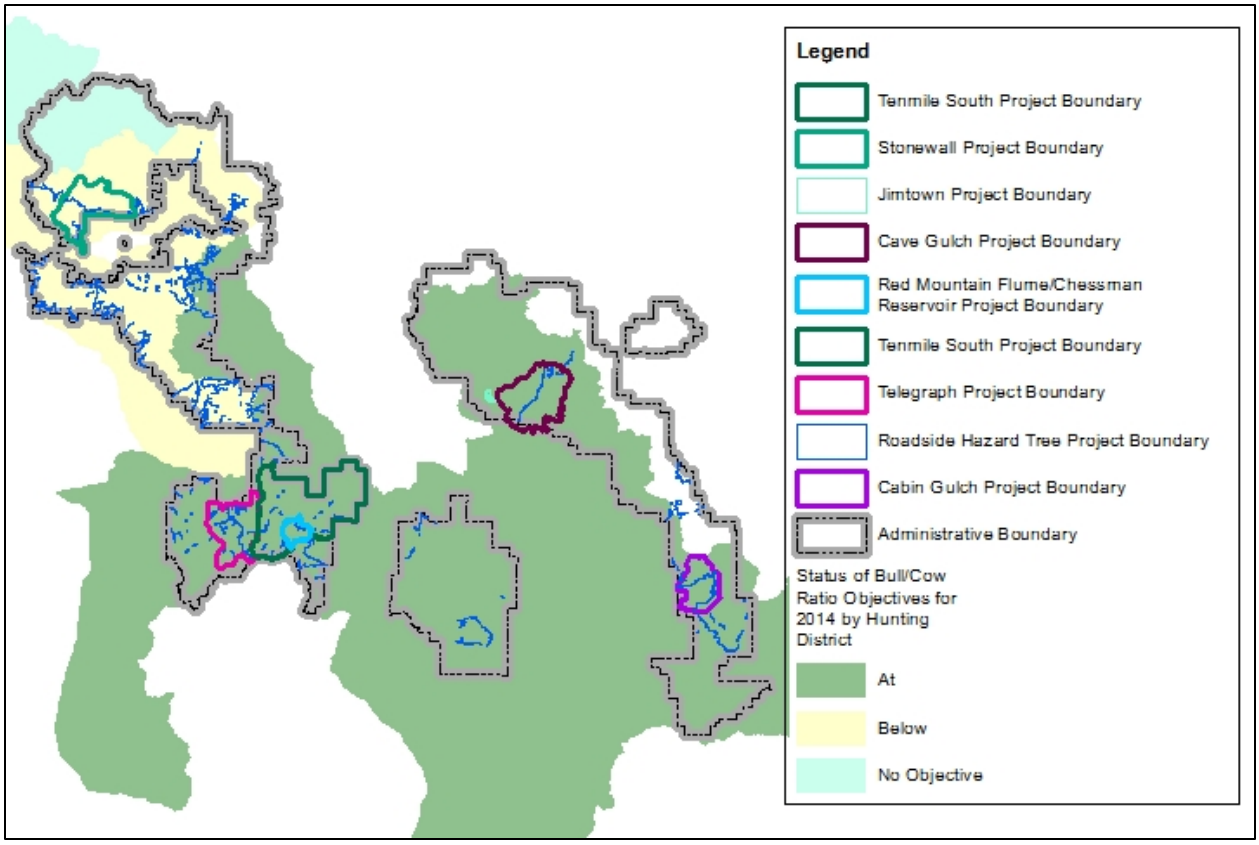

Figure 85 - MDFWP bull survival objectives and projects for which a site-specific amendment has been completed or is proposed

Total numbers of hunters, elk harvested and bull elk harvested has remained relatively stable in those HDs that overlap with the Helena National Forest suggesting that the reductions in cover associated with these site-specific amendments may be so minor as to not influence hunter numbers and harvest success (Figure 86).

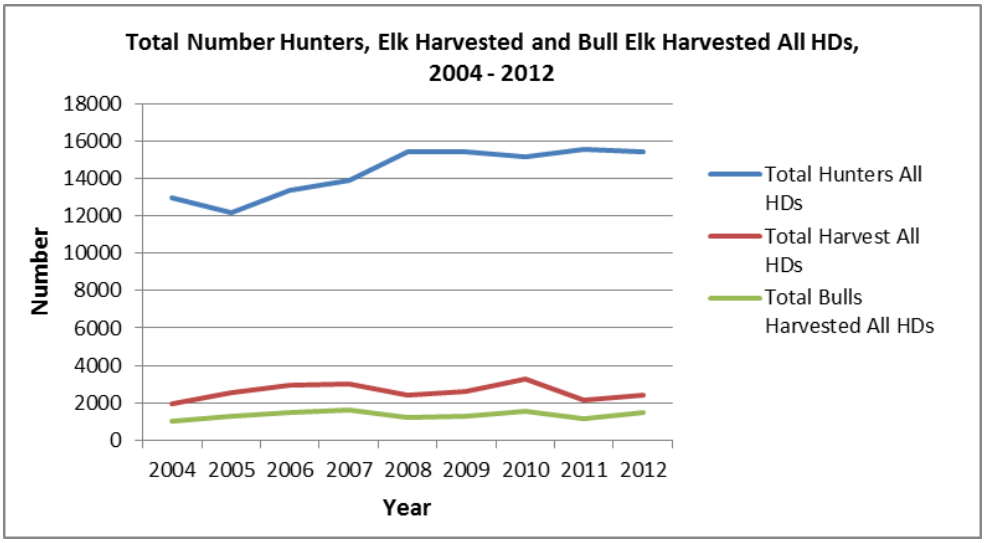

Figure 86 - Total number hunters, elk harvested and bull elk harvested in those HDs that overlap the Forest, 2004 - 2012

A variety of factors influence elk distribution and abundance in addition to cover management. The lack of public access to hunt big game on private lands and the resulting differences in relative hunting pressure can play a major role in elk population dynamics and distribution. Human disturbance and potential for displacement of big game animals is not restricted to the 5- week rifle season currently in place in Montana. Because archery hunting has increased significantly in popularity, there has been a noted shift in some cases of elk moving to private land, as a result of displacement during the archery season. Human disturbance may also influence elk habitat use and distribution during time periods outside of the hunting season. In addition, predators (generally mountain lions, wolves and bears) also influence elk population dynamics and distribution in some areas.

Elk are fairly resilient animals. Ernest Thompson Seton (as cited in RMEF 1997) postulated that 10 million elk lived in North America prior to European settlement. By 1907, there were less than 100,000. In Montana, elk were widely distributed during the era of exploration. As Montana was 'settled', elk began to decline were completely eliminated from eastern Montana by the early 1900s. Today, elk are abundant; their ability to withstand near extirpation at the turn of the last century strongly suggests that they can withstand temporary declines in available cover associated with the site-specific amendments described herein.

Programmatic Amendments

Existing Amendments

Northern Rockies Lynx Management Direction (NRLMD)

The NRLMD was amended to National Forest Plans in Montana and parts of Idaho, Wyoming and Utah in 2007. The NRLMD incorporates management direction that conserves and promotes recovery of Canada lynx, by reducing or eliminating adverse effects from land management activities on National Forest System lands, while preserving the overall multiple use direction in existing plans. Some of the NRLMD standards may benefit elk and other big game by retaining winter snowshoe hare habitat which may provide cover, reducing disturbance associated with mineral development and reducing habitat fragmentation (USDA 2007, p. 210)

Proposed Amendments

Blackfoot Non-winter Travel Plan Programmatic Amendment Big Game Standard 4a

The Blackfoot Non-winter Travel Plan is currently in the analysis phase with an anticipated FEIS in the spring of 2015. As part of this process, the Forest proposes to programmatically amend Forest Plan Standard 4a to reflect updated research. The FEIS and draft Record of Decision has been released to the public in 2014. The programmatic amendment associated with the Blackfoot Non-winter Travel Plan is the same as that for the Divide Travel Plan in terms of security area definition, motorized use, (public and other) and a goal of improving elk security as opportunities arise. The Blackfoot Non-winter Travel Plan amendment does not include consideration of intermittent refuge areas or cover. The Blackfoot Non-winter Travel Plan project area is not as fragmented as the Divide Travel Plan project area so the inclusion of intermittent refuge areas and/or cover in that programmatic document was deemed unnecessary. It is anticipated that this amendment would improve our ability to effectively manage elk habitat during the hunting season defined as 9/1 through 12/1..

Cumulative Effects Conclusions All Amendments

All of the site-specific amendments described above have been or will be site-specific in time and space; as such, effects to elk cover are transitory. None of the past amendments has resulted in significant

impacts to elk; nor should the proposed site-specific amendments significantly impact elk. Cumulatively, effects to elk hiding cover from this and other site-specific Forest Plan amendments should not compromise the Forest's ability to provide habitat potential to meet Forest Plan elk population goals. Elk will continue to be abundant across the Forest as evidenced by the increases in elk numbers since the incipience of the Forest Plan.

The past and ongoing programmatic amendments (i.e. NRLMD, Blackfoot Non-winter Travel Plan Amendment) should improve habitat for elk along with Alternative B. Alternative B would address cover losses by protecting large blocks of habitat secure from the influences of open motorized routes during the hunting season and would be beneficial in terms of the Forest's ability to manage elk habitat. Alternative A, the existing condition, will continue to lack sufficient flexibility to address long term cover losses associated with the mountain pine beetle-related tree mortality.

This programmatic amendment will have little cumulative long-term impacts to the long-term relationship with multiple-use goods and services or have a substantive impact on the land management plan or its resources when considered with site-specific amendments 7, 21, 23, 24 28 and 29.

Cumulative Effects of Site-Specific and Programmatic Amendments on Elk

The Helena National Forest is located within several hunting districts identified by MFWP (See Figure 63). The total number of elk that have been observed in these hunting districts through the 2014 aerial surveys is 14,736 (MFWP aerial survey data). Some of these hunting districts barely overlap with the Helena National Forest. Discounting those HDs, the total number of elk that have been observed on and around the Forest is 11,349 – although this is probably an underestimate because elk that occur in the 'discounted' HDs do spend some time on the Forest. Nevertheless, the number of elk associated with the Helena National Forest is well in excess of the 6,400 population target identified in the Helena National Forest Plan (USDA 1986, p. V/5).

Several of the HDs that overlap with the Forest are at population objectives in terms of both number of elk observed and bull survival post-hunting season (Table 141). Management challenges associated with those HDs below objectives (i.e. 281, 293) include predation and lack of access to private land where elk congregate and extensive motorized use. Predation and lack of public access are outside of the Forest's influence; extensive motorized use, particularly in HDs 281 and 293 is being addressed by way of the Blackfoot Non-winter Travel Plan. Management challenges for those HDs above objectives (i.e. 215, 390, 391) also include limited public access.

Table 141 - MFWP 2005 population objectives and recent trend data in Hunting Districts that Overlap with the Forest

Hunting District		Population Objectives Based on Aerial Surveys Post-Harvest (MFWP 2005)	Recent Trend Data (Year of Data)	Summary
215	Number of Elk	800-1,200 elk	2,234 elk (2014)	Elk numbers above objective and bull/cow ratio at objective. Management challenges in this HD include housing development and mining activity, access, extensive motorized use and wolf establishment (MFWP 2005, pp. 190-193).
	Bull/ Cow Ratios	Minimum 10 bulls/100 cows	12 bulls/ 100 cows (2013)	

Hunting District		Population Objectives Based on Aerial Surveys Post-Harvest (MFWP 2005)	Recent Trend Data (Year of Data)	Summary
281	Number of Elk	500-700 elk	651 elk (2014)	Elk numbers at objective and bull/cow ratio below objective. Management challenges in this HD include access, disposition of Plum Creek Timber lands, predation and habitat conditions related to forage availability (MFWP 2004, pp. 113-115) "Many segments of the elk populations are influenced by the successional stages of vegetation in the wilderness and by roadless habitats. Much of this area is not at a successional stage of vegetation that is conducive to producing abundant forage and dense elk populations."
	Bull/ Cow Ratios	At least 15 bulls/100 cows or 8% bulls/total elk observed	14 bulls/100 cows (2014)	
293	Number of Elk	750 elk	264 elk (2014)	Elk numbers and bull to cow ratio below objectives. Management challenges in this HD include development, access, noxious weeds, predation and elk security in terms of cover and road densities (MFWP 2005, pp. 197-198).
	Bull/ Cow Ratios	At least 10 bulls/100 cows	5 bulls/100 cows (2014)	
335	Number of Elk	480-720 elk	1,187 elk (2014)	Elk numbers and bull/cow ratio at objective. Management challenges in this HD include housing development and mining activity, extensive motorized use and wolf establishment (MFWP 2005, pp. 190-193).
	Bull/ Cow Ratios	At least 10 bulls/100 cows	10 bulls/ 100 cows (2014)	
343	Number of Elk	560-840 elk	650 elk (2014)	Elk numbers and bull/cow ratio at objective. Management challenges in this HD include housing development, access, noxious weeds, predation and elk security in terms of cover and road densities (MFWP 2005, pp. 197-198).
	Bull/ Cow Ratios	At least 10 bulls/100 cows	14bulls/100 cows (2014)	
380	Number of Elk	1700 – 2,300 elk	1,445 elk (2014)	Elk numbers and bull/cow ratio assumed to be at objective even though trend counts indicate otherwise (pers. comm. FWP Area

Hunting District		Population Objectives Based on Aerial Surveys Post-Harvest (MFWP 2005)	Recent Trend Data (Year of Data)	Summary
	Bull/ Cow Ratios	15 bulls/100 cows or 10% bulls/total elk observed	3% antlered bulls/total elk observed (2014)	Biologist). Management challenges in this HD include limited public access and housing development and impacts to winter range (MFWP 2005, pp. 242-245).
390	Number of Elk	900 elk	1.997 elk (2014)	Elk numbers above objective and bull/cow ratio meets objective. Management challenges in this HD include limited public access and noxious weeds (MFWP 2005, pp. 255-257).
	Bull/ Cow Ratios	65 bulls minimum	347 bulls (2014)	
391	Number of Elk	550 elk	1,608 elk (2014)	Elk numbers above objective and bull/cow ratio at objective. Management challenges in this HD include limited public access and noxious weeds (MFWP 2005, pp. 255-257).
	Bull/ Cow Ratios	40 bulls minimum	188 bulls (2014)	
392	Number of Elk	880-1,320 elk	1,313 elk (2011)	Elk numbers and bull/cow ratio at objective. Management challenges identified for this HD include access and noxious weeds (MFWP 2005, p. 249).
	Bull/ Cow Ratios	At least 10 bulls/ 100 cows or at least 7% bulls/total elk observed	10 bulls/100 cows (2011)	

National Forest Management Act

The National Forest Management Act (NFMA) provides that forest plans may be amended in any manner, but if the management direction results in a significant change in the plan, additional procedures must be followed.

In April 2012, the Forest Service adopted new planning regulations at 36 CFR 219, Subpart A and Subpart B, which replaced the final 2000 land management planning rule (2000 rule) as reinstated in the Code of Federal Regulations on December 18, 2009 (74 FR 67062). The 2012 rule includes a transition period during which plan amendments may be initiated under the provisions of the prior planning regulation for 3 years after May 9, 2012 and may be completed and approved under those provisions. This amendment is being completed under the provisions of the prior regulations. It is, however, subject to the objection process in 36 CFR 219 Subpart B (at 219.59(b)).

The 1982 regulations at 219.10(f) require the agency to determine whether or not a proposed amendment would result in a significant change in the plan. If the change resulting from the proposed amendment is determined to be significant, the same procedure as that required for development and approval of a plan shall be followed. If the change resulting from the amendment is determined not to be significant for the purposes of the planning process, then the agency may implement the amendment following appropriate public notification and completion of the NEPA procedures.

Forest Service Manual section 1926.5 identifies factors to consider in determining whether an amendment is significant or non-significant for those plans using planning regulations in place before November 9, 2000.

Forest Service Manual section 1926.51 identifies factors to consider in determining whether an amendment is significant or non-significant for those plans using planning regulations in place before November 9, 2000 (Table 142).

Table 142 - Factors for consideration to determine amendment significance

Changes to the Land Management Plan That are Not Significant	Management Standards 3 and 4(a) Exceptions
1. Actions that do not significantly alter the multiple-use goals and objectives for long-term land and resource management.	This amendment is consistent with the goals and objectives of the Forest Plan, including Forestwide goals to maintain and improve the habitat over time to support big game and other wildlife species. (USDA 1986, page II/1). The amendment will provide habitat to support viable populations of elk. Long term goals and objectives associated with other resource management such as vegetation management, grazing and mineral management, are not expected to be significantly altered as a result of this amendment
2. Adjustments of management area boundaries of management prescriptions resulting from further on-site analysis when the adjustments do not cause significant changes in the multiple-use goals and objectives for long-term land and resource management.	The amendment does not adjust management area boundaries or management prescriptions.
3. Minor changes in standards and guidelines.	This amendment does provide for a change in management standards for big game in the project area. It incorporates more recent science as well as input from Montana Fish, Wildlife and Parks, the state wildlife management agency. The amendment provides a standard that more closely ties to direct impacts to elk security and is not as tied to vegetation conditions, which can be affected by many factors, including those related to climate change stressors.
4. Opportunities for additional projects or activities that will contribute to achievement of the management prescription.	This amendment will apply to other projects within the project area. It provides an improved measure of security for big game and more management opportunities for achieving management prescriptions.
5. Actions that significantly alter the multiple-use goals and objectives for long-term land and resource management.	This amendment would not alter the long-term relationship between levels of multiple-use goods and services originally projected in the Forest Plan for wildlife habitat, Allowable Sale Quantity, or other resource outputs, nor does it have an important effect on the entire land management plan or affect land and resources throughout a large portion of the planning area during the planning period.

This amendment would not alter the long-term relationship between levels of multiple-use goods and services originally projected in the Forest Plan for wildlife habitat, Allowable Sale Quantity, or other resource outputs, nor does it have an important effect on the entire land management plan or affect land and resources throughout a large portion of the planning area during the planning period.

Based on consideration of the four factors identified in the Forest Service Manual, 1926.51 and considering the Forest Plan in its entirety, amending Standard 4a of the Forest Plan would not be a significant change under NFMA to the Helena Forest Plan. This amendment is fully consistent with, but further refines and clarifies the means to achieve, current Forest Plan goals and objectives.

Amending Standard 4a would not affect the Forest's ability to realize the elk population potential established in the Forest Plan. When the Forest Plan Record of Decision was signed in 1986, the selected alternative was E-1. Alternative E-1 established Forestwide elk population potential for summer and winter range. In 1986, the Forest Plan summer range elk potential was 6,300 elk; the winter range elk potential was 4,000 elk. By decade 5, summer range elk potential in the Forest Plan was projected at approximately 6,200 elk and winter range elk potential at 3,200 elk (Forest Plan Record of Decision page 13, Forest Plan FEIS pages II/56-60). Based on aerial survey data collected by MFWP, there are at least 10,727 elk that have been observed on and around the Forest, in excess of the 6,400 population target identified in the Helena National Forest Plan (USDA 1986, p. V/5).

Further, this amendment would not preclude the Forest's ability to achieve the goals and objectives as outlined in the Forest Plan. The goal, to "maintain and improve the habitat over time to support big game and other wildlife species" (USDA 1986, p. II/1) is being achieved with the proposed new amendment as well as through the retention of other existing Forest Plan standards. Our objective, - "management will emphasize…the maintenance or enhancement of elk habitat..." (USDA 1986, p. II/4) – is also being realized for the same reasons.

We would also continue to achieve our objective of "ensuring that viable populations of existing…animal species are maintained" (USDA 1986, p. II/17). Elk habitat will remain abundant and well distributed across the Forest. It is anticipated that the Forest will retain security components necessary to maintain a viable and huntable elk population. However, while habitat (e.g. hiding cover) is important to the long term viability of elk populations, elk populations – and their viability - are more likely to be controlled by harvest than by limits in cover (Unsworth et al. 1993, Bender and Miller 1999, Biederbeck et al. 2001, Conard et al. 2012). However, standards will remain in place that provide for hiding cover considerations.

Furthermore, implementation of this project and others for which Forest Plan amendments have been or could be applied, should not impede the ability of the Forest to maintain and/or improve big game security while providing for an extended hunting season – the intent of Standard 4a. The metrics used by MFWP to determine if elk objectives are being met indicate that in many cases the hunting districts that overlap with the Forest are at or above MFWP objectives.

Endangered Species Act

The Endangered Species Act creates an affirmative obligation "…that all federal departments and agencies should seek to conserve endangered and threatened species" of fish, wildlife and plants. Implementation of Alternative B, the amendment, would not affect listed or proposed species or critical habitat.

National Historic Preservation Act

This amendment is a programmatic action and does not authorize site-specific activities. Projects undertaken following the management direction will comply fully with the laws and regulations that

ensure protection of cultural resources. This plan direction complies with the National Historic Preservation Act and other statues that pertain to the protection of cultural resources.

Clean Water Act

This amendment is a programmatic action and does not authorize site-specific activities. Projects undertaken following the management direction will comply fully with the laws and regulations that ensure protection of water quality. This plan direction complies with the Clean Water Act and other statutes that pertain to the protection of water quality.

Environmental Justice

Executive Order 12898 directs federal agencies to identify and address, as appropriate, any disproportionately high and adverse human health or environmental effects on low-income and minority populations. This plan direction has no effect on low income or minority populations.

Summary and Conclusions

One of the objectives of the Divide Travel Plan is to avoid imposing outdated management direction contained in the *Helena Forest Plan* (USDA 1986) on the road and trail system of the Divide landscape. The argument for doing so with regard to big game security standards has been made in previous sections. This section condenses those rationale into a more compact format.

The Travel Plan is designed to maintain a road and trail system that provides the public with reasonable access to the National Forest and allows the Forest Service to manage the landscape with some efficiency, while, at the same time, buffering as much of the wildlife resource as possible from problems generated by motor vehicles and disruptive human presence in general. Part of the process of balancing the need for road access with the security requirements of big game animals entails developing a system of habitat assessment and management guidance that can accurately depict the security status of elk in a given area and appropriately address any problems detected. Experience with the Forest Plan over the last couple decades has led Helena National Forest wildlife biologists to conclude that elk security standards in the Plan [particularly Standard 4a (USDA 1986, p. II/17 – II/18)] do not accurately reflect the habitat needs of elk during the hunting season and have required road closures that restrict travel but often do not improve elk security.

In particular:

- *Forest Plan* Standard 4a (the big game security index) indicates that three of the 6 EHUs in the Divide landscape are deficient in elk security to the point that they do not meet the standard.
- Despite the fact that three out of 6 EHUs do not meet Forest Plan Standard 4a, elk numbers have been steadily increasing since the crafting of the Forest Plan in 1986. Aerial survey data collected by Montana Department Fish, Wildlife and Parks staff through 2014 indicate that there are at least 11,349 elk within the hunting districts that cover the Forest. This is well above the 6,400 benchmark identified in the Forest Plan.
- MFWP data indicate that elk populations in the Divide landscape are either at or near population objectives of the *Montana Final Elk Management Plan* (2005) for the last several years for most of the HDs; or that management challenges are are only partially habitat related. That is, elk security is adequate in many HDs. The existing Forest Plan standard is not an accurate indicator of elk security.

- In spite of the fact that the Travel Plan alternatives close several miles of routes to vehicle access during the hunting season, the analysis for Standard 4a indicates that only one EHU shows improvement in elk security over the existing condition.
- In one of the six herd units (Greenhorn), not even the closure of all roads managed by the Forest would be enough to meet Standard 4a. The Helena National Forest is in the position of never being able to meet Standard 4a in this herd unit in the foreseeable future (even while elk continue to thrive).
- By introducing reasonably measurable criteria as part of the formula for guaging the level of security needed in a given herd unit, the new standard provides a more realistic means of guiding travel management on the Forest.

In conclusion, Forest Plan Standard 4a inaccurately depicts the nature of elk security in the Divide landscape, is insensitive to changing road densities and places unnecessary and impractical constraints on travel management. Meanwhile, the more recently developed elk security area methodology provides a reasonably accurate picture of elk security across the landscape, is responsive to proposed changes in open road patterns and correctly directs management to areas that need further attention.

Although this amendment eliminates cover measurements as part of the determination of elk security, it does not change other elk or big game related standards relative to the analysis and maintenance of cover, notably Forestwide Big Game Standards 1, 2, 3 and 5. Big Game Standards 4b thru 4h and 6 regarding road management activities are also still in effect.

"In areas with high hunter densities and general bull seasons, it is unlikely that road closures alone will reduce bull mortality to acceptable levels. We are not aware of an elk population that is hunted (except those that are hunted under a very limited number of controlled permits) where it has been shown that environmental or habitat factors are limiting the male cohorts of the populations. Habitat is definitely important to the long term viability of elk populations, but we believe that elk populations are more likely to be controlled by harvest than by limits in cover or forage. In most years, hunters, their efficiency modified by road density and topography, control elk populations." (Unsworth et al. 1993)

Monitoring

Forest plan monitoring items will remain in place that will serve as the basis for determining if the proposed amendment is meeting the Forest's goals and objectives for big game. These monitoring items include:

- C1 - Monitoring of seasonal distribution, movement patterns and density of elk as determined by ground and aerial observations (USDA 1986, p. IV/7);
- C2 - Habitat evaluation to determine habitat preferences by elk (and other big game species (*Ibid,* p. IV/7);
- C3 - Habitat evaluation to determine effects of land use activities on ungulates (*Ibid,* p. IV/7);
- C4 – Habitat evaluation to determine impacts of open road densities, livestock grazing and effects to cover on elk habitat potential (*Ibid*, p. IV/8)

SENSITIVE PLANTS

Regulatory Framework

The Endangered Species Act (1973) as amended, the National Forest Management Act of 1976 (PL 94-588) and the National Environmental Policy Act (1978) require protection and consideration of threatened, endangered and other "rare" species.

Threatened and endangered plant species in Region 1 include:

- Macfarlane's four-o'clock (*Mirabilis macfarlanei*);
- Spalding's catchfly (*Silene spaldingii*);
- Water howellia (*Howellia aquatilis*); and
- Western prairie fringed orchid (*Platanthera praeclara*).

There are no known or suspected populations of these species on the Helena National Forest. These species will not be discussed further in this report.

Whitebark pine was analyzed by the U.S. Fish and Wildlife Service in 2010 as a candidate for listing. Their 12-month finding states that whitebark pine as a species is declining based on synergistic threats from habitat loss (USDI 2011). However, U.S. Fish and Wildlife Service also states that the entire range of whitebark pine is not threatened by extinction. U.S. Fish and Wildlife Service determined that whitebark pine federal listing is warranted but precluded, which currently makes the species a candidate for federal listing. The Region 1 Regional Forester added whitebark pine to the Regional Forester's Sensitive Species list on December 24, 2011 (USDA 2011). Several threats to whitebark pine were identified by the Fish and Wildlife Service (USDI 2011), the combination of which has raised concerns about the long-term viability of whitebark ecosystems.

The *Forest Plan* for the Helena National Forest (USDA 1986) direction for sensitive plants (II/20) is as follows:

> *8. Species of Special Concern*
>
> *There are habitats on the Forest where the following species of special concern may be found:*

- Lemhi penstemon (Penstemon lemhiensis);
- Howell's gumweed (Grindelia howellia);
- Missoula phlox (Phlox missoulensis); and
- Cliff toothwort (Cardamine rupicola).

Missoula phlox and cliff toothwort have been located on the Helena National Forest. Other plants that are termed rare have also been located on the Helena National Forest. They are Klaus' bladderpod (Lesquerella klausii) and Long-styled thistle (Cirsium longistylum). Two additional rare plants, Moschatel (Adoxa moschalellina) and lesser rushy mikvetch (Astragalus connvallarius) are believed to occur on the Helena National Forest but currently have no occurrence records.

If any of these species are verified on the Forest, appropriate measures, pursuant to Section 7 of the Endanger(ed) Species Act, will be taken.

The *Forest Plan* refers to Section 7 of the Endangered Species Act. Section 7(a)(1) states that "*All other Federal agencies shall…utilize their authorities in furtherance of the purposes of this chapter by carrying out programs for the conservation of endangered species and threatened species….*" Section 7(a)(2) states that "*Each Federal agency shall, in consultation with the U.S. Fish and Wildlife Service, insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened or result in the destruction or adverse modification of (its) habitat*" (Reel et al. 1989).

Subsequent to the completion of the *Forest Plan*, the Regional Forester has designated sensitive plant species for the Region and identified the known and suspected species for each Forest. Regional office direction in 2011 updated the Forest's sensitive species list. That list still includes two of the species listed in the *Forest Plan*, Howell's gumweed and Missoula phlox (now called *Phlox kelseyi* var. *missoulensis* instead of *P. missoulensis*). The other species listed in the *Forest Plan* are not included in the updated sensitive plants list for the Forest or the Northern Region and are not included in specific species searches. The 2011 list reflects a change made in November of 2004, in which the Regional Forester removed long-styled thistle *(Cirsium longistylum)* from the sensitive plant list. The Regional Sensitive Species list can be found in the project file.

A letter from the Regional Foresters of Regions 1, 4 and 6, dated August 7, 1995 (see project file), further defines the Forest Plan intent with the following: "*Loss of individuals or habitat can be considered significant when the potential effect may be: 1.) Contributing to a trend toward Federal listing; 2.) Results in a significantly increased risk of loss of viability to a species; or, 3.) Results in a significantly increased risk of loss of viability to a significant population (stock).*"

Assumptions

The following assumptions were used:

- The sensitive species list and descriptions for the Helena National Forest were used for the analysis as described in appendix A;
- Geospatial information systems combined with habitat information, on the ground experience and past surveys are useful to screen areas of low probability of species occurrence;
- Reconnaissance of representative habitats is appropriate to determine the presence of sensitive plant populations;
- Known habitats need to be specifically identified and surveyed in the field;
- No ground disturbing activities are proposed in this project;
- Use of over-snow motorized vehicles would not result in any plant disturbance as the ground would be covered with snow; and
- Roads and motorized trails located on private land and those that are not under Forest Service management were not considered in this analysis.

Design Features

The following design criteria are applicable for all action alternatives.

For populations known to occur within the project area, a buffer would be established around each plant population as a no-entry zone for equipment associated with road maintenance. A 100-foot buffer would be established around any known populations where no herbicide application would occur. The exception for this would be *Juncus hallii*, which is not affected by

broadleaf herbicides; non-specific herbicides such as Round-up would not be allowed for application within a 100-foot buffer of *Juncus hallii* populations.

If any sensitive plant populations are found within road rights-of-way, those areas would be buffered and protected using design criteria appropriate for the species.

Weed treatment, such as herbicide application, will be consistence with guidance from the Helena National Forest Weed Treatment Project FEIS (2006) such that sensitive plant populations will be protected.

Monitoring

Continual survey work within potential habitat would occur associated with other projects and would add to the knowledge base for sensitive plant populations and habitat. This information would be used to protect new populations as described above.

Information Used

Experience, GIS analysis and information from plant surveys in adjacent areas and specific plant surveys in high potential habitat were used to determine areas that would be more likely to support sensitive plant populations.

The Montana Natural Heritage Program (MTNHP) maintains a statewide database for sensitive species. Data from the Montana Natural Heritage Program were used for known sensitive plant populations. Ground reconnaissance was conducted by the Helena National Forest ecologist and trained field crews in representative habitats within the Divide Travel Planning Area.

FIA plot protocol requires identification of sensitive plant species; these data were analyzed for sensitive plant presence. Botanists were part of data collection crews in the FIA data collection and were instructed to look for sensitive plants while travelling between plots as well as while collecting data at plots.

New plant populations have been found and are included in the Forest GIS layer as well as this analysis.

Past surveys by the Montana Natural Heritage Program (Barton and Crispin 2002; Poole and Heidel 1993) as well as past surveys by the Helena National Forest ecologist were used to focus the survey work.

Surveys conducted in conjunction with other projects were used to supplement the knowledge base for the Divide Travel Planning Area. Potential habitat was identified by selecting land types that commonly have high or perched water tables, along with slopes of 0 to10 percent to locate treatment areas that may support habitat for the species that require moist habitats. Potential wetlands were surveyed by trained field crews who also searched for sensitive plant species.

A University of Montana Master's study (Nock 2008) was conducted within the Divide Travel Planning Area that identified potential habitat which was then surveyed for sensitive plants.

Both negative and positive survey information was used from all surveys in the preparation of this analysis.

Methodology & Scientific Accuracy (40 CFR 1502.15)

The methodology used for this analysis includes best available data from several geospatial layers using known sensitive plant populations to predict sensitive plant habitat.

General reconnaissance surveys as well as FIA data collection were conducted in the project area. Botanists were part of the FIA data collection crews and were instructed to search for sensitive plants while travelling between data points as well as at the data points themselves. The specific layers used to identify potential sensitive plant populations include the Montana Natural Heritage Program data on sensitive species, the Helena National Forest Soil Survey (USDA 2001), habitat types from the Master Vegetation database, experience from past surveys and field crew surveys in areas identified as potential habitat.

Botrychium crenulatum, Juncus hallii and Schoenoplectus subterminalis, are associated with wetlands and moist areas. Potential wetlands were modeled using sensitive land types - areas identified as having wet or moist areas and slopes less than 10 percent. These areas were intersected with potential habitat and surveyed in 2009 across various project areas. In 2009 focus was on the Telegraph project area which has known populations of *Juncus hallii*. In 2010, the Ten Mile area and MacDonald pass areas were surveyed, using a potential wetlands GIS layer developed by the Forest hydrologist (see project file). A species list associated with each wetland is available in the project file. Numerous populations of *Juncus hallii* were found during field surveys in 2009 across the Forest; 10 populations were within the Divide Travel Planning Area. No other species associated with moist to wet habitats were found during these surveys. In 2012, an additional *Juncus hallii* population was located within the project area. *Schoenoplectus subterminalis* is known from the Indian Meadows Research Natural Area on the Lincoln Ranger District. The species was not found during riparian surveys using Pacific INFISH Biological Opinion (PIBO) protocols in sample sites across the Forest, or in wetland surveys across various project areas. Plot locations for negative survey locations for these species are maintained in GIS databases as well as the wetlands data referred to above.

Botrychium paradoxum and *Phlox kelseyi* var *missoulensis* are associated with non-forest habitats. The R1-VMAP product (USDA 2009) was used to identify non-forested areas within major grazing allotments within the project area (i.e. Little Blackfoot and North Divide allotments). Plot data was collected throughout these allotments by field crews trained to identify sensitive plant species. FIA and FIA grid intensification data points have not discovered any populations of these species to date. Numerous negative survey data (other than FIA data) is maintained in GIS databases. The Montana Natural Heritage Program database identifies 10 areas of *Phlox kelseyi* var. *missoulensis* on the Helena National Forest. Two of those populations of *Phlox kelseyi* var. *missoulensis* were located on the Forest in 2008 by the Forest Ecologist and Regional Botanist and three additional populations were found in 2009 while the Forest was validating a model which predicts sensitive plant habitat (Nock 2008; Bicker field surveys 2009). One additional population was found in 2008 and verified in 2011 by the Forest Ecologist (see project file, Olsen notes). Two additional populations were located in 2014. In total eight populations occur in the Divide Travel Plan Area. Details for field survey protocols and areas that were searched can be found in the project file.

Cypripedium parviflorum is found in fens, damp mossy woods, seepage areas and moist forest-meadow ecotones in valleys and lower elevations in the mountains. This species had been identified in the Montana Natural Heritage Program database as being present in the Mount Helena area, but has never been relocated. The Montana Natural Heritage Program botanist has determined that the location was likely in error (see project file). Habitat for the species is limited in the project area. Numerous negative survey data (other than FIA data) is maintained in GIS databases. The species has not been located on the Forest to date.

Numerous surveys and inventories have been conducted in the Divide Travel Plan area over the past 20-years or more: FIA grid intensification plots are a systematic placement of intensive inventory plots where data collectors are instructed to search for and identify sensitive plant species (see project file for detailed information on FIA data collection procedures); roadside surveys associated with noxious weed infestations (Barton and Crispin 2002), project level reconnaissance by Forest Service field crews; riparian study plots; field survey crew inventories (Little Blackfoot and North Divide Allotments). Negative survey information is used in identifying potential habitat and as well as to help identify areas that do not support sensitive plant habitat. A list of past projects in the Divide Travel Plan area can be found in the cumulative effects table appendix B.

A literature review has been completed of available information on sensitive plant species, habitat and disturbance process effects on flora. (Barton and Crispin 2002; Chadde et al. 1998; Cooper et al. 2005; Hurd et al. 1994; Keane at al. 2012; Mack et al. 2000; Montana Natural Heritage Program, Plant Species of Concern Database 2014; Nock 2008; Pauchard et al. 2003; Reel et al. 1989; Tomback et al. 2001)

Sensitive Plants, Affected Environment

Introduction

Sensitive species in the Northern Region of the Forest Service are those plant and animal species identified by the Regional Forester for which population viability is a concern. Viability concern is evidenced by: 1.) substantial current or predicted downward trends in population numbers or density and/or 2.) substantial current or predicted downward trends in habitat capability that would reduce a species' existing distribution (Reel et al. 1989).

The Helena National Forest has known or suspected occurrences of 21 species of sensitive plants. A complete list of these species and a description of associated habitat can be found in Table 143. The likelihood of occurrence of a given species within the project area and status is listed below.

The species listed as "possible" are those species whose habitat is potentially included in the project area. The remaining species do not have habitat that would be directly impacted by these activities, due to the type of habitat or geographic location in which the plants occur.

The species that are specifically addressed in this analysis are those identified as possible in the project area (indicated in bold in Table 143).

Table 143: Helena National Forest Sensitive Plant Species

Species	Known Occurrences HNF	Known from Divide Travel Plan Area	Likelihood of Occurrence in Project Area
Amerorchis rotundifolia Orchidaceae	No	No	Unlikely – known from the Rocky Mtn. Front and NW corner of state, in spruce forests along seeps/streams. Geographically unlikely to occur.
Aquilegia brevistyla Ranunculaceae	No	No	Unlikely – in Montana, known only from Little Belt Mtns.; open woods and stream banks at mid-elevations in montane zone. Geographically unlikely to occur.

Species	Known Occurrences HNF	Known from Divide Travel Plan Area	Likelihood of Occurrence in Project Area
Astragalus lackschewitzii Fabaceae	No	No	Unlikely – restricted to high elevation gravelly and rocky slopes and ridges; habitats not generally subject to human disturbance.
Botrychium crenulatum Ophioglossaceae	No	No	**Possible** – known from the Beaverhead Deerlodge and in western Montana, generally in wet habitats with high cover
Botrychium paradoxum Ophioglossaceae	Yes	Yes	**Known** from the Occidental Plateau and near Irish Mine Hill; habitat of Helena NF populations are in sagebrush/rough fescue and rough fescue, however other populations have been documented from mesic meadows associated with spruce and lodgepole pine forests in montane and subalpine (MTNHP 2010),
Cypripedium parviflorum Orchidaceae	No*	No	**Possible**. Habitat in fens, damp mossy woods, seepage area and moist forest-meadow ecotone, valley & lower montane. Former location near Mount Helena has not been relocated and is believed to be in error (Mincemoyer email, project file).
Cypripedium passerinum Orchidaceae	No	No	Unlikely– in mossy, moist, or seepy places in coniferous forest; northwestern Montana including Glacier NP. Geographically unlikely to occur.
Drosera anglica Droseraceae	Yes	No	Unlikely – Known from Indian Meadows, occurs with sphagnum moss in wet, organic soils of fens. Specialized habitat not present in Divide travel plan area.
Drosera linearis Droseraceae	Yes	No	Unlikely – Known from Indian Meadows, in wet, organic soil of nutrient-poor fens. Specialized habitat not present in Divide travel plan area.
Epipactis gigantea Orchidaceae	No	No	Unlikely – associated with seeps/springs, often thermal. Specialized habitat not present in Divide travel plan area.
Goodyera repens Orchidaceae	No	No	Unlikely – in Montana, known from Little Belt and Big Snowy Mtns.; in moist, montane forests with mossy understory. Geographically unlikely to occur.
Grindelia howellii Asteraceae	No	No	Unlikely – endemic known only from a cluster of sites in the Blackfoot drainage wetlands and a single county in Idaho. Geographically unlikely to occur.
Juncus hallii Juncaceae	Yes	Yes	**Known**, several populations occur on the Forest in the Big Belts and the Divide area. Moist to wet meadows.

Species	Known Occurrences HNF	Known from Divide Travel Plan Area	Likelihood of Occurrence in Project Area
Oxytropis podocarpa Fabaceae	No	No	Unlikely – habitat in alpine zone. Specialized habitat not present in Divide travel plan area.
Phlox kelseyi* var. *missoulensis Polemoniaceae	Yes	Yes	**Known** from the Divide Travel plan area, including the analysis area; habitat is rough fescue meadow, exposed, limestone-derived slopes in foothills and montane.
Pinus albicaulis Pineaceae	Yes	Yes	**Known** - Occurs in mixed stands at the higher elevations of the project area.
Polygonum douglasii* ssp. *austinae Polygonaceae	Yes	No	**Possible** – Known from the Big Belts landscape in open gravelly shale-derived soil of eroding slopes/banks or usually moist barren shale slopes. MTNHP shows additional occurrences within proximity but on.
Saxifraga tempestiva Saxifragaceae	No	No	Unlikely– Montana endemic known only from vernally moist open sites and rock ledges at high elevations, west of Continental Divide. Geographically unlikely to occur.
Schoenoplectus subterminalis Cyperaceae	Yes	No	**Possible**– Known from Indian Meadows and sites in NW primarily west of Continental Divide; open water and boggy margins of ponds, lakes and sloughs.
Thalictrum alpinum Ranunculaceae	No	No	Unlikely – in Montana, known from sites in SW corner, in moist alkaline meadows. Geographically unlikely to occur.
Veratrum californicum Liliaceae	No	No	Unlikely – in Montana, from 4 sites in Bitterroot Valley. Geographically unlikely to occur.

*Species found on or very near the HNF. **Bolded, Species whose habitat is potentially included in the project area.**

Analysis Area

The rights-of-way of travel-ways within the project area were used as the analysis area for direct effects. The Divide Travel Plan area was used for indirect effects on individual populations.

Sensitive Plant Populations

This assessment addresses the potential for sensitive plant populations to occur in the project area and within the rights-of-way of travel-ways and the effects of the alternatives on those populations.

Species Known or Possibly Present

Four sensitive plant species are known to have habitat in the project area, as shown in Table 143: *Botrychium paradoxum, Juncus hallii, Phlox kelseyi* var. *missoulensis* and *Pinus albicaulis*. Additionally the following four species may have habitat in the project area: *Botrychium crenulatum, Cypripedium parviflorum, Polygonum douglasii* spp. *austiniae and Schoenoplectus subterminalis.*

Botrychium crenulatum has not been found to-date on the Helena National Forest. This species has been found on the Beaverhead-Deerlodge National Forest, immediately adjacent in the Occidental Plateau area. The habitat for this species is moist to wet areas, similar habitat to that of *Juncus hallii*. This species is searched for in all wetland and riparian surveys but has not been found to-date.

Botrychium paradoxum is known from two populations on the Helena National Forest, one population is known within the Divide Travel Plan project area. The population is near a motorized trail in the Irish Mine Hill area in an open rough fescue grassland area. This species has been found in sagebrush/rough fescue shrublands and rough fescue grasslands on the Helena National Forest.

Cypripedium parviflorum has not been found to-date on the Forest. An unverified record of this species from the Mount Helena area has been determined to be unfounded (see project file). Habitat for this species includes fens, moist woods and seepage areas in the lower mountain areas. Limited habitat exists in the project area due to the low elevation that this species occupies, along with the moist habitat requirements.

Juncus hallii is known to occur at several locations on the Helena National Forest. In the Divide project area, Hall's rush is documented at 18 locations, including sites discovered in 2009 and 2012 during project surveys. The populations are associated with the headwaters of Ontario and Clemmer gulches, above Sally Anne Creek, in Sure Thing swamps, one location in the headwaters of Tenmile Creek and a population near Chessman reservoir. This species typically occurs in moist grasslands and sedge meadows (Poole and Heidel 1993). The Helena populations are on the edge of more moist riparian or wetland areas, similar to the habitat for *Botrychium crenulatum*. Many negative surveys were found during wetland identifications. The populations tend to be small and isolated; it is likely that many populations could exist, particularly in the area where other known populations are concentrated. The species has not been found to date west of the Little Blackfoot River or north of Highway 12 in the project area.

Although widespread across the mountainous portions of southwest and central Montana, *Juncus hallii* is rare. Threats and potential negative impacts to most known occurrences appear to be minimal and the species is likely tolerant of some levels of disturbance (MTNHP 2013). The Montana Natural Heritage Program has recently removed Hall's rush from their Species of Concern list, its status re-determined as low-risk, low priority due to its occurrence in at least 15 subwatersheds.

Phlox kelseyi var. missoulensis has eight known populations within the analysis area. Two large populations, north and south of the highway on MacDonald pass, one population in the Austin Creek area, one population near Baldy Ridge, one small population on FS Trail 501 (Kading cabin); one east of Larabee Gulch road; one between the top of Kading Grade (FS Trail 501) and the Fred Burr road, 1868; one on either side of FS Road 708-E3 (Snowshoe Creek). Several of the populations are near motorized travel-ways. The MacDonald Pass site is adjacent to noxious weeds. The other populations do not currently have noxious weeds immediately adjacent to the populations. This species could occur in other areas of rough fescue grasslands within the project area. Negative survey information is available in the project file.

Pinus albicaulis occurs in higher elevations throughout the Helena National Forest. Within the project area, whitebark pine is present on subalpine fir climax habitat types. This landscape does not contain the elevations and sites where whitebark pine would be a tree-line dominant. It is a minor and often understory component in sites dominated by lodgepole pine and/or

subalpine fir and Engelmann spruce. In the Divide Travel Plan Project area, whitebark pine occurs on at least 1,102 acres. Numerous route segments, ranging from 0 to 0.3 miles and totaling 18.8 miles intersect whitebark pine stands (see project file).

Whitebark pine is a keystone species because of its various roles in supporting community diversity and a foundation species for its roles in promoting community development and stability (Keane et al 2012). Whitebark pine forests are declining across most of their range in North America because of the combined effects of mountain pine beetle outbreaks, fire exclusion policies and white pine blister rust. It can be promoted by removing competing conifers and creating suitable sites for regeneration.

> "*The decline of whitebark pine comes from a synergism of natural and human-driven causes. Periodic, massive outbreaks of mountain pine beetle, killing mature whitebark pines, have been exacerbated by suppression of natural fires. A major reduction in high-elevation fires since the early 1900's has led to successional replacement of whitebark pine on more productive sites in the part of its range where it otherwise should be abundant…White pine blister rust is killing whitebark pine trees in the intermountain region, coastal ranges and Canadian Rocky Mountains and rangewide mortality is expected within one to several decades.*" (Tomback et al 2001, p. 13)

Whitebark pine is dependent on fire to maintain dominance and vigor. It is shade intolerant and susceptible to mountain pine beetle and the exotic disease white pine blister rust. The success of mountain pine beetle and white pine blister rust has been exacerbated by drought. See the Forested Habitats of Special Concern report, in the project record, for more detailed descriptions of these mortality agents and the ecology of whitebark pine. On the Helena National Forest, there is whitebark pine mortality from insects and disease and evidence for the decline of this species is supported by recent Aerial Detection Survey reports and other whitebark pine monitoring. Again, see the Forested Habitats of Special Concern, in the project record, report for further details.

Keane and others (2012) published *A Range-Wide Restoration Strategy for Whitebark Pine* (*Pinus albicaulis*), providing a comprehensive strategy for whitebark restoration. The strategy contains four principles:

1. <u>Promote rust resistance</u>, by a) supporting selective breeding programs to develop and deploy blister-rust resistant whitebark; b) facilitating and accelerating natural selection for rust resistant trees by reducing competition, providing openings for natural seed dispersal and seedling survival; and c) planting seedlings from trees known to have some level of resistance.
2. <u>Conserve genetic diversity</u>, by collecting and archiving seeds and growing and planting genetically diverse seedlings.
3. <u>Saving seed sources</u>, by protecting mature seed-producing resistant whitebark pine trees so that apparent rust-resistant seeds can be harvested in the future; and
4. <u>Employing restoration treatments</u>, by considering whitebark pine areas that are in decline for restoration treatments, including limiting the spread of blister rust, using fire to encourage regeneration, implementing silvicultural cuttings to reduce competition and increase vigor and reduce likelihood of mountain pine beetle attacks, planting rust-resistant seedlings to accelerate the effects of selection and promoting natural regeneration and diverse age-class structures to maintain

ecosystem function and reduce landscape level beetle hazard and to provide large populations for selection for rust resistance.

Recommended actions relative to these principles include assessments, planning, reducing disturbance impacts, gathering seeds, growing seedlings, protecting seed sources, implementing treatments, planting seedlings, monitoring activities and conducting research (Keane et al. 2012).

Polygonum douglasii ssp*. austiniae* is known from loose talus slopes in the Big Belts Mountains on the Helena National Forest. There are no known populations within the project area. Other occurrences are documented by the Montana Natural Heritage Program near the project area. This species may exist within the project area in talus slopes, other sparsely vegetated areas and potentially along roads.

Schoenoplectus subterminalis is known from the Indian Meadows Research Natural Area on the Helena National Forest. There are no known populations within the project area. This species occurs in very wet sites on the edges of ponds, bogs and open water.

All species on the sensitive species list are searched for in any sensitive plant surveys. Numerous past vegetation data collection efforts by Forest personnel and Montana Natural Heritage Program staff have failed to discover any sensitive plant populations in the project area. Forest Inventory Analysis Intensified Grid data collection that occurred on a grid across the entire Divide Travel Plan area in 2007 and 2008 did not identify any sensitive plant populations.

Species Unlikely To Be Present

As stated above, all species on the sensitive plant list are searched for during field surveys. The species discussed below that are followed with * have been found on or very near the Helena National Forest. Habitats for all species are described in appendix D of the sensitive species specialist report in the project record.

Astragalus lackschewitzii, Drosera anglica, Drosera linearis*, Epipactis gigantean, Oxytropis podocarpa and Veratrum californicum* all have specialized habitat that does not occur in the analysis area. These species will not be included in the effects analysis as the specialized habitats are not known to occur.

Amerorchis rotundifolia, Aquilegia brevistyla, Cypripedium passerinum, Goodyera repens, Grindelia howellii, Saxifraga tempestiva and Thalictrum alpinum are unlikely to occur due to geographic separation from known habitats. These species have not been found on the Helena National Forest to date. Habitat for these species potentially exists in the analysis area.

These species will not be analyzed further.

Sensitive Plants, Environmental Consequences

Effects Common to All Alternatives

A direct effect of motorized travel would be the constant exposure of weed seeds to the rights-of-way of motorized travel-ways, specifically those areas with a sensitive plant population. Noxious weeds can out-compete most native plants for nutrients, water and sunlight. The spread of noxious weeds has a very adverse potential impact on sensitive plant populations forestwide (Mack 2000; Pauchard et al 2003). If these species are left unchecked it is likely that noxious weeds would occupy sensitive plant populations, especially those close to motorized

routes in drier habitats. The Helena National Forest requires weed-seed-free feed for stock users; this limits the exposure of noxious weeds seeds in non-motorized areas. Bicycles can carry weed seeds, but is much less likely to carry weed seed or plant parts any distance. Animals (both domestic and wild) can carry noxious weed seeds in their coats (Campbell and Gibson 2001; Myers et al. 2004). An indirect effect of weed infestations in the rights-of-ways would be that the entire project area would be exposed to weed introduction and transfer by motorized vehicles (Trunkle and Fay 1991) and to a lesser extent, bicycles and other non-motorized travel. The increased weed presence would pose a threat to sensitive plants and their habitat throughout the travel plan area.

In addition to spreading weeds, vehicles that travel off established routes have the potential to directly harm sensitive plant populations by driving in or near the populations.

The presence of humans in the forest increases the risk of man-caused wildfire, which would be an indirect impact. The potential exists for wildfire to have a short term detrimental effect on sensitive plant habitats, but no long-term effects in most cases. However, there has been a dramatic increase of severe wildfires in the ponderosa pine type in recent decades where fuels have built up due to fire suppression (Agee and Skinner 2005). In these habitats there is potential for long-term damage to sensitive plant habitats (Menges and Dolan 1998; Pendergrass et al. 1999). Plant response to fire is a result of the interaction between severity of the fire and the individual plant species' inherent resistance to injury and ability to recover (Brown et al. 2000). Mortality of herbaceous species is more dependent on the length of time plants are exposed to high heat, determined by the amount of duff and woody fuel consumed by the fire, than flame length and fire intensity (Armour et al. 1984). The effect of wildfire on sensitive plant habitats therefore would depend on the surface fuel conditions. The longer fuels build up on the forest floor, the greater the potential damage to sensitive plant habitats.

Wildland fires also risk enhancing non-native plant invasions if severe fires damage the native vegetation. Canada thistle, bull thistle, knapweeds, Dalmation toadflax and cheatgrass have been shown to increase following wildfire (Harrod and Reichard 2002). Noxious weeds are a serious threat to sensitive plant habitats. Wildland fires can also exacerbate non-native plant invasions if native vegetation is damaged by severe fire. Studies in interior ponderosa pine forests have shown that Canada thistle, bull thistle, knapweeds, Dalmation toadflax and cheatgrass increase after fire (Jacobs and Sheley 2003; Keeley 2006).

The spread of noxious weeds can have an adverse impact on sensitive plant populations whether or not a fire occurs. Noxious weeds dominate plant communities and tend to form monocultures which negatively impact native biological diversity. This weed competition to individual plants and plant communities can result in loss of species diversity and sensitive native plants. If noxious weeds are left unchecked, they can out-compete sensitive plant populations, especially those close to motorized routes in drier habitats. Herbicide application would have variable effects on sensitive plant populations. Broadleaf herbicides (i.e. 2,4-D or Tordon) could adversely impact *Botrychium crenulatum*, *Botrychium paradoxum, Cypripedium parviflorum, Phlox kelseyi* var. *missoulensi, Pinus albicaulis and Polygonum douglasii* ssp. *austiniae* with the exception of herbicides that are specifically designed to harm plant families, such Asteraceae, the aster family. Grass-like species, *Juncus hallii* and *Schoenoplectus subterminalis*, would not be harmed by herbicides designed to kill broadleaf plants. These species would, however, be harmed by herbicides that are "non-specific" and kill both broadleaf and grass-like species. An example of this type of herbicide is Round-up. The Helena National Forest Weed Treatment Project FEIS provides guidance for proper weed treatment (USDA 2006)

and provides guidance for appropriate herbicides to be used. Herbicide application used to control noxious weeds would adversely affect sensitive plant populations as described above unless sensitive plant populations were protected.

Effects Common to All Action Alternatives

The effects common to all alternatives would apply to all action alternatives.

Alternative 1, No Action

Direct and Indirect Effects

There are numerous travel-ways that have known sensitive plant populations. Alternative 1 has the highest amount of motorized travel-ways of all the alternatives.

Botrychium crenulatum has not been found to date on the Helena National Forest. This species is associated with wetland habitats. This species was not found to-date in field surveys of the area nor in FIA grid intensification which conducted in the project area. Wetlands, seeps and springs would be protected from ground disturbance in the design criteria for this project.

Botrychium paradoxum is known from two populations on the Helena National Forest, of which one was in the Divide Travel Plan area. The habitat for this species on the Helena National Forest is open grassland and open grassland/sagebrush. The population is adjacent to the junction of existing travel-ways as shown in Table 144.

Cypripedium parviflorum has not been found on the Helena National Forest. Its habitat is fens, which are limited in extent within the project area. The habitat also includes damp mossy woods, seepage areas and moist forest-meadow ecotones in valleys and lower elevations in the mountains. These habitats are extremely limited in the project area.

Juncus hallii is known from several locations on the Helena National Forest. In the Divide project area, Hall's rush is documented in 18 locations, including sites discovered in 2009 and 2012 during project surveys. Of those, five populations of this species are known to exist within or very close to road rights-of-way within the Divide Travel Plan area. The roads are shown in Table 145 by alternative.

Phlox kelseyi var. missoulensis is known to occur on eight locations within road rights-of-way in the project area as shown in Table 146.

Pinus albicaulis occurs in higher elevations throughout the Forest. In the Divide Travel Plan area, whitebark pine is present on subalpine fir climax habitat types. This landscape does not contain the elevations and sites where whitebark pine would be dominant. In the project area, whitebark pine occurs on approximately 1,102 acres, identified from stand exam data, silvicultural diagnoses and anecdotal evidence. Routes with proposed travel changes bisecting whitebark pine stands are located in the vicinity of Bison Mountain, Treasure Mountain, Josephine area, Bullion Parks, Luttrell Peak, upper Banner Creek, Chessman Reservoir and Ward Gulch.

Polygonum douglasii ssp. *austiniae* has not been found on the Forest. The species has the potential to exist in the project area on talus slopes, sparsely vegetated areas or along roads.

Schoenoplectus subterminalis is known only from the Indian Meadows Research Natural Area and only in true fens. This species is associated with wetland habitats and fens which are limited

on the Forest. This species was not found in field surveys of potential wetlands in the area nor in FIA grid intensification.

Conclusion

Overall, Alternative 1 has the lowest restriction of any alternative. This would be slightly less restrictive than alternative 2 and substantially less restrictive than alternatives 3, 4 or 5. Motorized wheeled vehicles would have the potential to introduce noxious weed seeds and spread noxious weeds at a higher rate than over-snow vehicles or non-motorized means of travel (Trunkle and Fay 2001).

Botrychium paradoxum populations: Alternative 1 would have a similar impact as alternative 2, in that both alternatives leave the routes where *Botrychium paradoxum* is found open to motorized use.

Juncus hallii populations: Alternative 1 closes 1859-E1 year-round, but leaves the other roads open. Overall this alternative has potential for adverse impacts to the populations, although road 1859-E1 is close to the populations and closing this route would benefit the populations.

Phlox kelseyi var. *missoulensis* populations: Alternative 1 would have the most potential impact to *Phlox kelseyi* var. *missoulensis* by leaving all routes with populations open to wheeled motorized vehicles.

Pinus albicaulis populations: Alternative 1 closes or limits travel to over-snow vehicles on seven routes. Overall, this alternative provides some protection to the known populations by closing three roads yearlong and limiting travel to over-snow on the remaining four routes.

Alternative 1 provides the least restrictions to motorized wheeled vehicles. This alternative would have the highest direct impact on sensitive plant populations by leaving the above roads and trails open. This alternative would also have the most potential for indirect impacts on the populations due to the potential for introduction and spread of noxious weed seeds.

Design criteria would be applied to protect populations from ground disturbance activities and/or herbicide application by implementing a 100-foot buffer around known or discovered populations.

Irreversible/Irretrievable Commitments

There are no irreversible/irretrievable commitments that would affect sensitive plants under this alternative as known populations would be protected from ground disturbance associated with road maintenance or the use of herbicides.

Cumulative Effects

The cumulative effects analysis area is the Helena National Forest, as effects on plant populations throughout the Forest are considered in determining potential impacts to the overall population. Cumulative effects described here for the apply for the all five alternatives.

Cumulative effects from the list of projects noted in the appendix B would be minimal. The projects that have occurred since 1993 have all had field surveys to determine whether sensitive plant populations would be impacted by those actions. Where sensitive plant populations were found, populations were appropriately buffered from treatment. The actions listed in appendix B could impact individuals or habitat but will not likely contribute to a trend toward Federal listing or cause a loss of viability to the populations or species.

Past activities may have caused minor impacts to sensitive plants or their habitats. The effects of past activities are reflected in the existing condition of the current sensitive plant populations. Particularly for those sensitive species related to disturbance (moonworts, whitebark pine, some habitats for Austin knotweed), these past actions likely resulted in mixed effects (possible damage or loss of individuals, but improvement of habitat conditions in some affected areas).

Present/ongoing activities that could be contributing to cumulative effects are also described in appendix B. There are only minor effects to sensitive plant habitats resulting from ongoing activities, with a low probability of impacting individuals.

Reasonably foreseeable activities that could affect sensitive plants or their habitats are also addressed in appendix B and the major activities and expected effects are summarized below:

For the reasonably foreseeable future, the following projects have been reviewed; Telegraph Vegetation Project, Tenmile South Helena Project, Grassy Mountain Vegetation Project, Stonewall Vegetation Management Project and Blackfoot NonWinter Travel Plan.

Telegraph Vegetation Project. This project would treat approximately 6,300 acres with a combination of pre-commercial thinning, timber harvest and prescribed fire. Up to six miles of new temporary road would be built. There are known populations of *Pinus albicaulis* and *Juncus hallii* within the project area. Those populations have been identified and design criteria appropriate for each species would protect populations.

Tenmile South Helena Project: This project would conduct fuel treatments for the purposes of maintaining consistent water quantity and quality within Helena's municipal watershed and improving conditions for public and firefighters safety across the landscape in the event of a wildfire. There are known populations of *Pinus albicaulis* and *Juncus hallii* in the project area. Surveys will be conducted prior to any ground disturbance. Design criteria would be implemented as appropriate to protect any sensitive plant populations found.

Grassy Mountain Vegetation Project. This project would treat approximately 3,900 acres with a combination of prescribed fire and timber harvest. Up to one-half mile of new temporary road would be built. Intensive vegetation data collection in the project area was completed in 2006. No sensitive plant populations were found during those surveys or previous surveys. If any populations are found at any time they will be protected from ground disturbance or herbicide application.

Stonewall Vegetation Management Project: This project would treat approximately 8,500 acres with a combination of pre-commercial thinning, timber harvest and prescribed fire. Up to five miles of new temporary road would be built. Field surveys of the proposed units and temporary roads were completed in 2009. There are known populations of *Pinus albicaulis* in the project area. Design criteria would protect all known sensitive plant populations as appropriate. If additional sensitive plant populations are found at any time, they would be protected from ground disturbance or herbicide application.

Blackfoot NonWinter Travel Plan: This decision would be to determine what roads would be open to motorized traffic. The decision would also include prescriptions for closing routes which would include ground disturbance. There are known sensitive plant populations of *Drosera anglica*, *Drosera linearis*, *Phlox kelseyi* var. *missoulensis*, *Pinus albicaulis* and *Schoenoplectus subterminalis* within the project area that could potentially be affected. These populations have been identified in the sensitive plant analysis and would be protected from ground disturbing

activities and herbicide application. Design criteria and monitoring would protect any sensitive plant populations found.

Surveys are currently occurring or have been completed for reasonably foreseeable actions. If populations have been/are found, they will be protected from ground disturbance or herbicide application. For more information, please see the Cumulative Effects in appendix B to this report.

Alternative 2

Direct and Indirect Effects

The routes affecting known sensitive plant populations are shown under alternative 1. The impacts associated with alternative 2 are fewer than the impacts associated with alternative 1.

Overall, alternative 2 would only eliminate wheeled motorized use on approximately 132 miles of the travel-ways in the Divide Travel plan area. This would be slightly more restrictive than alternative 1, but substantially less restrictive than alternatives 3, 4 or 5. Motorized wheeled vehicles would have the potential to introduce noxious weed seeds and spread noxious weeds at a higher rate than over-snow vehicles or non-motorized means of travel (Trunkle and Fay 2001).

Conclusion

Botrychium paradoxum populations: Alternative 2 would have a similar impact as alternative 1, in that both alternatives leave the routes where *Botrychium paradoxum* is found open to motorized use.

Juncus hallii populations: Alternative 2 would limit road 1863 to over-snow, but would leave the other roads open. This alternative is likely have the most potential impact to the species, as the populations are closer to road 1859-E1 than to road 1863.

Phlox kelseyi var. *missoulensis* populations: Alternative 2 is likely to have the potential for impact (similar to alternative 1) to *Phlox kelseyi* var. *missoulensis* by leaving all routes open to wheeled motorized vehicles.

Pinus albicaulis populations: Alternative 2 provides some protection to populations by closing three roads yearlong and limiting travel to over-snow on the remaining four routes.

This alternative would have a lower indirect impact on the populations, as compared to alternative 1, in relation to the potential for introduction and spread of noxious weed seeds throughout the travel plan area.

Design criteria would be applied to this alternative to protect populations from ground disturbance or herbicide application within a 100-foot buffer as appropriate.

Irreversible/Irretrievable Commitments

There are no irreversible/irretrievable commitments that would affect sensitive plants under this alternative as known populations would be protected from ground disturbance associated with road maintenance or the use of herbicides.

Cumulative Effects

Please see the cumulative effects section under alternative 1 for a description of projects. Under alternative 2, the cumulative effects would likely be minimal as known plant populations would be protected.

Surveys are currently occurring or have been completed for reasonably foreseeable actions. If populations have been or are found, they will be protected from ground disturbance and herbicide application. For more information, please see the Cumulative Effects appendix for the sensitive species specialist report.

Alternative 3

Direct and Indirect Effects

The routes affecting known sensitive plant populations are shown under alternative 1. Alternatives 3 and 4 would impose less impact by restricting the use of motorized vehicles more than alternatives 1 or 2, although alternative 5 is the most restrictive. Alternative 3 would be most beneficial to *Botrychium paradoxum* as compared to other alternatives. Alternative 3 and 4 both provide similar benefit to *Juncus hallii*, only slightly better than alternative 5. Alternative 3 would be slightly less beneficial to *Phlox kelseyi var. missoulensis* as compared to alternatives 4 and 5, but more beneficial than alternatives 1 or 2.

Overall, alternative 3 would restrict motorized use on approximately199 miles of the travel-ways in the project area. This would be less restrictive then alternative 5, but would provide better long-term protection of sensitive plants by limiting potential exposure to noxious weed infestations than alternatives 1 or 2.

Conclusion

Botrychium paradoxum populations: Alternative 3 would provide the most protection to this species by closing both motorized routes year-round. This is the only alternative that closes both routes.

Juncus hallii populations: Alternatives 3 and 4 provide the best protection for the plant populations, by limiting all of the roads, affecting this population, except 1859-B1 to over-snow, when minimal damage would be done.

Pinus albicaulis: Alternative 3 provides some protection to this species as it limits travel to over-snow vehicles on six routes as does alternative 4.

Phlox kelseyi var. missoulensis populations: Alternative 3 would provide protection for known populations by closing four of the five routes motorized vehicles either totally, or allows only over-snow vehicles.

This alternative would have a substantially lower potential for indirect impact on the populations as compared to alternatives 1 and 2 with regards to the introduction and spread of noxious weed seeds throughout the travel plan area because motorized vehicle use would be restricted.

Design criteria would be applied to this alternative to protect populations from ground disturbance or herbicide application within a 100-foot buffer as appropriate.

Irreversible/Irretrievable Commitments

There are no irreversible/irretrievable commitments that would affect sensitive plants under this alternative as known populations would be protected from ground disturbance associated with road maintenance or the use of herbicides.

Cumulative Effects

Please see the cumulative effects section under alternative 1 for a description of projects. Under alternative 3, the cumulative effects would likely be minimal as no known plant populations would be affected.

Alternative 4

Direct and Indirect Effects

The routes affecting known sensitive plant populations are shown under alternative 1. Alternatives 3 and 4 would impose less impact by restricting the use of motorized vehicles more than alternatives 1 or 2, although alternative 5 is the most restrictive. Alternatives 4 and 5 are the most beneficial to *Phlox kelseyi var. missoulensis* as compared to alternatives 1, 2 and 3. Alternative 4 is slightly less beneficial to *Botrychium paradoxum* as compared to Alternative 3.

Overall, alternative 4 would restrict motorized use on approximately 187 miles of the travel-ways in the project area. This would be slightly less restrictive then alternative 3 but would provide better long-term protection of sensitive plants by limiting potential exposure to noxious weed infestations than alternatives 1 or 2.

Conclusion

Botrychium paradoxum populations: Alternative 4 would provide slightly less than alternative 3 protection by closing one of the routes that affect this population to motorized wheeled vehicles year-round.

Juncus hallii populations: Alternatives 3 and 4 provide the best protection for the plant populations, by limiting all of the roads with the exception of 1859-B1, which is open to over-snow vehicles, when minimal damage would be done to the plant species.

Pinus albicaulis populations: Alternative 4 provides some protection to this species as it limits travel to over-snow vehicles on six routes as does Alternative 3.

Phlox kelseyi var. missoulensis populations: Alternative 4 and 5 provide the best protection for this species as they close all five open routes with populations.

This alternative would have a substantially lower potential for indirect impact on the populations as compared to alternatives 1 and 2 with the lower potential for introduction and spread of noxious weed seeds throughout the travel plan area because motorized vehicle use would be restricted.

Design criteria would be applied to this alternative to protect populations from ground disturbance or herbicide application within a 100-foot buffer as appropriate.

Irreversible/Irretrievable Commitments

There are no irreversible/irretrievable commitments that would affect sensitive plants under this alternative as known populations would be protected from ground disturbance associated with road maintenance or the use of herbicides.

Cumulative Effects

Please see the cumulative effects section under alternative 1 for a description of projects. Under alternative 4, the cumulative effects would likely be minimal as no known plant populations would be affected.

Alternative 5

The routes affecting known sensitive plant populations are shown under alternative 1. Alternative 5 is the most restrictive alternative, but along with alternatives 3 and 4, impose the least impact by restricting the use of motorized vehicles more than alternatives 1 and 2. Alternative 5 is most beneficial to *Pinus albicaulis.* Alternative 5 provided similar benefit to *Phlox kelseyi* var. *missoulensis* as compared to alternative 4.

Overall, alternative 5 would restrict motorized use on approximately 250 miles of the travel-ways in the project area. This would be the most restrictive alternative and would provide the most long-term protection of sensitive plants by limiting potential exposure to noxious weed infestations.

Conclusion

Botrychium paradoxum populations: Alternative 5 provides limited protection to this species by limiting travel to vehicles less than 50 inches in width on routes that affect the population.

Juncus hallii populations: Alternatives 3 and 4 provide slightly better protection than alternative 5 for the plant populations, by limiting all of the roads with the exception of 1859-B1, which is open to over-snow, when minimal damage would be done.

Phlox kelseyi var. *missoulensis* populations: Alternatives 4 and 5 provide the best protection for this species as it would close all five open routes with known populations.

Pinus albicualis: Alternative 5 provides the best protection for this species by closing or limiting travel to over-snow on ten routes.

This alternative would have a substantially lower potential for indirect impacts on the populations as compared to alternatives 1 and 2 with the lower potential for introduction and spread of noxious weed seeds throughout the travel plan area because motorized vehicle use would be restricted.

Design criteria would be applied to this alternative to protect populations from ground disturbance or herbicide application within a 100-foot buffer as appropriate.

Irreversible/Irretrievable Commitments

There are no irreversible/irretrievable commitments that would affect sensitive plants under this alternative as known populations would be protected from ground disturbance associated with road maintenance or the use of herbicides.

Cumulative Effects

Please see the cumulative effects section under alternative 1 for a description of projects. Under alternative 5, the cumulative effects would likely be minimal as no known plant populations would be

Conclusions

Alternative 1, No Action, would have the highest potential impact on sensitive plants by having the least restriction on motorized wheeled vehicles.

Overall, alternatives 3, 4 and 5 would have the lowest level of potential to affect sensitive plant populations by restricting motorized wheeled vehicle use, with alternative 4 or 5 providing the most benefit to *Phlox kelseyi* var. *missoulensis* and alternative 3 being more beneficial to *Botrychium paradoxum*. Alternatives 3 and 4 both offer similar benefit to *Juncus hallii,* which is only slightly better than alternative 5. Alternative 5 would be most beneficial to *Pinus albicaulis*.

Alternative 2 would have more potential for adverse effects than alternatives 3, 4, or 5, but somewhat less impact than alternative 1. With the design criteria and proposed mitigation, the action alternatives may impact individuals, but would not contribute toward a trend for Federal listing or loss of viability to any of the populations present.

Overall, alternative 5 would eliminate wheeled motorized use on approximately 250 miles of the travel-ways in the Divide Travel Planning Area and would be the most restrictive alternative. Alternative 4 would be slightly less restrictive than alternative 3; closing approximately 187 miles to wheeled motorized use compared to approximately 199 miles, but would provide better long-term protection of sensitive plants by limiting potential exposure to noxious weed infestations than alternative 1 and 2. Alternative 2 differs very little from alternative 1 in the respect that it would only eliminate wheeled motorized use on approximately four miles.

Sensitive Plants Biological Evaluation

SPECIES- Botrychium crenulatum

Direct, Indirect and Cumulative Effects of Proposed Actions

This species is known from the Beaverhead-Deerlodge Forest, immediately adjacent to the Helena National Forest. This species is associated with wetland habitats. This species was not found in field surveys of the area nor in FIA grid intensification which included the project area. Wetlands, seeps and springs would be protected from ground disturbance in the design criteria for this project. Should any populations be found, a buffer would be established around each plant population as a no-entry zone for equipment associated with road maintenance. This species would be impacted by broadleaf herbicides. Should any populations be found, a 100-foot buffer would be established around any populations and would become a no herbicide zone. See cumulative effects section under alternative 1 and the cumulative effects appendix to the sensitive species specialist report.

Determination

The decision **may impact individuals but would not contribute toward a trend for Federal listing or loss of viability** because the design criteria described above would protect potential habitat.

SPECIES- Botrychium paradoxum:

Direct, Indirect and Cumulative Effects of Proposed Actions

Botrychium paradoxum is known from two populations on the Helena National Forest, one of which is in the Divide Travel Planning area. The habitat for this species on the Helena National

Forest is open grassland and open grassland/sagebrush. The population is adjacent to the junction of existing travel-ways as shown below.

Table 144: Roads or Trails with Known Populations of *Botrychium paradoxm*

Trail	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Trail 501	Open to vehicles 50 inches or less in width May 16th to October 14th	Open to vehicles 50 inches or less in width May 16th to October 14th	Closed to motorized vehicles yearlong	Closed to motorized vehicles yearlong	Open to vehicles 50 inches or less in width May 16th to August 31st
Road 314	Open to motorized vehicles 6/1-8/3. Open to over-snow December 1st to August 31st	Open to highway legal vehicles May 16th to October 14th. Open to over-snow December 2nd to May 15th	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Open to highway legal vehicles May 16th to October 14th. Open to over-snow December 2nd to May 15th	Open to vehicles 50 inches or less in width May 16th to August 31st

Alternative 3 would provide the best protection for this population as no motorized vehicles would travel the routes during the growing season. Alternatives 1 and 2 would have the most potential impact as both routes would be open to motorized traffic. Alternative 4 would provide some protection by closing trail 501 year-round.

A buffer would be established around each plant population as a no-entry zone for equipment associated with road maintenance. This species would be impacted by broadleaf herbicides. A 100-foot buffer around the known populations would be a no herbicide zone. See cumulative effects section under alternative 1 and the cumulative effects appendix to the sensitive species specialist report.

Determination

The decision **may impact individuals but would not contribute toward a trend for Federal listing or loss of viability**. The existing routes have been in place for many years and the population has not been impacted. As long as the routes do not change location, direct impacts to the population are unlikely. Indirect impacts due to noxious weeds would be more likely with alternatives 1, 2 or 4. Alternative 3 would provide the best protection to this population. Implementation of appropriate design criteria would provide additional protection to the population from herbicides.

SPECIES- Cypripedium parviflorum:

Direct, Indirect and Cumulative Effects of Proposed Actions

This species has not been found on the Helena National Forest. The habitat is fens, which are limited in extent on the forest. The habitat also includes damp mossy woods, seepage areas and moist forest-meadow ecotones in valleys and lower elevations in the mountains. These habitats would be protected by design criteria that limit ground disturbance in wet habitats.

If any populations are found in the future, a buffer would be established around each plant population as a no-entry zone for equipment associated with road maintenance. This species

would be impacted by broadleaf herbicides. A 100-foot buffer around the known populations would be a no herbicide zone. See cumulative effects section under alternative 1 and the cumulative effects appendix to the sensitive species specialist report.

Determination

The decision **may impact individuals but would not contribute toward a trend for Federal listing or loss of viability**. Design criteria as described above would protect potential habitat.

SPECIES- *Juncus hallii*

Direct, Indirect and Cumulative Effects of Proposed Actions

This species has 15 populations Forestwide, including 11 populations known within the Divide Travel Plan area. Of those 11, five populations of this species are known from within or very close to road rights of way within the Divide Travel Plan area as shown in the following table by alternative.

Table 145: Roads or Trails with Known Populations of *Juncus hallii*

Road	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Road 1859-B1	Open to highway legal vehicles	No Change	No Change	No Change	Open to vehicles 50 inches or less in width May 16th to August 31st
Road 1859-E1	Closed to motorized vehicles yearlong	Open to highway legal vehicles, no seasonal restrictions	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Open to vehicles 50 inches or less in width May 16th to August 31st
Road 1859-E2	Open to highway legal vehicles, no seasonal restrictions	Open to highway legal vehicles, no seasonal restrictions	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th
Road 1863	Open to highway legal vehicles, no seasonal restrictions	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Closed to motorized vehicles yearlong

Alternatives 3 and 4 provide the best protection for the plant populations, by limiting all of the roads except 1859-B1 to over-snow, when minimal damage would be done. Alternative 1 closes 1859-E1 year-round, but leaves the other roads open. Overall alternative 1 has potential for adverse impacts to the populations, although road 1859-E1 is close to the populations and closing this route would benefit the populations. Alternative 2 would limit road 1863 to over-snow, but would leave the other roads open. Alternative 2 would have the most potential to impact the species, as the populations are closer to road 1859-E1 than to road 1863.

Ground disturbance would be the most likely direct impact to these populations. Wetlands, seeps and springs would be protected from ground disturbance in the design criteria for this project. A buffer would be established around each plant population as a no-entry zone for equipment associated with road maintenance. This species would not be impacted by broadleaf herbicides. Non-specific herbicides such as Roundup would damage the population. A 100-foot buffer around the known populations would be a no herbicide zone if non-specific herbicides were applied. See cumulative effects section under alternative 1 and the cumulative effects appendix to the sensitive species specialist report.

Determination

The decision **may impact individuals but would not contribute toward a trend for Federal listing or loss of viability.** The populations are all some distance from the road prisms and are within wet areas. This species would not be impacted by most herbicides. The design criteria associated with the project would protect the populations from disturbance. Road maintenance in this area would be designed to protect the populations.

SPECIES- Phlox kelseyi var. missoulensis

Direct, Indirect and Cumulative Effects of Proposed Actions

This species is known from eight locations within road rights-of-way in the Divide Travel plan area as shown in the following table.

Table 146: Roads or Trails with Known Populations of *Phlox kelseyi* var. *missoulensis*

Road/Trail	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Rd 337	CDNST	No change	No change	No change	No change
Rd 1017-A1	Open to motorized vehicles May 16th to April 14th. Open to over-snow vehicles, no seasonal restrictions	Open to highway legal vehicles May 16th to December 1st. Open to over-snow vehicles December 2nd to May 15th.	Open to highway legal vehicles May 16th to December 1st. Open to over-snow vehicles December 2nd to May 15th.	Open to highway legal vehicles May 16th to December 1st. Open to over-snow vehicles December 2nd to May 15th.	Open to highway legal vehicles, no seasonal restrictions
Rd 1802-C1	Open to highway legal vehicles May 16th to December 1st. Open to over-snow vehicles December 2nd to May 15th.	Open to highway legal vehicles May 16th to December 1st. Open to over-snow vehicles December 2nd to May 15th.	Open to highway legal vehicles May 16th to December 1st. Open to over-snow vehicles December 2nd to May 15th.	Closed to motorized vehicles yearlong	Closed to motorized vehicles yearlong

Road/Trail	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Rd 708-E3	Open to highway legal vehicles, no seasonal restrictions	Open to highway legal vehicles, no seasonal restrictions	Open to highway legal vehicles, no seasonal restrictions	Open to highway legal vehicles, no seasonal restrictions	Closed to motorized vehicles yearlong. Open to over-snow vehicles December 2nd to May 15th.
Trail 501	Open to vehicles 50 inches or less in width May 16th to October 14th	Open to vehicles 50 inches or less in width May 16th to October 14th	Closed to motorized vehicles yearlong	Closed to motorized vehicles yearlong	Open to vehicles 50 inches or less in width May 16th to August 31st
East of Road 495	Open to highway legal vehicles, no seasonal restrictions	No change	No change	No change	No change
East of Burr Creek Road-Road 1868	Open to motorized vehicles, 6/1-8/3. Open to over-snow vehicles December 1st to August 31st	Open to vehicles 50 inches or less in width May 16th to October 14th	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th
Trail 502	Open to vehicles 50 inches or less in width May 16th to October 14th	Open to vehicles 50 inches or less in width May 16th to October 14th	Closed to motorized vehicles yearlong	Closed to motorized vehicles yearlong	Closed to motorized vehicles yearlong
Trail 503	Open to vehicles 50 inches or less in width May 16th to October 14th	Open to vehicles 50 inches or less in width May 16th to October 14th	Closed to motorized vehicles yearlong	Closed to motorized vehicles yearlong	Closed to motorized vehicles yearlong

Alternatives 4 and 5 close a total of five routes to motorized vehicles either totally or only allows over-snow vehicles which is one more road than the other alternatives. The additional route that is closed (road 1802-C1) is near a large population and would provide additional protection although there are open roads near the population. Alternative 3 closes or limits travel to over-snow vehicles on four routes. Alternatives 1 and 2 would have essentially the same (and the most) potential impact to this species by leaving all routes open to wheeled motorized vehicles.

The greatest danger to this species would be from noxious weed infestations, herbicide application or ground disturbance. A buffer would be established around each plant population as a no-entry zone for equipment associated with road maintenance. This species would be impacted by broadleaf herbicides. A 100-foot buffer around the known populations would be a no herbicide zone, unless site-specific exceptions were made by the Forest Ecologist. See cumulative effects section under alternative 1 and the cumulative effects appendix to the sensitive species specialist report.

Determination

The decision **may impact individuals but is not likely to result in a loss of viability, nor cause a trend toward Federal listing.** Alternatives 4 and 5 provide the best protection for populations, followed by alternative 3. Alternatives 1 and 2 would have the most potential impact to the populations by leaving routes open. The design criteria associated with the project would protect the populations from disturbance and damage from herbicides in the road rights-of-way under all alternatives.

SPECIES- Pinus albicaulis

Direct, Indirect and Cumulative Effects of Proposed Actions

Pinus albicaulis occurs in higher elevations throughout the Helena National Forest. In the Divide Travel Plan area, whitebark pine is present on subalpine fir climax habitat types. This landscape does not contain the elevations and sites where whitebark pine would be dominant. In the Divide Travel Plan area, whitebark pine occurs on approximately 1,102 acres, identified from stand exam data, silvicultural diagnoses and anecdotal evidence. Routes with proposed travel changes bisecting whitebark pine stands are located in the vicinity of Bison Mountain, Treasure Mountain, Josephine area, Bullion Parks, Luttrell Peak, upper Banner Creek, Chessman Reservoir and Ward Gulch.

Table 147: Roads or Trails with Known Populations of *Pinus albicaulis*

Road/Trail	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Road 299	Open to highway legal vehicles, no seasonal restrictions	No change	No change	No change	No change
Road 299-A1	Open to highway legal vehicles, no seasonal restrictions	Open to highway legal vehicles, no seasonal restrictions	Open to highway legal vehicles, no seasonal restrictions	Open to highway legal vehicles, no seasonal restrictions	Closed to motorized vehicles yearlong
Road 527	Open to highway legal vehicles, no seasonal restrictions	No change	No change	No change	No change
Road 708-B2	Closed to motorized vehicles	Closed to wheeled motorized	Closed to wheeled motorized	Closed to wheeled motorized	Closed to wheeled motorized

Road/Trail	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	yearlong	vehicles yearlong. Open to over-snow December 2nd to May 15th	vehicles yearlong. Open to over-snow December 2nd to May 15th	vehicles yearlong. Open to over-snow December 2nd to May 15th	vehicles yearlong. Open to over-snow December 2nd to May 15th
Road 1801	Closed to motorized vehicles yearlong	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Closed to motorized vehicles yearlong
Road 1859	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Open to highway legal vehicles, no seasonal restrictions	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th
Road 1859-D4	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Open to highway legal vehicles, no seasonal restrictions	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Open to vehicles 50 inches or less in width May 16th to August 31st
Road 1863	Open to highway legal vehicles, no seasonal restrictions	No change	No change	No change	No change
Road 1863-A1	Open to highway legal vehicles, no seasonal restrictions	Open to highway legal vehicles, no seasonal restrictions	Open to highway legal vehicles, no seasonal restrictions	Open to highway legal vehicles, no seasonal restrictions	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th
Road 1863-F1	Open to	Open to	Open to	Open to	Closed to

Road/Trail	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	highway legal vehicles, no seasonal restrictions	highway legal vehicles, no seasonal restrictions	highway legal vehicles, no seasonal restrictions	highway legal vehicles, no seasonal restrictions	wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th
Road 1876	Open to highway legal vehicles, no seasonal restrictions	No change	No change	No change	No change
Road 1876-A1	Open to highway legal vehicles, no seasonal restrictions	Open to highway legal vehicles, no seasonal restrictions	Open to highway legal vehicles, no seasonal restrictions	Open to highway legal vehicles, no seasonal restrictions	Non-motorized trail
Road 1876-C1	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Open to highway legal vehicles, no seasonal restrictions	Open to highway legal vehicles, no seasonal restrictions	Open to highway legal vehicles, no seasonal restrictions	Closed to motorized vehicles yearlong
Road 1876-E1	Open to highway legal vehicles, no seasonal restrictions	Open to highway legal vehicles, no seasonal restrictions	Open to highway legal vehicles, no seasonal restrictions	Open to highway legal vehicles, no seasonal restrictions	Closed to motorized vehicles yearlong
Road 4009-A1	Closed to motorized vehicles yearlong	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Closed to motorized vehicles yearlong
Road 4164	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th	Closed to wheeled motorized vehicles yearlong. Open to over-snow December 2nd to May 15th

Alternative 5 would provide the best protection for this species because it closes a total of 10 routes to motorized vehicles either totally or only allows over-snow vehicles which is more than the other alternatives. Alternatives 3 and 4 limit travel to over-snow vehicles on six routes. Alternative 1 closes or limits travel to over-snow vehicles on five routes. Alternative 2 only limits travel to over-snow vehicles on four routes and therefore would have the most potential impact to this species.

Live individuals would be retained where they occur and damage to this species or potential habitat would be limited as no additional tread is proposed in any of the alternatives. The greatest danger to this species would be from herbicide application or ground disturbance. A buffer would be established around each plant population as a no-entry zone for equipment associated with road maintenance. A 100-foot buffer around known populations would be implemented as a no herbicide zone, unless site-specific exceptions were made by the Forest Ecologist. See cumulative effects section under alternative 1 and the cumulative effects appendix to the sensitive species specialist report.

Determination

The decision **may impact individuals but would not contribute toward a trend for Federal listing or loss of viability** because the design criteria described above would protect individuals and potential habitat.

SPECIES- Polygonum douglasii ssp. austiniae

Direct, Indirect and Cumulative Effects of Proposed Actions

This species is known to exist on Bureau of Land Management lands west of Highway 141, immediately adjacent to the Helena National Forest. This species is known to occur on gravelly, often shale-derived soil of open slopes and banks in the montane zone. Should any populations be found, a buffer would be established around each plant population as a no-entry zone for equipment associated with road maintenance. This species would be impacted by broadleaf herbicides. Should any populations be found, a 100-foot buffer would be established around any populations and would then become a no herbicide zone. See cumulative effects section under alternative 1 and the cumulative effects appendix to the sensitive species specialist report.

Determination

The decision **may impact individuals but is not likely to result in a loss of viability, nor cause a trend toward Federal listing**. The design mitigations as described above would protect individuals and habitat.

SPECIES- Schoenoplectus subterminalis

Direct, Indirect and Cumulative Effects of Proposed Actions

This species is known from the Indian Meadows Research Natural Area in the northern portion of the Forest in true fens. This species is associated with wetland habitats and fens which are limited on the Forest. This species was not found in field surveys of potential wetlands in the area nor in FIA grid intensification conducted within the project area. Wetlands, seeps and springs would be protected from ground disturbance in the design criteria for this project. Should any populations be found, a buffer would be established around each plant population as a no-entry zone for equipment associated with road maintenance. This species would not be impacted by broadleaf herbicides. Non-specific herbicides such as Roundup would damage the population. A 100-foot buffer around the known populations would be a no herbicide zone for

non-specific herbicides. See cumulative effects section under alternative 1 and the cumulative effects appendix to the sensitive species specialist report.

Determination

The decision **may impact individuals but would not contribute toward a trend for Federal listing or loss of viability** because the design criteria as described above would protect potential habitat.

Forest Plan Consistency

The Forest Plan direction for sensitive plants (USDA 1986, II/20) refers to the Endangered Species Act and pertains only to listed species, none of which occur on the Helena National Forest. Therefore, this direction is not applicable at this time. Subsequent guidance from the Regional Office provides direction regarding sensitive plants and their habitats with which the project as proposed is consistent.

NOXIOUS WEEDS

Regulatory Framework

The **Plant Protection Act** defines a noxious weed as "*any plant or plant product that can directly or indirectly injure or cause damage to crops (including nursery stock or plant products), livestock, poultry, or other interests of agriculture, irrigation, navigation, the natural resources of the United States, the public health, or the environment*" (7 *USC* 104 § 7702, 2000). Montana also has a Weed Control Act (7 *Montana Code* 22 §§ 2101 et seq., 2003) and while Montana laws do not apply to federal lands, section 2814 of the Federal Noxious Weed Act of 1974, as amended (7 *USC* 61 § 2814, 1990)[9] requires that federal land management agencies "*complete and implement cooperative agreements with state agencies regarding the management of undesirable plant species on federal lands under the agency's jurisdiction and establish integrated management systems to control or contain undesirable plant species targeted under cooperative agreements.*"

The **National Forest Management Act** of 1976 (PL 94-588) under 36 CFR 219.10(b) states: Sustaining ecological systems. The overall goal of the ecological element of sustainability is to provide a framework to contribute to sustain native ecological systems by providing ecological conditions to support diversity of native plant and animal species in the plan area. This will satisfy the statutory requirement to provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives (16 U.S.C. 1604(g)(3)(B)). Procedures developed pursuant to 219.1(c) for sustaining ecological systems must be consistent with the following:

1. Ecosystem diversity. Ecosystem diversity is the primary means by which a plan contributes to sustaining ecological systems. Plan components must establish a framework to provide the characteristics of ecosystem diversity in the plan area.
2. Species diversity. If the Responsible Official determines that provisions in plan components, in addition to those required by paragraph (b)(1) of this section, are needed to provide appropriate ecological conditions for specific threatened and endangered species, species-of-concern and species-of-interest, then the plan must

9 The Plant Protection Act repealed all sections, except section 2814, of the Federal Noxious Weed Act of 1974.

include additional provisions for these species, consistent with the limits of agency authorities, the capability of the plan area and overall multiple-use objectives.

The **Federal Noxious Weed Act** of 1974 (7 *USC* 2801 et seq.; 88 Stat. 2148) provides for the control and management of non-indigenous weeds that injure or have the potential to injure the interests of agriculture and commerce, wildlife resources, or the public health. The act requires that each federal agency develop a management program to control undesirable plants on federal lands under the agency's jurisdiction; establish and adequately fund the program; implement cooperative agreements with state agencies to coordinate management of undesirable plants on federal lands; and establish integrated management systems to control undesirable plants targeted under cooperative agreements. A federal agency is not required to carry out management programs on federal lands unless similar programs are being implemented on state or private lands in the same area.

Executive Order 13112 directs federal agencies to respond to invasive species that threaten terrestrial and aquatic resources of the National Forest System (NFS) and to collaborate with Federal, State and local partners to address invasive species that can spread from adjacent lands.

The Forest Service (forest) adopted new guidelines for invasive species management in 2011 in the form of a new **Forest Service Manual (FSM) 2900**. FSM 2900 was issued in order to comply with EO 13112 and address adverse impacts from invasive species. FSM 2900 is also intended to ensure, as a matter of policy, that all forest management activities are designed to minimize or eliminate the possibility of establishment or spread of invasive species on NFS lands, or to adjacent areas.

FSM 2080 Supplement R1 2000-2001-1 (USDA 2001) provided prevention and control measures for resource groups. The supplement is no longer in use as result of the new **FSM 2900**. However, similar prevention and control measures as those outlined in FSM 2080 (R1 2000-2001-1) will be carried forward into a new regional supplement to FSM 2900.

The **Helena National Forest Weed Treatment Project FEIS** (USDA 2006) provides environmental standards and guidelines for control and management of noxious weeds, specifically the use and effects of herbicide application.

The **Montana Weed Control Act** was established in 1948 to protect Montana from destructive noxious weeds. This act, amended in 1991, established a set of criteria for the control and management of noxious weeds in Montana. Noxious weeds are defined by this act as being any exotic plant species that may render land unfit for agriculture, forestry, livestock, wildlife or other beneficial uses or that may harm native plant communities (Grubb et al 2003). The State of Montana maintains a Noxious Weed List for the State and individual counties may add species at the country level as noxious that are not considered noxious at the State level. The State list, with the appropriate county additions, as of December 2013 was used to identify noxious species for this analysis. These lists are available in the project file.

Assumptions

The following assumptions were used:

- The analyses and decisions made in the record of decision for the Helena National Forest Weed Treatment Project FEIS are incorporated in noxious weed analysis and management on the Helena National Forest. This includes all environmental protection measures. The environmental protection measures are as follows:

- Any soil disturbing activity with mechanized equipment has the potential to increase noxious weed invasion or spread.
- It is anticipated that weeds would continue to spread at a rate of approximately 8 to 12 percent on an annual basis (USDA 1998), without disturbance. The rate of spread could increase in areas affected by ground disturbing activities.
- Herbicide use in accordance with the requirements specified in the Helena National Forest Weed Treatment Project FEIS (USDA 2006) is appropriate for noxious weed management on infested lands.
- The Forest noxious weed treatment program would continue to treat approximately 30 percent of the weeds within the project area annually, regardless of whether the project occurs or not.

The paragraphs below define mapped weed acres and weed treatment acres as used in this report.

Mapped Weed Acres: Mapped acres are reflected by polygons within which there is at least 1 percent noxious weed cover. There are weeds outside those polygons that are too scattered to map, or are infestations that have not been discovered yet. The mapped acres are taken from the layer containing invasive plant information, in the Helena National Forest geographical information systems (GIS) database.

Weed Treatment Acres: Weed treatment acres for the purposes of this report are assumed to be the total polygon acres described above.

Design Elements

FSM 2900 requires that all forest management activities are designed to minimize or eliminate the possibility of establishment or spread of invasive species on National Forest System lands, or to adjacent areas. The following best management practices are intended to satisfy that requirement and were designed to minimize the spread of existing invasive plants and prevent the colonization of new invasive plants within the project area.

Roads – Required Objectives and Associated Practices

1. Incorporate weed prevention into road layout, design and alternative evaluation. Environmental analysis for road construction and reconstruction would include a weed risk assessment.
2. Remove the seed source that could be picked up by passing vehicles and limit seed transport in new and reconstruction areas.
    a. Remove all mud, dirt and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. This does not apply to service vehicles that would stay on the roadway, traveling frequently in and out of the project area.
    b. Landings, skid trails and other areas of disturbance resulting from logging activities would be monitored for weed infestations.
    c. Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders as determined by the forest weed specialist. Reference Contract Provision C/CT 6.626.

3. Re-establish vegetation on bare ground due to construction and reconstruction activity to minimize weed spread.
    a. Revegetate all disturbed soil, except the travel way on surfaced roads, in a manner that optimizes plant establishment for that specific site, unless ongoing disturbance at the site would prevent weed establishment. Use native material where appropriate and available. Use a seed mix that includes fast, early season species to provide quick, dense revegetation. To avoid weed contaminated seed, each lot must be tested by a certified seed laboratory against the State noxious weed lists and documentation of the seed inspection test needs to be provided.
    b. Use local seeding guidelines for detailed procedures and appropriate mixes. Use native material where appropriate and available. Revegetation may include planting, seeding, fertilization and weed-free mulching as indicated by local prescriptions.
    c. Monitor and evaluate success of revegetation in relation to project plan. Repeat as indicated by local prescriptions.
4. Minimize the movement of existing and new weed species caused by moving infested gravel and fill material. The borrow pit would not be used if new invaders, defined by the forest weed specialist, are found on site.
5. Minimize sources of weed seed in areas not yet revegetated. If straw is used for road stabilization and erosion control, it must be certified weed-free or weed-seed free.
6. Minimize roadside sources of weed seed that could be transported to other areas during maintenance.
    a. Look for priority weed species during road maintenance and report back to district weed specialist.
    b. Do not blade roads or pull ditches where new invaders are found.
    c. Maintain desirable roadside vegetation. If desirable vegetation is removed during blading or other ground disturbing activities, area must be revegetated according to section (3) (a), (b), (c) above.
    d. Straw used for road stabilization and erosion control would be certified weed-free or weed-seed-free.
7. Reduce weed establishment in road obliteration/reclamation projects. Revegetate according to section (3) (a), (b), (c) above.

Information Used

A geodatabase contains numerous geospatial layers that provide the data used in this analysis. This geodatabase is available in the project file. The layers include known locations of weed infestations, watershed and stream information and habitat types. The data was compiled and utilized to complete an invasive plant risk assessment.

Methodology and Scientific Accuracy

The methodology used in this analysis includes the best available data from the Helena National Forest weeds database, geographic information system datasets, personal ground

reconnaissance of the project area and experience including vegetation monitoring from past vegetation treatments on the Helena National Forest. Literature review has been completed of available information on noxious weed species, habitat and the effects of disturbance on flora. Various datasets were combined using a geographic information system. The data was then analyzed and reviewed to assist in understanding the relationships and effects of travel routes on weeds and other flora as well as influences from physical characteristics across the project area such as landforms and landtypes.

Data used to generate statistics and information regarding existing condition and affected environment were provided by the Helena National Forest GIS department in the form of a geodatabase and based on inventories completed in field in the project area in 2003, 2009, 2010, 2011 and 2012. All raw numbers and calculations can be found in the project file. Numbers are rounded to the nearest whole number and nearest percent.

The geographic analysis area for this proposal is defined as the project boundary. The cumulative effects section extends beyond the project boundary. The project area is used as the spatial boundary for direct and indirect effects. Bounding for the analysis of cumulative effects of past, present and foreseeable future actions is also the project area. Past actions are considered as part of the existing condition and future effects are considered for 10 years into the future, which allows an adequate length of time to record vegetative changes relevant to the purpose of this project. Effects associated with various actions are based on literature, known weed infestations and specialist experience.

Noxious Weeds, Affected Environment

Analysis Area

The Divide Travel Plan analysis area was used as the analysis area for this project. A 100-foot wide buffer was applied to all routes within the project area. This includes 1,751 acres and was used as the analysis area for direct effects. Natural Resources Conservation Service 6th code Hydrologic Unit Codes (HUCs) that had roads with noxious weed infestations within the buffer were used for the affected environment discussion and the pesticide delivery analysis.

Weeds have been expanding on the Helena National Forest for many years. A variety of factors has contributed to the spread of noxious weeds. According to inventory data compiled in 2011 in support of this analysis, there are over 23,000 acres of mapped noxious weed infestations on the Helena National Forest and over 5,600 infested acres are in the Divide landscape, which includes the project area. Noxious weeds are invasive by definition and are able to spread when there are no natural enemies, pathogens, or ungulate grazing to keep them in check. The spread of weeds is favored by wildfire and ground disturbance of any kind. More use by the public has occurred across the Helena National Forest in the past few years due in part to increased OHV use, recreation displacement from wildfire areas and travel plan closure areas, which place more pressure on the remaining open areas.

Various methods of weed control are used. Herbicide application is the most common form of control used in the project area. This analysis tiers to the Helena National Forest Weed Treatment Project FEIS (USDA 2006) which provides environmental requirements and guidelines regarding noxious weed treatment and herbicide effects. The Forest treats approximately one-third of the mapped weeds on an annual basis under the normal weed treatment program. The areas scheduled for treatment in a given year are a combination of: acres associated with projects with ground disturbing activities; travel and recreation corridors; and re-treatment of

existing infestations. Effectiveness monitoring is used to prioritize the roads and polygons that need re-treatment.

There are over 23,000 acres of mapped noxious weed infestations on the Helena National Forest. There is an ongoing effort to accurately map the extent of weeds as new infestations start every year and old infestations often expand. The following table reflects the mapped infestations as of 2011 using the dominant noxious weed species in the infested area. Many populations have more than one noxious species present.

Table 148: Known Noxious Weed Infestations on the Helena National Forest

Landscape Area	Dominant Noxious Species	Total Acres
Big Belts	Musk Thistle (*Carduus Nutans*)	79
	Spotted knapweed (*Centaurea maculosa*)	2,519
	Canada thistle (Cirsium arvense)	1,327
	Leafy spurge (Euphorbia esula)	752
	Dalmation toadflax *(Linaria dalmatica)*	5,583
	Sulfur cinquefoil *(Potentilla recta)*	1
	Common tansy (Tanacetum vulgare)	10
Big Belts Total		10,265
Blackfoot	Spotted knapweed (*Centaurea maculosa*)	4,978
	Oxeye daisy (Leucanthemum vulgare)	1
	Canada thistle (Cirsium arvense)	191
	Hounds tongue(Cynoglossum officinale)	1
	Leafy spurge (Euphorbia esula)	1
	St Johnswort (Hypericum perforatum)	11
	Dalmation toadflax *(Linaria dalmatica)*	17
Blackfoot Total		5,202
Divide	Spotted knapweed (*Centaurea maculosa*)	2,262
	Oxeye daisy (Leucanthemum vulgare)	23
	Canada thistle (Cirsium arvense)	1,581
	Leafy spurge (Euphorbia esula)	124
	Dalmation toadflax *(Linaria dalmatica)*	1,301
	Sulfur cinquefoil *(Potentilla recta)*	366
Divide Total		5,656
Elkhorns	Spotted knapweed (*Centaurea maculosa*)	639
	Canada thistle (Cirsium arvense)	678
	Leafy spurge (Euphorbia esula)	8
	Dalmation toadflax *(Linaria dalmatica)*	470
	Sulfur cinquefoil *(Potentilla recta)*	14
Elkhorns Total		1,808
Grand Total		22,937

The above table shows large differences between landscape areas in terms of both primary weed species and acres infested. Dalmation toadflax is a major concern in the Big Belts, while it is of less, although increasing, concern in the Blackfoot area. Spotted knapweed is a dominant weed species across all areas. Roadsides are an area commonly infested with noxious weeds. Roads have high weed infestations due to several reasons: vehicles carry weed seeds, which are dispersed along travel ways; roads are disturbed by maintenance activities on a regular basis, which provides a ready seedbed for weed seeds, both the seeds dispersed by vehicles and those

that are carried on the wind or by animals and birds; human use is concentrated along roadsides which increases the exposure of these areas to noxious weed seed dispersal (Lonsdale 1999; Pauchard et al. 2003).

Although herbicide application has been the primary noxious weed treatment method, numerous biological control insectories have been established across the Forest. The Forest generally treats approximately 3,900 acres of weeds annually (averaging 2007 through 2009 as typical years). Table 149 shows insect releases made Forestwide from 2005–2008.

Table 149: Biological Controls Release on the Helena National Forest

Weed Species Treated	Insect Agent Used
Canada thistle	Urophora cardui - gall flies 400 adult stage insects, 4,000 pupae
	Ceutorhynchus litura (now C. hadroplantus) basal root weevil, 1,000 adults
Musk thistle	Trichosirocalus horridus 1,000 adults
Dalmatian toadflax	Mecinus janthnus - stem mining weevils 1,100 insects
Leafy spurge	Aphthona - mixed speciesflea beetles 16,000 insects
Spotted knapweed	Cyphlocleonus achates - root boring weevil (6,400 insects)

Numerous partners and volunteers including the Rocky Mountain Elk Foundation, Backcountry Horsemen, OHV groups, snowmobile clubs and counties participate as partners with the Forest in weed treatment annually. In addition, numerous grants and volunteer contributions are used to treat weeds.

Current Condition with Planning Area and Buffered Roads

Within the Divide Travel Plan analysis area, approximately 3,178 acres are currently infested with noxious weeds. The majority of these areas were infested from light (less than 5 percent) to high (50 percent canopy cover of weeds). This represents approximately 14 percent of the mapped noxious weed infestations on the Forest. The areas affected by this project are all along roadsides and as described above, these areas are susceptible to noxious weed infestation.

The following table shows the miles of motorized routes and non-motorized routes within the analysis area. County, private and state owned routes were not analyzed in this report.

Table 150: Summary Comparison of Motorized and Non-Motorized Routes

Type of Use	Total Miles
Motorized Route	344
Non-Motorized Route	147

The following species of noxious weeds have been identified in the Divide Travel Management Project Area:

Table 151: 2011 Project Area Noxious Weed Infestations

Primary Noxious Weed Species	**Infested Acres**
Spotted knapweed (*Centaurea maculosa*)	1,729
Canada thistle (*Cirsium arvense*)	1,312
Leafy spurge (*Euphorbia esula*)	34
Orange hawkweed (*Hieracium aurantiacum*)	<1
Oxeye daisy (*Leucanthemum vulgare)*	21
Dalmation toadflax *(Linaria dalmatica)*	17
Sulfur cinquefoil (*Potentilla recta*)	65
Total Acres	**3,178**

Roads and trails are known vectors for noxious weed infestation and spread (Lonsdale, 1999; Pauchard et al. 2003). There are 1,751 acres within a 100-foot buffer of the motorized routes in the analysis area. The following table shows the acres infested with noxious weeds within the 100-foot buffer of all travel routes in the planning area.

Table 152: Noxious Weed Infestations along Buffered Travel Routes

Primary Noxious Weed Species	**Infested Acres**
Spotted knapweed (*Centaurea maculosa*)	1,036
Canada thistle (*Cirsium arvense*)	695
Leafy spurge (*Euphorbia esula*)	<1
Oxeye daisy (*Leucanthemum vulgare)*	17
Dalmation toadflax (Linaria dalmatica)	3
Total Acres	**1,751**

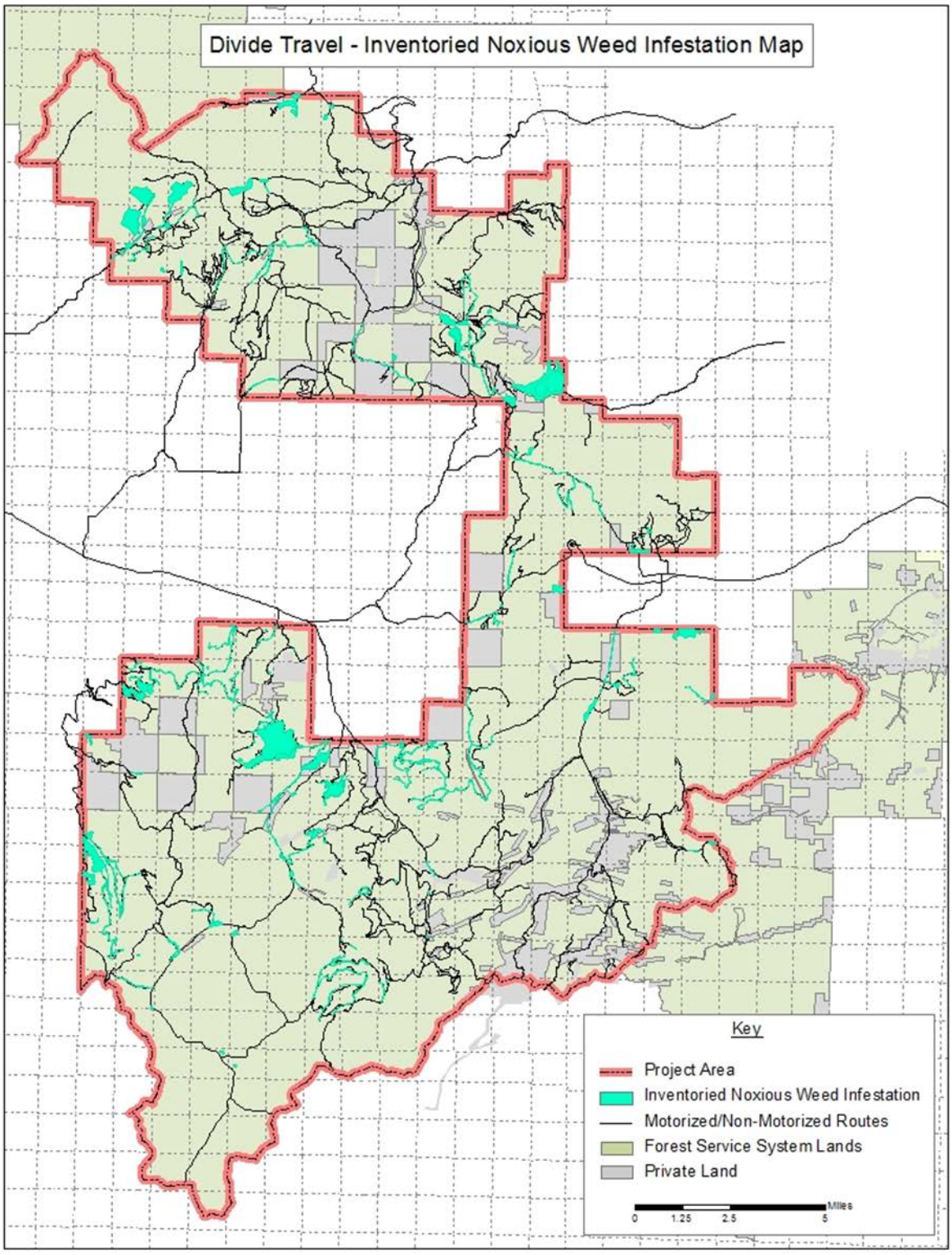

Figure 87: Noxious Weed Inventory within Divide Project Boundary

There are eight State of Montana noxious weed species of primary concern in terms of level of infestation in the treatment area: spotted knapweed (*Centaurea maculosa*), Canada thistle (*Cirsium arvense),* leafy spurge (*Euphorbia esula*),), oxeye daisy (*Leucanthemum vulgare*), Dalmation toadflax (*Linaria dalmatica*), common toadflax (*Linaria vulgare*), Orange hawkweed (*Hieracium aurantiacum*) and sulfur cinquefoil (*Potentilla recta*). Cheatgrass (*Bromus tectorum*), although not listed as a noxious weed in the state of Montana, is considered a "regulated plant" by the State and is a species of concern on the Helena National Forest.

Many infested areas have more than one weed species present; Table 151 shows the predominant species in the project area. Other common noxious weeds associated with the "primary" weeds shown above include butter and eggs (*Linaria vulgaris*). In addition, a given infestation may have more than one of the primary weed species present. For example, spotted knapweed may be the primary mapped species, but Canada thistle is often present as well. Details on additional species in a given infestation are available in the GIS layer available in the project file.

Spotted knapweed (*Centaurea maculosa*) has the largest extent of infestation within the project area. The species occurs along roadsides and throughout south facing areas of past harvest, as well as in the natural grasslands. Spotted knapweed thrives in open areas, with forest canopies of less than 20 percent closure. Spotted knapweed spreads almost entirely by prolific seed production (Zouhar 2001a). This species has also been shown to have allelopathic properties, secreting toxins that suppress the growth of other plants, although resource competition is just as effective in its ability to dominate areas (Zouhar 2001a).

Canada thistle (*Cirsium arvense*) has been mapped on a smaller area as compared to spotted knapweed. This species spreads primarily by adventitious root buds that may form new adventitious shoots can develop along the root at any location (Zouhar 2001b). Canada thistle is present in much of the project area, generally associated with roadside disturbance or harvest disturbance. Its habitat is restricted to open areas of less than 10 percent canopy closure.

Orange hawkweed (*Hieracium aurantiacum*) is one of the most dangerous weeds in the project area (Stone 2010), although it is known only at one location. Orange hawkweed forms a monoculture by establishing a dense mat of plants, lowers biodiversity and reduces the forage value of grasslands for grazing animals. This plant is a successful competitor, crowding out native, pasture and range species (Prather et al. 2003). Hawkweed species are allelopathic (Murphy and Aarssen 1995). It hybridizes freely with native and non-native hawkweeds (Rinella and Sheley 2002).

Leafy spurge (*Euphorbia esula*) is found in limited acreage within the project area. Leafy spurge generally grows in clumps, producing stems up to 3 feet tall from caudices, rhizomes and roots. It has an extensive underground rhizome and root system. Roots can penetrate into the soil as far as 15 to 30 feet. Leafy spurge can rapidly invade disturbed sites by establishing from seed and by sprouting from existing roots and root crowns. Once established, leafy spurge tends to expand and persist (Simonin 2000; Gucker 2010).

Sulfur cinquefoil (*Potentilla recta*) has limited mapped acreage. Populations in North America are commonly associated with roadsides, vegetation disturbance, abandoned agricultural fields and "waste areas." Sulfur cinquefoil can also invade native plant

communities that are far from any apparent human disturbance and is now common in natural grasslands and shrubby areas (Zouhar 2003c).

Oxeye daisy (*Leucanthemum vulgare* also known as *Chrysanthemum leucanthemum)* is found along numerous roads and trails in the Divide landscape, although its mapped acreage is limited. Besides reproducing vegetatively along a rhizome, oxeye daisy is a prolific seed (achene) producer (Olson and Wallander 1999). Oxeye daisy reduces plant species diversity in infested areas. Grazing by cattle in infested areas intensifies its spread because they avoid the plant. Consequently, it forms dense populations. Oxeye daisy has the potential of increasing soil erosion because bare soil is more prominent in areas where high densities occur. Cultivation destroys oxeye daisy's shallow root system without difficulty (Mitich 2000). This plant can become noxious and is capable of taking over and modifying natural areas, pasture and rangeland and may increase soil erosion compared to native plant communities (Olson and Wallander 1999).

Dalmation toadflax (*Linaria dalmatica*) has a limited mapped acreage in the project area. Toadflax has been shown to readily establish on open and disturbed sites where competition from other plants is reduced (Zouhar 2003b). Dalmatian toadflax seeds may be dispersed by cattle, deer and other browsing animals and the seeds can remain viable after passing through the gastrointestinal tracts of cattle and possibly deer. This species can also expand vegetatively by the formation of adventitious shoots from both the tap and lateral roots (Zouhar 2003b). There is serious risk of infestation from Dalmation toadflax, even though current infestation levels are thought to be very low. Weeds are expected to increase in level of infestation and acres infested overall in the project area in spite of the efforts of herbicide application for control. Weed seeds are stored in the upper soil layers and will germinate over several years. This species is difficult to control.

Common yellow toadflax, or butter and eggs, (*Linaria vulgaris*) infestations may be included in the Dalmation toadflax mapped acreage for this project area. The two species have similar characteristics. Butter and eggs has been shown to readily establish on open and disturbed sites where competition from other plants is reduced (Zouhar 2003b). The seeds may be dispersed by water, ants, birds and rodents, but existing infestations of butter and eggs appear to expand mainly by vegetative reproduction rather than by seed (Pauchard et al. 2003; Zouhar 2003b). There is serious risk of infestation from yellow toadflax even though current infestation levels are thought to be very low.

Cheatgrass (*Bromus tectorum*) is a serious weed that competes with native vegetation and fuels wildfires (Young et al 1987). Cheatgrass is listed as a regulated species on the Montana State Noxious Weed list and has not been mapped on the Helena National Forest. It is established along numerous roadsides and other areas of disturbance in Montana. Cheatgrass spread rapidly through sagebrush ranges following World War II and has been expanding its range ever since. Disturbance by spring grazing or even rodent activity is sufficient to perpetuate cheatgrass reproduction (Zouhar 2003a). Cheatgrass is highly adaptable and has increased on lands around the Helena National Forest over the past 30 years.

Noxious Weeds, Environmental Consequences

Indicators used to disclose environmental effects of the alternatives are:

- Predicted acres of noxious weed infestation within 100-foot buffer of motorized routes with the associated management cost for weed control activities; and
- Qualitative comparison of risk of noxious weed infestation between alternatives.

Effects Common to All Alternatives

The Forest treats approximately one-third of its mapped weeds on an annual basis under its normal weed treatment program; therefore, one-third, or 525 of the 1,751 acres of weeds along travel routes, would be treated annually. Herbicide treatment of these acres would have an average cost of about $51 per acre for easily accessible sites (≤200 feet of a road and on slopes <40 percent) and $65 per acre for areas with more difficult terrain (>200 feet from a road and on slopes >40 percent). The cost of bio-control is included in these prices. An average cost of $58/acre is used to calculate costs. Appendix A of the noxious weed specialist report outlines the weed control costs by method of treatment and can be found in the project file.

Table 153 displays treatment type and cost to treat one-third of the acres in the project area. This table does not include the cost of monitoring. This cost is not included in further analysis of the alternatives as it is assumed to be a baseline, independent of management actions and common to all alternatives.

Table 153: Treatment Type and Cost for Infested Acres—All Alternatives

Treatment Type	Average Cost/Acre	Acres	Average Total Cost
Herbicide/Bio-control	$58.00	525	$30,450

Noxious weed infestations adversely affect native fauna and flora and present the greatest large-scale threat to native ecosystems that exist in the nation's wild lands today (DiTomaso 2000; Lodge and Shrader-Frechette 2003; Lonsdale 1999; Mack et al 2001; Pauchard et al 2003). Noxious weeds can create monocultures if they are not controlled with herbicides or effective biocontrol. At high infestation levels (canopy cover of ≥25 percent), noxious weeds can cause a loss of native plant diversity, reduction of wildlife habitat and forage, increase in erosion and depletion of soil moisture and nutrient levels (DiTomaso 2000). These effects are common to all alternatives and would vary depending on the level of infestation. The loss of plant biodiversity, soil productivity and foraging values are great (Pauchard et al., 2003; Zouhar 2001a, 2001b, 2002a, 2002b, 2003a, 2003b, 2003c; Gucker 2009, 2010; Stone 2010).

Current weed management activities would continue under all alternatives. Chemical weed treatments would be used in areas accessible to ground spraying equipment. Roadside infestations would be treated on a scheduled basis. Bio-control would be used in areas where the biological agents have optimal conditions for survival and expansion. In riparian areas, biological control would be emphasized where conditions for insect establishment are met.

Public access for recreation, firewood collection and private property access would continue along roadsides. Also, forest users would be free to use all existing dispersed recreation sites and other open areas, except during spring break-up when the road surfaces are over saturated with moisture. The ground disturbance associated with these activities would likely increase weed infestations where bare soil is exposed. The

area immediately adjacent to the roads would continue to be the most vulnerable to weed infestation due to several factors: weed seed from vehicles would be likely to detach along the roadsides; these areas are disturbed when roadsides are bladed with heavy machinery; and weed seed can be on the machinery or in the soil that is spread along the maintained area. The exposure to new weed infestations to road and trail routes is high due to constant delivery of weed seed from vehicles, humans and animals. The more vehicles that travel the routes, the higher the exposure to noxious weed seed spread.

Weeds could be expected to increase by an estimated 8 to 12 percent (USDA 1998). The most susceptible forest habitat types would be dry habitat types that have existing infestations of noxious weeds due to the natural openness of such forest types.

Spotted knapweed, cheatgrass and Canada thistle may spread rapidly with ground disturbance and will spread at a slower rate without disturbance (Young et al 1987; Zouhar 2001a, 2001b, 2003b). Dalmatian toadflax, leafy spurge and sulfur cinquefoil spread readily without ground disturbance and spread very rapidly with disturbance (Simonin 2000; Zouhar 2003b, 2003c; Gucker 2010). Dalmatian toadflax is of primary concern across the project area due to the amount of infestation and difficulty of control whether or not additional ground disturbance occurs. Leafy spurge is also a concern due to difficulty of control (USDA 2006).

New weed infestations would occur under all alternatives, particularly along roadsides and areas of disturbance (Lonsdale 1999). The Helena National Forest Weed Treatment Project FEIS (USDA 2006) provides guidance and environmental requirements for weed control activities that would be applied to this area under any alternative. The forest currently uses herbicides to treat approximately 30 percent of infestations annually. There is also a bio-control program on the forest that has been successful in establishing insectories.

The data on response of weeds and changes in weed ecology due to climate change are limited. Weeds are genetically diverse and if resources such as light, water, nutrients, or carbon dioxide change within the environment, it is more likely there may be an expansion of weeds. However, very little is known regarding the impact of climate change on the reproductive success of invasive weeds and the potential consequences for their management (Ziska 2006).

Native plant diversity would be impacted by infestations of non-native plants, especially noxious weeds. Noxious weeds dominate plant communities and tend to form monocultures that negatively impact native biological diversity. This weed competition to individual plants and plant communities can result in loss of species diversity and sensitive native plants. Native grasses used for domestic livestock and wild ungulates have been particularly susceptible to impacts from weeds (Beck 2001).

A review of the mechanisms underlying exotic plant invasions by Levine and others (2003) revealed that although numerous studies have been done examining the effects of invasives on community structure and diversity, few studies have examined the underlying processes (e.g. competition, allelopathy, production of flammable biomass, nutrient cycling) that cause the impact. It is well understood that community biodiversity decreases with exotic plant invasion, but the results of changes to soil community diversity, resource allocation and soil water availability, for example, have not been examined (Levine et al. 2003).

Evans et al. (2001) found that cheatgrass invasion can significantly alter nutrient cycling through differences in litter quality and quantity. However, the consequences of altered nitrogen availability for community structure are poorly demonstrated and highly variable (Levine et al. 2003).

Studies of impacts to natural fire processes strongly support the expectation that invader impacts on disturbance regimes (ecosystem process) can strongly and possibly irreversibly affect community structure (Levine et al. 2003). Dramatic alterations of fire frequency in historic shrublands that are now dominated by cheatgrass have been demonstrated (Ehrenfeld et al. 2001). Other cases of exotic grass and shrub impacts include increasing fuel resulting in greater flame lengths, higher temperatures and greater heat release. In most cases, the specific ecophysiological reasons for greater biomass production have not been identified. The effects of cheatgrass strongly support the prediction that invaders affecting disturbance processes have the greatest potential to create large impacts on ecosystems (Vitousek 1990).

Allelopathy is a biological phenomenon by which one organism produces bio-chemicals that influence the growth, survival and reproduction of other plants. Ridenour and Calloway (2001) showed that spotted knapweed reduced the root growth of Idaho fescue by 50 percent, demonstrating an adverse allelopathic effect. Additional studies on the effect of arbuscular mycorrhizae on interactions of spotted knapweed and Idaho fescue roots showed an enhancement of the competitive ability of spotted knapweed but direct effects of mycorrhizae were weak (Marler et al. 1999). Unanswered questions in the ecosystem impacts literature include the degree to which the documented impacts result simply from the addition of new functional traits brought in by the invader, or alternatively, the reduction or elimination of native species (Mack et al. 2001).

The use of herbicides may have positive or negative impacts on native plant diversity. Rice et al. (1997) found in a detailed comparison of plant community composition over an eight year period that plots treated with Tordon®, Transline® and Curtail® were more similar to the potential natural communities than the no-spray controls (Mueggler and Stewart 1980). On the other hand, Ortega and Pearson (In Review) found that side effects of weed management can vary as a function of local site conditions (Shea et al 2005). Side effects of management actions include: reducing vigor or abundance of native or desirable species, inhibiting overall productivity or diversity, shifting community structure and function and altering physical conditions (D'Antonio et al 2004; Hulme 2006; Louda et al 1997). Therefore, effective weed management requires weighing the success of control measures (e.g., impacts on target weeds and recovery of native species) against the side effects of management actions. This necessitates a thorough understanding of how management tools interact with non-target system components as well as the target weed (Ortega and Pearson, In Review).

The Helena National Forest Weed Treatment Project FEIS (USDA 2006) provides guidance and environmental requirements for weed control and treatment activities, which would be applied to the project area in any alternative. All personnel using herbicides are appropriately certified by the State of Montana and knowledgeable as to the environmental guidelines and requirements of the Helena National Forest Weed Treatment Project FEIS (USDA 2006).

Effects Common to All Action Alternatives

While the spread of noxious weeds would continue under all alternatives, the rate of spread could potentially be faster in areas proposed to change from non-motorized use to open for motorized use. Weed management would continue as in the past with the addition of management in areas that have ground disturbance associated with this project. Areas of ground disturbance would be monitored for weed infestations and treated as appropriate, in accordance with the Helena National Forest Weed Treatment Project FEIS (USDA 2006) and best management practices designed to minimize the spread of existing invasive plants and prevent the colonization of new invasive plants within the project area and the Helena National Forest. Chemical weed treatments would be the primary treatment method along roadside areas as those areas are accessible to ground spraying equipment. Bio-control would be used in areas where the biological agents had optimal conditions for survival and expansion. In riparian areas, biological control would be emphasized where conditions for insect establishment are met. The effect of all treatment methods would be to control and contain existing and new infestations related to open roads and trails.

Noxious weed infestations are introduced and spread through most ground disturbing activities (Young et al. 1987; Lonsdale 1999; Zouhar 2001a, 2002b, 2003b; King County 2007). Vehicles that travel the National Forest road and trail system provide a source of weed seed as well as a chronic disturbance along those corridors. Some weeds, such as Dalmation toadflax, leafy spurge, houndstongue and sulfur cinquefoil spread readily without ground disturbance and spread very rapidly with disturbance (Zouhar 2002b; Zouhar 2003b; Zouhar 2003c). Weed control efforts in the form of herbicide treatment and biological control provide beneficial effects undertaken over time to control existing and new infestations.

For the purpose of calculating potential risk of weed infestation in the treatment areas, moderate risk is equated to approximately 10 percent soil surface disturbance of the potential acres affected and high risk is equated to 100 percent soil surface disturbance of the acres affected.

The Helena National Forest Weed Treatment Project FEIS (USDA 2006) identified several 6th code HUCs in which herbicide application would be limited based on the amount of herbicide applied, the location of the application, the streamflow and HUC area. The estimates of the amount to be applied if all acres were treated are shown by HUC in appendix B of the noxious weed specialist report (see project file). The rationale for that determination is from the coarse filter calculation to estimate possible concentrations of herbicide in stream waters, shown in appendix C of the noxious weed specialist report (see project file). No HUCs would exceed the limit identified through modeling. Please refer to the fisheries specialist report for the effects and limits to herbicide application.

Cumulative Effects

The cumulative effects area for noxious weeds is the Divide Travel Plan project area (155,000 acres). Cumulative effects are addressed under each of the alternatives. The cumulative effects that are described include ongoing actions that are assumed to have effects beginning shortly after implementation of the action. These impacts are anticipated to continue into the reasonably foreseeable future. Effects associated with various actions are based on literature, known weed infestations and professional experience.

Past activities have contributed to the previously described affected environment and would be accounted for in the most recent weed inventory data.

Ongoing activities include, but are not limited to: roadside hazard tree reduction implementation (491 miles); fuels reduction project (Chessman Reservoir); timber harvest on private lands and other private land activities; noxious weed treatment on National Forest System lands; livestock grazing allotments; and small mining operations. For a full list of past, present and reasonably foreseeable activities refer to appendix B.

Alternative 1, No Action

Direct and Indirect Effects

No additional ground disturbance beyond that described in "Effects Common to All Alternatives" would occur under this alternative. Weeds would continue to spread at a rate of approximately 8 to 12 percent per year. Treatment of the currently mapped noxious weeds within roadside areas would average about $58.00 per acre; excluding monitoring costs.

Under this alternative, there are approximately 1,155 acres of noxious weed associated with motorized routes, 495 acres of noxious weeds associated with non-motorized routes and 101 acres of weeds associated with the Continental Divide National Scenic trail (CDNST). A spreadsheet showing the weeds on a given route as well as a map can be found in the project file.

Generally, any given roadside is treated with Tordon every two to three years rather than annually. Using the average annual treatment cost of $58 per acre and assuming one-third of the infestations would likely be treated, the existing condition 525 acres would be treated at a total cost of $30,450 for alternative 1.

The following table shows the estimated costs within the project area (100-foot road buffer) for this alternative and assumes that 30 percent of a population is treated each year. For the more treatment specific cost estimates found in appendix A of the noxious weed specialist report (see project file).

Table 154: Acres Infested with Noxious Weeds by Type and Cost

Type of Route	Infested Acres	30% of Infested Acres	Treatment Costs/Acre	Total Cost Treating 30% per year
Motorized	1,155	346.5	$51.00	$17,672
Non-motorized	495	148.5	$65.00	$9,653
CDNST	101	30.3	$51 to $65	$1,757
Total	1,751	525.3	--	$20,382

The following table shows a qualitative comparison of risk of weed infestation and/or expansion due to various factors.

Table 155: Qualitative Comparison of Risk by Type of Route

Type of Risk	Motorized Routes	Non –motorized Routes
Amount of area exposed to new or increased size of weed infestations	Motorized routes (344 miles) are 57% higher than non-motorized routes (147 miles)	
Frequent exposure to weed seed	Very high	Low
Likelihood of treatment	High	Low
Longterm impact on native flora	High due to herbicde effects and introduced species	High due to infestation level without treatment
Overall Risk of new infestations	High	Low

Irreversible/Irretrievable Commitments

The effects of noxious weed infestations are adverse to native fauna and flora and present the greatest large-scale threat to native ecosystems that exist in the Nation's wildlands today (Lonsdale 1999; DiTomaso 2000; Mack et al. 2001; Lodge and Shrader-Frechette 2003; Pauchard et al. 2003). At high infestation levels, these effects are adverse due to the loss of native plant diversity, reduction of wildlife habitat and forage, increase in erosion and depletion of soil moisture and nutrient levels (DiTomaso 2000). These effects are common to all alternatives due to the effects of noxious weeds whether ground disturbance occurs or not. If noxious weed populations are not controlled, these effects could be irreversible.

This alternative has the highest potential for adverse effects, due to the number of acres of current infestation along a 100-foot of routes (1,155) and the percentage of motorized routes (57).

Cumulative Effects

The existing condition reflects the effect of past disturbances as well as the effect of noxious weed control efforts. Please refer to the cumulative effects table in appendix B for a specific descriptions of the past, present and foreseeable activities.

Ongoing activities: Weed expansion would continue to occur under the alternative 1 in association with ongoing activities at a rate of approximately 8 to 12 percent per year (USDA 1998). Ground disturbance associated with the following projects would likely cause noxious weed expansion in the cumulative effects area:

- Grazing Allotments – in areas where cattle congregate such as salt grounds. Disturbed soil in these areas would be susceptible to weed infestation. Grazing allotments are monitored annually and noxious weed infestations are treated as part of the forestwide noxious weed treatment program.
- Roadside Hazard Tree Removal – this project includes approximately 491 miles of harvest along existing roads in the project area in the short-term. Noxious weed treatment (herbicide) is required on all harvest units before and after harvest.

- Fuels Reduction Project (Chessman Reservoir) – this project includes harvest around the Chessman Reservoir.
- Private Land Tree Activities – Tree removal would be expected to continue as trees continue to die due to the mountain pine beetle. Ground disturbance associated with road construction and logging operations would likely cause noxious weed population expansion in the cumulative effects area. Private land operations are governed by Montana state law to control noxious weed populations.
- Mining operations – there are numerous small mining operations ongoing. All plans of operations require weed treatment of all ground disturbances.
- Forest Noxious Weed Treatment Program – the herbicide treatment is primarily along roads and in patches that are accessible to mechanized equipment (ATVs, UTVs) and/or by hand, biological (insects), goats/sheep and aerial spraying. Areas for treatment are as identified in the EIS/ROD and continually being updated and treated as new infestations are located. The program would continue to treat approximately 30 percent of the weeds within the project area.

There are no other foreseeable actions that would have cumulative effects with this alternative.

Alternative 2

Direct and Indirect Effects

No additional ground disturbance beyond that described in “Effects Common to All Alternatives” would occur under this alternative. Weeds would continue to spread at a rate of approximately 8 to 12 percent per year. Treatment of the currently mapped noxious weeds within roadside areas would average about $58.00 per acre; this does not include costs for any monitoring activities.

Under this alternative there are approximately 833 acres of noxious weed associated with motorized routes, 817 acres of noxious weeds associated with non-motorized routes and 101 acres of weeds associated with the Continental Divide Scenic Trail. A spreadsheet showing the weeds on a given route as well as a map can be found in the project file.

Generally, a given roadside is treated with Tordon every two to three years rather than annually. Using the average annual treatment cost of $58 per acre and assuming one-third of the infestations would likely be treated, for the existing condition 525 acres would be treated at a total cost of $30,450.

The following table shows the estimated costs within the project area (100-foot road buffer) for this alternative, assuming that 30 percent of a population is treated each year. For the more treatment specific cost estimates found in appendix A of the noxious weed specialist report (see project file).

Table 156: Acres Infested with Noxious Weeds by Type and Cost

Type of Route	Infested Acres	30% of Infested Acres	Treatment Costs/Acre	Total Cost Treating 30% per year
Motorized	833	249.9	$51.00	$12,745
Non-motorized	817	245.1	$65.00	$15,932
CDNST	101	30.3	$51-$65	$1,757
Total	1,751	525.3	--	$30,434

The following table shows a qualitative risk rating of various factors for motorized and non-motorized routes.

Table 157: Qualitative Comparison of Risk by Type of Route

Type of Risk	Motorized Routes	Non –motorized Routes
Amount of area exposed to new or increased size of weed infestations	Motorized routes (339 miles) are 54% higher than non-motorized routes (156 miles)	
Frequent exposure to weed seed	Very high	Low
Likelihood of treatment	High	Low
Long term impact on native flora	High due to herbicde effects and introduced species	High due to infestation level without treatment
Overall Risk of new infestations	High	Low

The cost of treatment for this alternative would be essentially the same as the existing condition also known as the alternative 1. The overall weed acreage within the project area would not be affected in the short-term. With fewer miles of motorized routes in particular, the acres of weeds inside the buffer would be reduced. Over time, this would mean less exposure to weed seed and disturbance. This alternative would have similar but lower impacts in terms of noxious weeds as compared to the alternative 1.

Irreversible/Irretrievable Commitments

Please refer to alternative 1 for Irreversible/Irretrievable commitments. This alternative has the second least potential for adverse effects, due to the number of acres of infestation along a 100-foot buffer of motorized routes (833) and the percentage motorized routes (56).

Cumulative Effects

Cumulative effects under alternative 2 would be similar to those identified under alternative 1. There would be fewer infested acres along motorized routes and fewer motorized routes associated with alternative 2. As a result some effects would be expected to be less with this alternative as compared to alternative 1.

There are no additional ongoing or foreseeable actions that would have cumulative effects with this alternative beyond those described under alternative 1.

Alternative 3

Direct and Indirect Effects

No additional ground disturbance beyond that described in "Effects Common to All Alternatives" would occur under this alternative. Weeds would continue to spread at a rate of approximately 8 to 12 percent per year. Treatment of the currently mapped noxious weeds within roadside areas would average about $58.00 per acre; this does not include costs for any monitoring activities.

Under this alternative, there are approximately 853 acres of noxious weed associated with motorized routes, 797 acres of noxious weeds associated with non-motorized routes and 101 acres of weeds associated with the Continental Divide Scenic trail. A spreadsheet showing the weeds on a given route as well as a map can be found in the project file.

Generally, a given roadside is treated with Tordon every two to three years rather than annually. Using the average annual treatment cost of $58 per acre and assuming one-third of the infestations would likely be treated, the existing condition 525 acres would be treated at a total cost of $30,450.

This alternative would result in lower number of infested acres within the 100 foot buffer along motorized routes. The following tables show the route use mileages and the acres infested with noxious weeds within the 100-foot buffer of travel routes in the project area. For the more treatment specific cost estimates found in appendix A of the noxious weed specialist report (see project file).

Table 158: Acres within the buffered area currently infested with weeds by type of route

Type of Route	Infested Acres	30% of Infested Acres	Treatment Costs/Acre	Total Cost Treating 30% per year
Motorized	853	255.9	$51.00	$13,051
Non-motorized	797	239.1	$65.00	$15,542
CDNST	101	30.3	$51-65	$1,757
Total	1,751	525.3	--	$30,350

The following table shows a qualitative risk rating of various factors for motorized and non-motorized routes.

Table 159: Qualitative Comparison of Risk by Type of Route

Type of Risk	Motorized Routes	Non –motorized Routes
Amount of area exposed to new or increased size of weed infestations	Motorized routes (272 miles) is approximately 18% higher than non-motorized routes (223 miles)	
Frequent exposure to weed seed	Very high	Low
Likelihood of treatment	High	Low
Longterm impact on native flora	High due to herbicde effects and introduced species	High due to infestation level
Overall Risk of new infestations	High	Low

Alternative 3 has the lowest number of miles of motorized routes as compared to the existing condition and the other three action alternatives. As a result, it would have the lowest number of noxious weeds associated with motorized routes. This alternative would have the lowest impacts of the four alternatives in terms of noxious weed infestations and potential for future noxious weed spread. This is due to the fact that fewer roads would remain open to motorized use. At local scales, non-native invasive species richness and abundance are generally highest in and around disturbed patches, corridors and edges such as riparian corridors and transportation corridors (Benninger-Truax et al. 1992; Gelbard and Belnap 2003; Larson 2003). Buckley et al. (2003) found that main forest routes (among others) serve as primary conduits for entry of introduced species into the interior of managed stands. Fewer roads open to motorized use would avoid a perpetuation in disturbance associated with motorized use as well as reduce the potential for the introduction of noxious weed seeds.

Irreversible/Irretrievable Commitments

Please refer to alternative 1 for irreversible/irretrievable commitments. This alternative has the least potential for adverse effects, due to the number of acres of infestation along a 100-foot of motorized routes (853) and the percentage motorized routes (31).

Cumulative Effects

Cumulative effects under alternative 3 would be similar to those identified under alternative 1. There would be fewer infested acres along motorized routes and fewer motorized routes associated with alternative 3, so some effects would be expected to be less with this alternative as compared to alternative 1.

There are no other additional ongoing or foreseeable actions that would have cumulative effects with this alternative beyond those described under alternative 1.

Alternative 4

Direct and Indirect Effects

No additional ground disturbance beyond that described in “Effects Common to All Alternatives” would occur under this alternative. Weeds would continue to spread at a rate of approximately 8 to 12 percent per year. Treatment of the currently mapped noxious weeds within roadside areas would average about $58.00 per acre; this does not include monitoring costs.

Under this alternative there are approximately 1,070 acres of noxious weed associated with motorized routes, 580 acres of noxious weeds associated with non-motorized routes and 101 acres of weeds associated with the Continental Divide Scenic Trail. A spreadsheet showing the weeds on a given route as well as a map can be found in the project file.

Generally a given roadside is treated with Tordon every two to three years rather than annually. Using the average annual treatment cost of $58 per acre and assuming one-third of the infestations would likely be treated, the existing condition 525 acres would be treated at a total cost of $30,450.

This alternative would result in a lower number of infested acres within the 100-foot buffer along motorized routes. The following table shows the route use mileages and the acres infested with noxious weeds within the 100-foot buffer of travel routes in the

project area. For the more treatment specific cost estimates found in appendix A of the noxious weed specialist report (see project file).

Table 160: Acres Infested by Type of Route

Type of Route	Infested Acres	30% of Infested Acres	Treatment Costs/Acre	Total Cost Treating 30% per year
Motorized	1,070	321	$51.00	$16,371
Non-motorized	580	174	$65.00	$11,310
CDNST	101	30.3	$51-65	$1,757
Total	1,751	525.3	--	$29,438

The following table shows a qualitative risk rating of various factors for motorized and non-motorized routes.

Table 161: Qualitative Comparison of Risk by Type of Route

Type of Risk	Motorized Routes	Non –motorized Routes
Amount of area exposed to new or increased size of weed infestations	Motorized routes (285 miles) is approximately 26% higher than non-motorized routes (210 miles)	
Frequent exposure to weed seed	Very high	Low
Likelihood of treatment	High	Low
Longterm impact on native flora	High due to herbicde effects and introduced species	High due to infestation level
Overall Risk of new infestations	High	Low

Alternative 4 has the second lowest number of miles of motorized routes as compared to alternative 1 and therefore the second lowest number of noxious weeds associated with the motorized routes. This alternative would have lower impacts than alternatives 1 and 2 in terms of noxious weed infestations and potential for future noxious weed spread and slightly more impacts than alternative 3.

Irreversible/Irretrievable Commitments

Please refer to alternative 1 for irreversible/irretrievable commitments. This alternative has the second most potential for adverse effects, due to the number of acres of infestation along a 100-foot of motorized routes (1,070) and the percentage motorized routes (50).

Cumulative Effects

Cumulative effects under alternative 4 would be similar to those identified under alternative 1. There would be fewer infested acres along motorized routes and fewer motorized routes associated with alternative 4, so some effects would be expected to be less with this alternative as compared to alternative 1.

There are no other additional ongoing or foreseeable actions that would have cumulative effects with this alternative beyond those described under alternative 1.

Alternative 5

Direct and Indirect Effects

No additional ground disturbance beyond that described in "Effects Common to All Alternatives" would occur under this alternative. Weeds would continue to spread at a rate of approximately 8 to 12 percent per year. Treatment of the currently mapped noxious weeds within roadside areas would average about $58.00 per acre; this does not include monitoring costs.

Under this alternative, there are approximately 933 acres of noxious weed associated with motorized routes, 890 acres of noxious weeds associated with non-motorized routes. A spreadsheet showing the weeds on a given route as well as a map can be found in the project file.

Generally, a given roadside is treated with Tordon every two to three years rather than annually. Using the average annual treatment cost of $58 per acre and assuming one-third of the infestations would likely be treated, the existing condition 525 acres would be treated at a total cost of $30,450.

This alternative would result in lower acres of infestation within the 100-foot buffer along motorized routes. The following tables show the route use mileages and the acres infested with noxious weeds within the 100 foot buffer of travel routes in the project area. For more the treatment specific cost estimates found in appendix A of the noxious weed specialist report (see project file).

Table 162: Acres Infested by Type of Route

Type of Route	Infested Acres	30% of Infested Acres	Treatment Costs/Acre	Total Cost Treating 30% per year
Motorized	933	280	$51	$14,280
Non-motorized	890	267	$65	$17,355
Total	1,823	547	--	$31,635

The following table shows a qualitative risk rating of various factors for motorized and non-motorized routes.

Table 163: Qualitative Comparison of Risk by Type of Route

Type of Risk	Motorized Routes	Non –motorized Routes
Amount of area exposed to new or increased size of weed infestations	Motorized routes (222 miles) is approximately 13% lower than non-motorized routes (256 miles)	
Frequent exposure to weed seed	Very high	Low
Likelihood of treatment	High	Low
Longterm impact on native flora	High due to herbicde effects and introduced species	High due to infestation level
Overall Risk of new infestations	High	Low

Alternative 5 has the third lowest number of miles of motorized routes as compared to the existing condition and therefore, the third lowest number of noxious weeds

associated with the motorized routes. This alternative would have lower impacts than alternatives 1 and 4 in terms of noxious weed infestations and potential for future noxious weed spread and slightly more impacts than alternative 2 and 3.

Irreversible/Irretrievable Commitments

Please refer to alternative 1 for irreversible/irretrievable commitments. This alternative has the third greatest potential for adverse effects, due to the number of acres of infestation along a 100-foot of motorized routes (1,070) and the percentage motorized routes (50).

Cumulative Effects

Cumulative effects under alternative 5 would be similar to those identified under alternative 1. There would be fewer infested acres along motorized routes and fewer motorized routes associated with alternative 5, so some effects would be expected to be less with this alternative as compared to alternative 1.

There are no other additional ongoing or foreseeable actions that would have cumulative effects with this alternative beyond those described under alternative 1.

Conclusions

Table 164 below shows by alternative the acres of noxious weed infestation within a 100 foot buffer of all routes types, the acres of noxious weed infestation and treatment costs by motorized and non-motorized route type.

Table 164: Comparison of Weed Infestation and Treatment Costs by Alternative

Route status	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Motorized route mileage	344	339	272	285	222
Acres infested along 100-feet buffer of motorized route	1,155	833	853	1,070	933
Cost to treat 30% of infested acres of motorized routes ($51/acre)	$17,672	$12,745	$13,051	$16,371	$14,280
Non-motorized route mileage	147	156	223	210	256
Acres infested along 100-feet buffer of non- motorized route	495	817	797	580	890
Cost to treat 30% of infested acres of non-motorized routes ($65/acre)	$9,653	$15,932	$15,542	$11,310	$17,355
Acres infested along 100-feet buffer of CDNST route	101	101	101	101	*
Cost to treat 30% of infested acres on CDNST route ($58/acre)	$1,757	$1,757	$1,757	$1,757	-
Total cost to treat 30% infested acres	$29,082	$30,434	$30,350	$29,438	$31,635
Percent change in treatment total costs from Alt 1		6%	6%	1%	8%

The CDNST routes were analyzed under the motorized or non-motorized routes categories.

Alternative 5 has the third lowest amount of noxious weed infested acres within a 100-foot route buffer of motorized routes and the highest management cost for noxious weed control when comparing all alternatives. The increased cost of noxious weed management is due to the greater cost per acre for treatment along non-motorized routes ($51 vs. $65). Though alternative 5 has the greatest cost, it is the least likely of developing new weed infestations due to motorized vehicles spreading weed seeds and the possibility of ground disturbance which increases the vulnerablity of an area to weed invasion. Reducing the likelihood of new infestations reduces long-term impacts to native flora.

Forest Plan Consistency

The Helena National Forest Plan includes forestwide management direction that is applicable to noxious weeds as follows:

Noxious Weeds:

- Implement an integrated weed control program in cooperation with the state of Montana and county weed boards to confine present infestations and prevent establishing new areas of noxious weeds. Noxious weeds are listed in the Montana Weed Law and designated by county weed boards.
- Integrated Pest Management, which uses chemical, biological and mechanical methods, will be the principal control method(s). Spot herbicide treatment of identified weeds will be emphasized. Biological control methods will be considered as they become available.
- Funding for weed control on disturbance sites will be provided by the resource which causes the disturbance.

The alternatives and weed management strategies provided in this FEIS are consistent with the aforementioned forestwide management direction. There are no specific management area standards for noxious weed management in the Forest Plan due to the fact that the management direction for noxious weeds provided above apply to all areas within the Helena National Forest. This document tiers to the Helena National Forest Weed Treatment Project FEIS and subsequent Record of Decision which prescribes specific guidance for noxious weed management on the Helena National Forest.

ECONOMICS

Regulatory Framework

The preparation of NEPA documents is guided by CEQ regulations for implementing NEPA (40 CFR 1500-1508). NEPA requires that consequences to the human environment be analyzed and disclosed. The extent to which these environmental factors are analyzed and discussed is related to the nature of public comments received during scoping. NEPA does not require a monetary benefit-cost analysis (40 CFR 1502.23).

Assumptions

In general, economic effects associated with any change in management vary mainly by the total amount of spending and by the type of activity, but it cannot be generalized that motorized or non-motorized activities contribute more or less to the local economy

on a per visit basis because the number of visits per party group also vary across activities.

Trail Management and Road Decommissioning Costs

The following trail maintenance cost estimates are provided for work under any of the alternatives with the following caveats:

- A well designed motorized trail could cost less than this estimate.
- Estimate is using actual figures for maintaining at less than optimum trail design.
- Trails passing through burns will always cost more to maintain.
- Estimates based on contracting costs.
- Estimates do not take Forest crew costs into account.

Table 165: Trail Management Costs

Trail Category	Annual Maintenance Cost
Trails open to motorcycle seasonally	$90 / mile
Trails open to Motorcycle yearlong	$150 / mile
Trails open to 50 inches or less seasonally	$500 / mile
Trails open to 50 inches or less yearlong	$750 / mile
New trail construction for 60 inch width*	$17,000 / mile

*Trails constructed as connectors of roads or trails for OHV use (60 inches width tread, pack and saddle standard clearing limit: 8'x10', includes clearing, grubbing, excavation and rolling dip construction at 100 foot intervals. Mobilization cost/mile and Contracting Officer's Representative time for administration both included in this estimate.

The following road decommissioning cost estimate is provided for work under any of the alternative:

Table 166 - Road Decommissioning Costs

Road	One-time Decommissioning Cost
Average Road Decommissioning Cost for Helena National Forest	$10,000 / mile

Information Used

Economic information used to describe the affected environment is compiled from various primary government sources. There is no new data collected specifically for this analysis. Existing county-level and national forest-level data is used to describe trends in the regional economy. County economic profiles are available from the Economic Profile System (EPS), which compiles and digests primary population and economic data from a variety of government sources into a report. Recent EPS reports, which include data up to 2010, provide a recent description of the population, employment and income composition of the counties comprising the economic impact area for the Divide Travel Plan area. The recent economic conditions vary for the five counties that have land in the project area. Highlights of the EPS reports are presented below to describe the economies that may be impacted by the Divide Travel Plan decision. As a result of the small number of firms in area counties, employment and income figures were not available for some sectors of the economy due to disclosure restrictions.

Wildland dependency data, based on the percent of total labor income (employee compensation and proprietor income) earned in five resource areas, is obtained from

Gebert and Odell (2006). In these calculations the portion of labor income earned in economic sectors associated with each of five resource areas have been calculated for 1993 and 2003. Although these numbers cannot support thorough trend analysis, as they are only two snapshots in time, they do provide some important information.

Methodology and Scientific Accuracy

National Travel Management Rule Benefit Cost Analysis

When the travel management rule was developed, the Forest Service considered the consequences in a qualitative cost benefit analysis. The following text and Table 167 are extracted from that analysis.

"The benefits and costs of the final rule are described qualitatively because the rule is procedural. Actual transportation decisions will be made at the local level with public input and appropriate environmental analysis and documentation. Neither the costs nor benefits are readily quantifiable and thus this analysis discusses the costs and benefits to the extent information is available (see Table 167). The benefits of the final rule include gains to users, the agency and the environment. Sustainable, reliable, high-quality public access to National Forest System lands will lead to enhanced recreation opportunities for visitors. In addition, both users and the agency will benefit from improved public communication, more effective law enforcement and improved travel management planning. Other benefits include reduced environmental damage and a more consistent and defensible travel planning framework. The costs of the final rule include reductions in unconstrained cross-country motor vehicle use for those that value this activity and short-term agency planning costs as many national forests launch travel planning efforts following adoption of the rule."

Table 167: Costs and Benefits of Final Travel Management Rule

Potential Impacts	Current Rule	Final Rule
Public Communication	User confusion from inconsistent policy among national forests. Lack of compliance due to uncertainty and inconsistency of policy.	Increased user benefits and decreased agency management costs due to increased public involvement, user awareness, cooperation with user groups, access and route management.
Public Safety	Unmanaged user-created routes have potential safety issues. Law enforcement effectiveness limited by inconsistent regulatory framework.	Increased public safety due to better trail design and management. Increased law enforcement effectiveness and increased user benefits due to consistent regulatory framework.
Travel System Maintenance and Management	Many unmanaged, unmaintained routes result in deterioration of routes and environmental impacts.	Decreased loss of environmental benefits result from a sustainable system of managed, maintained and enforced routes.
Short Run Planning Costs	Increased agency planning costs as National Forests take on travel management issues individually without consistent framework.	Increased agency planning costs because many National Forests will launch travel planning.
Long Run Planning Costs	Travel management costs continue at high levels without National direction.	Decreased agency planning costs because of known framework and an established system.
User Benefits	Potential loss of recreation opportunities over time as use conflicts and environmental damage lead to route and area closures.	Increased user benefits, including enhanced recreation opportunities, improved natural environmental setting, reduced user conflicts and enhanced opportunities for cooperative construction and maintenance of routes because of long-term sustainability and legitimacy of route system. Potential decrease in some user benefits because of loss of unconstrained cross-country motor vehicle use.
Environment	Erosion, sedimentation and damage to fish and wildlife habitat from unmanaged cross-country motor vehicle use.	Increased environmental benefits due to reduction in erosion, sedimentation and habitat destruction that result from unmanaged cross-country motor vehicle use.

Economics, Affected Environment

Analysis Area

The analysis area for the environmental impact statement includes Deerlodge, Silver Bow, Jefferson, Lewis and Clark and Powell counties in Montana. Access management activities within the project area have the potential to mainly impact the economic conditions of the communities in these counties.

Modeling of economic impacts using input/output analysis is often conducted to estimate the expected changes in the contribution of jobs and labor income to local economies following management decisions. In order to model changes to jobs and income, expectations for changes in forest visitation are needed. Due to a dearth of recreation impact monitoring data from similar travel planning decisions, no recreation visitation impacts are provided for the Divide area. In lieu of this information, response

coefficients are sometimes derived. Response coefficients, which are reported here based on changes in the final demand for certain activities, indicate the number of full and part-time jobs and dollars of labor income per thousand national forest party trips per activity type. However, due to the fact that national visitor use monitoring, NVUM, data represents all activity on each national forest and is not broken down to describe just the Divide Travel Plan area and the uncertainty regarding recreational visitation changes/displacement that may occur following travel management decisions and an economic impact analysis was not conducted for this assessment. Instead the analysis focuses on recent economic dependency data, provides response coefficients and professional judgment regarding the likely change in the contribution of the National Forest System lands in the project area to the five-county economic impact area.

The combination of small towns and rural settings, along with people from a wide variety of backgrounds, provide a diverse social environment for the geographical region around the Helena Ranger District of the Helena National Forest. Local residents pursue a wide variety of life-styles, but many share a common theme, an orientation to the outdoors and natural resources. This is reflected in both vocational and recreational pursuits including employment in agricultural, logging and milling and mining operations, outfitter and guide businesses, hiking, hunting, fishing, camping and many other recreational activities.

Timber harvest and processing, mining, tourism and agricultural industries are important to the economy of local areas. Despite the common concern for and some dependence on natural resources within the local communities, social attitudes vary widely with respect to public land management. Local residents hold a broad spectrum of perspectives and preferences ranging from complete preservation to maximum development and recreational utilization of natural resources.

The key economic factors evaluated in this analysis include population, employment, income, economic diversity and natural resources dependency.

Population

Perhaps the most important attribute of any economy is the community of people who contribute to production, services, trade and consumption. The five counties in the economic impact area have had different population experiences since the 1970s, where only three of the counties saw overall positive population growth during this 35-year period. All impact area counties did experience median age increases during the last decade.

Deerlodge

From 1970 to 2010, the population of Deerlodge County decreased by 6,380 people, a 41 percent decrease, with roughly a decade of sharp decline, followed by two decades of slow decline. As an average annual rate, this represents a decrease of 1.6 percent. Total population in 2010 was 9,270 people, down 2 percent from 9,409 in 2000. The population has also gotten older since 2000. The 2010 median age was 46.2 years, up from 42.3 years in 2000, a 9 percent increase. In 2010, the largest age category was 15 to 19 years olds (1,025 people or 11 percent of the total). The 2009 population density in Deerlodge County was 12 people/square mile (US Census Bureau, Population Division, Table 1, 2000 to 2009). Population centers in this county include Anaconda (county seat), Galen, the eastern portion of Georgetown Lake, Opportunity and Warm Springs.

Silver Bow

From 1970 to 2010, the population of Silver Bow County decreased by 7,919 people, a 19 percent decrease, with a long decline from the mid-1970s through 1990 and another shorter period of decline since year 2000. As an average annual rate, this represents a decrease of 0.5 percent. At 34,233, this county had the second highest year 2010 population in the Divide Travel Plan economic impact area. The population has also gotten older since 2000. The median age was up 2.9 years, from 38.9 years in 2000 to 41.8 in 2010. The largest age category was 50 to 54 year olds (2,730 people or 8 percent of the total). The 2009 population density in Silver Bow County was high compared to neighbors at 46 people/square mile (US Census Bureau, Population Division, Table 1, 2000 to 2009). Population centers in this county include Butte (county seat), Ramsay, Rocker and Walkerville.

Jefferson

From 1970 to 2010, the population of Jefferson County increased by 6,131 people, a 116 percent increase, with undulating growth from the early 1970s through the mid-1980s and more consistent growth afterwards. As an average annual rate, this represented an increase of 3 percent. This lead to a, year 2010, population of 11,419 for this county. This was 1,367 more people or roughly 14 percent growth since 2000. The population has also gotten older since 2000. The median age was up 5.4 years, from 40.2 years in 2000 to 45.6 in 2010. The largest age category was 50 to 59 year olds (1,271 people or 12 percent of the total). Even after rapid population growth during the previous 30 years, the 2009 population density in Jefferson County was only 7 people/square mile. (US Census Bureau, Population Division, Table 1, 2000 to 2009). Population centers in this county include Basin, Boulder (county seat), Cardwell, Clancy, Jefferson City, Montana City and Whitehall.

Lewis and Clark

From 1970 to 2010, the population of Lewis and Clark County increased by 30,149 people, which was a 90 percent increase. This also represented the largest absolute increase in population for any Divide Travel Plan economic impact area county. With consistent growth from the early 1970s through the 2010, the average annual increase was 2.2 percent. At 63,604 people, this county had the highest year 2010 population in the Divide Travel Plan economic impact area. This included 7,718 additional residents or roughly 14 percent growth since 2000. The population in Lewis and Clark County also got older since 2000. The median age was up 2.7 years, from 38 years in 2000 to 40.7 years in 2010. The largest age category that year was 50 to 54 year olds (55,261 people or 8.6 percent of the total). The 2009 population density in Lewis and Clark County was 18 people/square mile (US Census Bureau, Population Division, Table 1, 2000 to 2009). Population centers in this county include Augusta, Austin, Canyon Creek, Canyon Ferry, Craig, East Helena, Fort Harrison, Helena (county seat), Lincoln, Marysville, Unionville and Wolf Creek.

Powell

From 1970 to 2010, the population of Powell County increased by 365 people, the average annual 5 percent increase obscures a sporadic population experience. Rapid population growth during the early 1970s was nearly mirrored by population loss of the same magnitude starting in the early 1980s. The 35-year low occurred around 1990 before climbing through the 1990s. There were 172 fewer residents or roughly 2

percent loss since 2000; this lead to a year 2010 population of 7,031 for this county. Around the turn of the century, the county population fell for several years before again starting to climb in recent years. The population in Powell County has also gotten older since 2000, where the median age was up 4.8 years, from 39.7 years in 2000 to 44.5 years in 2010. The largest age category was 45 to 49 year olds (710 people or 10 percent of the total). The 2009 population density in Powell County was 3 people/square mile (US Census Bureau, Population Division, Table 1, 2000 to 2009), the lowest in the five county area. Population centers in this county include Avon, Deer Lodge (county seat), Dempsey, Elliston, Garrison, Helmville and Ovando.

Economic Impact Area

In aggregate, from 1970 to 2010, the population of these five counties increased by 22,346 people, however this figure obscures the dynamic population experience. The period started with positive growth from the early 1970s through 1976, before starting a 15 year slide until 1990. Afterwards population growth remained positive in all years except 2001 and 2002, translating to an overall average annual increase of 0.5 percent. In sum, these counties have a year 2010 population of 125,584. There were 8,463 additional residents or roughly 7 percent growth since 2000. The population in all five counties has also gotten older since 2000, where median ages increased across the board. As a percentage, Jefferson County increased the most, at 13.4 percent from 40.2 to 45.6. Deerlodge County had the highest median age of 46.2 years old, while Lewis and Clark County had the lowest at 40.7. The 2000 population density in the five-county area was 13 people/square mile (BEA REIS 2005, Table CA30 and US Census 1990 and 2000).

Employment

Changes to access through travel management have the potential to slightly impact the existing configuration of employment across numerous economic sectors that support tourism and recreation in the five counties which is why it is described here. Information available in EPS helps portray the recent employment situation in these counties, which serves as part of the backdrop for travel planning. Providing services employs the greatest portion (6 percent) of people across the five-county area and the service sector grew rapidly in recent decades in most counties. Government employment was also high (21 percent) across the economic impact area, whereas goods producing jobs employed only 11 percent of workers.

Deerlodge

Over the period 1970 to 2005, roughly 1,875 jobs were lost in Deerlodge County. Not surprisingly, indexed job growth in Montana (204 percent) and the nation (191 percent) outpaced job growth of this county (70 percent) for the period. The majority of job growth between 1970 and 2005, 84 percent of all new jobs, was in proprietor employment (people who work for themselves). In 1970, proprietors represented 8.4 percent of total employment; this had changed significantly by 2010 when they represented 25.4 percent. For wage and salary jobs, the employment category whose share of the total gained the most was services and professional, which went from 35.2 percent in 1970 to 63.4 percent in 2000. The employment sector that decreased the most was manufacturing (including forest products) which fell from 26.7 percent during 1977 to only 3.2 percent during 1997. Farm employment actually increased from 1.7 percent in 1970 to 4.2 percent in 2005 (BEA REIS 2005).

Firms of various sizes operate in Deerlodge County. As a share of the total, the size category that with the most firms between 1977 and 2005 was 1 to 4 employees. The category that grew the fastest was 10 to 19 employees. In 2005, 93 percent of firms had fewer than 20 employees, although at least one firm had between 250 and 499 employees (Census County Business Patterns).

In 2010, the unemployment rate was 8.0 percent, compared to 6.8 percent in the state. In 2011, the monthly unemployment rate varied from a low of 7.2 percent in October to a high of 9.1 percent in February (Local Area Unemployment Statistics, Bureau of Labor Statistics), indicating approximately a 2 percent increase of the seasonal unemployment rate between fall and winter months.

Silver Bow

Over the period 1970 to 2005, despite overall population losses, roughly 3,691 jobs were added in Silver Bow County. Although this represented 122 percent of indexed growth for the county, it was outpaced by Montana (204 percent) and the nation (191 percent) for the period. The majority of job growth between 1970 and 2005, 53 percent of all new jobs, was in wage and salary employment (people who work for someone else). For wage and salary jobs, the employment category whose share of the number of establishments gained the most was services, which went from 35.1 percent in 1970 to 40.0 percent in 2000. The employment sector that decreased the number of establishments most was mining, which fell from 20.5 percent during 1977 to 2.0 percent during 2000. Farm employment increased slightly from 1.1 percent in 1970 to 1.7 percent in 2005 (BEA REIS 2005).

In 1970, proprietors represented 12.4 percent of total employment; this had changed significantly by 2010 when they represented 19.5 percent. However, employment of wage and salary earners contributed 63 percent of new employment between 1995 and 2005.

Firms of various sizes operate in Silver Bow County. As a share of the total, the size category that had the largest number of firms and the one that grew the most between 1977 and 2005 had 5 to 9 employees. In 2005, 88 percent of firms had fewer than 20 employees, although at least one firm had between 500 to 999 employees (Census County Business Patterns).

In 2011, the unemployment rate was 6.3 percent, compared to 6.8 percent in the state. In 2011, the monthly unemployment rate varied from a low of 5.7 percent in October to a high of 7.0 percent in January (Local Area Unemployment Statistics, Bureau of Labor Statistics), indicating a slight increase in seasonal unemployment rate between fall and winter months.

Jefferson

Over the period 1970 to 2005, roughly 3,725 jobs were added in Jefferson County. This indexed growth represented 300 percent for the county, so it outpaced Montana (204 percent) and the nation (191 percent) for the period. The majority of job growth between 1970 and 2005, 63 percent of all new jobs, was in proprietors (people who work for themselves). For wage and salary jobs, the employment category whose share of the total establishments that gained the most was services, which went from 17.2 percent in 1977 to 27.6 percent in 1997. The employment sector that decreased in employment the most was government which fell from 48.6 percent during 1970 to 19.9

percent during 2000. Farm employment decreased from 13.7 percent in 1970 to 8.9 percent in 2005 (BEA REIS 2005).

In 1970, proprietors represented 24.4 percent of total employment; this had changed significantly by 2010 when they represented 52.7 percent. Employment of wage and salary earners contributed 23 percent of new employment between 1995 and 2005.

Firms of various sizes operate in Jefferson County. As a share of the total, the size category that with the most firms between 1977 and 2005 had 1 to 4 employees. The category that grew the fastest was 10 to 19 employees. In 2005, 94 percent of firms had fewer than 20 employees, although at least one firm had between 100 and 249 employees (Census County Business Patterns).

In 2011, the unemployment rate was 5.6 percent, compared to 6.8 percent in the state. In 2011, the monthly unemployment rate varied from a low of 4.8 percent in November to a high of 7.2 percent in January (Local Area Unemployment Statistics, Bureau of Labor Statistics), indicating a 2.4 percent increase in the seasonal unemployment rate between fall and winter months.

Lewis and Clark

Over the period 1970 to 2005, roughly 24,001 jobs were added in Lewis and Clark County. This indexed growth of 239 percent for the county outpaced Montana (204 percent) and the nation (191 percent) for the period. The majority of job growth between 1970 and 2005, 75 percent of all new jobs, were in wage and salary positions (people who work for someone else). For wage and salary jobs, the employment category whose share of the total employment gained the most was services, which went from 54.4 percent in 1970 to 64.6 percent in 2000. The employment sector portion that decreased the most was government which fell from 30.7 percent during 1970 to 23.8 percent during 2000. Farm employment decreased slightly from 3.3 percent in 1970 to 3.0 percent in 2005 (BEA REIS 2005).

In 1970, proprietors represented 14.1 percent of total employment; this had increased significantly by 2010 when they represented 20.4 percent. Employment of wage and salary earners contributed only 27.9 percent of new employment between 1995 and 2005.

Firms of various sizes operate in Lewis and Clark County. As a share of the total, the size category that with the most firms between 1977 and 2005 had 1 to 4 employees. The category that grew the fastest had 10 to 19 employees. In 2005, 88 percent of firms had fewer than 20 employees, although at least one firm had between 599 and 1,000 employees (Census County Business Patterns).

In 2011, the unemployment rate was 5.3 percent, compared to 6.8 percent in the state. In 2011, the monthly unemployment rate varied from a low of 4.8 percent in October to a high of 5.8 percent in January (Local Area Unemployment Statistics, Bureau of Labor Statistics), indicating 1 percent increase of the seasonal unemployment rate between fall and winter months.

Powell

Over the period 1970 to 2005, roughly 1,052 jobs were added in Powell County. This indexed growth represented 141 percent for the county and it was outpaced by Montana (204 percent) and the nation (191 percent) for the period. The majority of job growth between 1970 and 2005, 65 percent of all new jobs, was in proprietors (people

who work for themselves). For wage and salary jobs, the employment category whose share of the total establishments gained the most was transportation, communication and utilities, which went from 5.4 percent in 1977 to 8.7 percent in 1997. The employment sector that decreased its number of establishments the most was manufacturing which fell from 12.4 percent during 1977 to 10 percent during 1997. Farm employment increased from 12.8 percent in 1970 to 13.4 percent in 2005 (BEA REIS 2005).

In 1970, proprietors represented 21.6 percent of total employment; this had increased significantly by 2011 when they represented 33.5 percent. Employment of wage and salary earners contributed 45 percent of new employment between 1995 and 2005.

Firms of various sizes operate in Jefferson County. As a share of the total, the size category with the most firms between 1977 and 2005 was 1 to 4 employees. The category that grew the fastest was 10 to 19 employees. In 2005, 94 percent of firms had fewer than 20 employees, although at least one firm had between 100 and 249 employees (Census County Business Patterns).

In 2011, the unemployment rate was 8.8 percent, compared to 6.8 percent in the state. In 2011, the monthly unemployment rate varied from a low of 7.1 percent in October to a high of 10.6 percent in February (Local Area Unemployment Statistics, Bureau of Labor Statistics), indicating 3.5 percent increase of the seasonal unemployment rate between fall and winter months.

Economic Impact Area

In aggregate, over the period 1970 to 2005, growth of 30,594 jobs in the five county area, representing an indexed increase of 169 percent from 1970 to 2005, was slightly slower than the state (204 percent) and the nation (191 percent). This is likely partially a function of the large loss of population during the 1980s. During this 35-year period, the majority of job growth, 63 percent of new jobs, was in wage and salary positions. For wage and salary jobs, the employment category whose share of the total employment that gained the most was services and professional, which went from 55.8 percent in 1977 to 64.8 percent in 2000. In 1970, proprietors represented 13.5 percent of total employment; by 2005, they represented 23.2 percent of all jobs (BEA REIS 2005). Farm employment increased slightly between 1977 and 2000, up from 2.9 percent to 3.3 percent.

Wage and salary employment (people who work for someone else) contributed 58 percent of new employment between 1995 and 2005. The growth in the number of operating firms and the available data on jobs by sector for the economic impact area suggest that for wage earners in the services, construction and retail sectors appear to explain much of the remaining job growth in the five county area. In all, during 2005, roughly 5,200 jobs were goods producing jobs, 33,800 were service providing and 13,300 jobs were government jobs. However, in 2005 it was government and government enterprises, which accounted for 20 percent of total employment. This was down from 25 percent during 1970 (BEA REIS 2005).

Most firms operating in the five-county area are small in size. During 2000, the size category that had the greatest number of firms was 1 to 4 employees, the category that grew the most was between 1990 and 2000, had 10 to 19 employees. In 2005, 89 percent of firms had fewer than 20 employees. The largest size firms in the five-county area had 500 to 999 employees (Census County Business Patterns).

In 2011, the unemployment rate was 5.9 percent, compared to 6.8 percent in the state. The monthly unemployment varied from a low of 5.3 percent in October to a high of 6.6 percent in January (Local Area Unemployment Statistics, Bureau of Labor Statistics). This information for 2011 shows a clear trend of a 1 to 4 percent increase in the seasonal unemployment rate between fall and winter months, in every county.

Income

Personal income and per capita income are often used to proxy standard of living. Not surprisingly, Silver Bow and Lewis and Clark Counties, with large populations outpaced more sparsely populated rural counties in total personal income growth during the last 40 years. Jefferson County's rapid increase in population and employment also pushed up total personal income. All counties saw an increase in the portion of income from non-labor sources, which have increased by roughly 10 to 20 percent in all five counties, since 1970. Per capita personal income rates have climbed for all counties, with increases ranging from 55 to 122 percent for the five individual counties and averaging 80 percent across the economic impact area. Although per capita personal income for all of the counties was below the national average, this can be explained by the fact that non-metro per capita personal income is almost always lower than metro per capita personal income and this higher income reflects the lower costs associated with living in rural areas versus metro areas which represent a large portion of the national average.

Although average real earnings per job for the five-county area were slightly higher during 2010 than during 1970, they fell through the 1980s and early 1990s before recovering slowly during the late 1990s and early 2000s. At $32,345, average annual wages providing services were lower across the five-county area than average goods producing wages ($48,306) and government wages ($48,055).

Deerlodge

From 1970 to 2010, annual total personal income in Deerlodge County increased $11 million in real ($2010) terms. The average annual real growth rate was 0.1 percent. The income category whose share of the total gained the most was non-labor income, which went from 24 percent in 1970 to 48 percent in 2010. Between 1970 and 2010, non-labor sources grew at an annual rate of 1.2 percent, outpacing labor sources which fell at a 0.7 percent rate. Of the new income, 48 percent was from non-labor sources. The labor income category whose share of the total shrank the most was manufacturing, which went from 33.7 percent in 1970 to 3.8 percent in 2010. In 2005, welfare represented 7.0 percent of transfer payments and 2.0 percent of total personal income. This was up slightly from 1970 and up slightly from 1980 (BEA REIS 2005 Table CA35).

Even though total personal income fell, since population decreased rapidly during the last few decades, per capita personal income (PCPI), adjusted for inflation, rose from $17,485 in 1970 to $30,638 in 2010. After this 75 percent growth during the 40-year period, the 2010 per capita personal income in Deerlodge County ($30,638), was lower than the state ($36,160).

Average earnings per job, adjusted for inflation, fell from $37,361 in 1970 to $32,783 in 2010. In 2010, average earnings per job in Deerlodge County at $32,783, were less than the state ($38,690). In 2011, government jobs paid the highest wages at $51,140 and services related jobs paid the lowest at $26,088. Conversely the highest numbers of jobs were services related with 1,956 and government jobs had the fewest at 87 jobs.

The second highest paying jobs were manufacturing at $44,792. The second highest numbers of jobs were education and health services at 632.

Silver Bow

From 1970 to 2010, annual total personal income in Silver Bow County increased $447 million in real ($2010) terms. The average annual real growth rate was 1.3 percent. The income category, whose share of the total gained the most, was non-labor income, which went from 28.2 percent in 1970 to 41.0 percent in 2010, with even higher percentages than this reported between the early 1980s and 2010. In those 40 years, non-labor sources grew at an average annual rate of 1.0 percent, outpacing labor sources which grew at a 0.6 percent average annual rate. The labor income category whose share of the total shrank the most was mining, which went from 31.3 percent in 1970 to 5.2 percent in 2010. Of the new income in that period, 55.5 percent was from non-labor sources. In 2005, 61 percent of transfer payments were from age-related sources (retirement, disability, insurance payments and Medicare). That year, welfare represented 8.5 percent of transfer payments and 1.6 percent of total personal income. This was up slightly from 1970 and up slightly from 1980 (BEA REIS 2005 Table CA35).

Per capita personal income (PCPI), adjusted for inflation, rose from $20,146 in 1970 to $37,866 in 2010. After this 88 percent growth during the 40-year period, the 2010 per capita personal income in Silver Bow County ($37,866) was higher than the state ($36,160).

Average earnings per job, adjusted for inflation, increased from $40,866 in 1970 to $44,386 in 2010. In 2010, average earnings per job in Silver Bow County at $40,386 were higher than the state ($38,690). In 2010, mining jobs paid the highest wages at $99,971 and leisure and hospitality jobs paid the lowest at $13,049. The highest numbers of jobs were trade, transportation and utilities with 3,460 and agriculture, forestry, fishing and hunting jobs had the fewest at 19 jobs. The second highest paying jobs were in natural resources at $96,786. The second highest numbers of jobs were in education and health services at $3,074.

Jefferson

From 1970 to 2010, annual total personal income in Jefferson County increased $90.3 million in real ($2010) terms. The average annual real growth rate was 9.5 percent; nearly double that of the state and national rates. The income category whose share of the total gained the most was non-labor income, which went from 24 percent in 1970 to 35 percent in 2010, with even higher percentages than this reported for periods between the mid-1980's and 2008. In those 40 years, non-labor sources grew at an average annual rate of 15 percent, outpacing labor sources which grew at a 7.7 percent rate. The labor income category whose share of the total shrank the most was government, which went from 48.6 percent in 1970 to 19.5 percent in 2000. Of the new income in that period, 30.5 percent was from non-labor sources. In 2005, 58 percent of transfer payments were from age-related sources (retirement, disability, insurance payments and Medicare). That year, welfare represented 6.4 percent of transfer payments and less than 1 percent of total personal income. This was up from 1970 and down from 1980 (BEA REIS 2005 Table CA35).

Per capita personal income (PCPI), adjusted for inflation, rose from $17,072 in 1970 to $37,891 in 2010. After this 122 percent growth during the 40-year period, the 2010 per

capita personal income in Jefferson County ($37,894) was slightly higher than the state ($36,160).

Average earnings per job, adjusted for inflation, fell from $31,627 in 1970 to $29,879 in 2010. In 2010, average earnings per job in Jefferson at $29,879 were less than the state ($38,690). During the 35-year period, average wage and salary disbursements grew at an average annual rate of 0.6 percent (adjusted for inflation), whereas average non-farm proprietors' income fell annually by 2.1 percent. In 2011, natural resources and mining jobs paid the highest wages at $65,734 and leisure and hospitality jobs paid the lowest at $10,018. The highest numbers of jobs were in trade, transportation and utilities with 290 and information jobs had the fewest at 9 jobs. The second highest paying jobs were in federal government at $41,928. The second highest numbers of jobs were in education and health services at 290.

Lewis and Clark

From 1970 to 2010, annual total personal income in Lewis and Clark County increased $826 million in real ($2010) terms. The average annual real growth rate was 5.1 percent, faster than the state and national rates. The income category whose share of the total gained the most was non-labor income, which went from 23 percent in 1970 to 36 percent in 2010, with even higher percentages than this between the early 1980s and 2010. In those 40 years, non-labor sources grew at an average annual rate of 9.2 percent, outpacing labor sources which grew at a 3.9 percent rate. The labor income category whose share of the total shrank the most was transportation and public utilities, which went from 9.6 percent in 1970 to 5.4 percent in 2010. Of the new income in that period, 44 percent was from non-labor sources. In 2005, 60 percent of transfer payments were from age-related sources (retirement, disability, insurance payments and Medicare). That year, welfare represented 7.6 percent of transfer payments and 1.1 percent of total personal income. This was up slightly from 1970 and down slightly from 1980 (BEA REIS 2005 Table CA35).

Per capita personal income (PCPI), adjusted for inflation, rose from $24,695 in 1970 to $39,445 in 2010. After this 60 percent growth during the 40-year period, the 2010 per capita personal income in Lewis and Clark County ($39,445) was higher than the state ($36,160).

Average earnings per job, adjusted for inflation, increased from $40,049 in 1970 to $44,198 in 2010. In 2010, average earnings per job in Lewis and Clark County at $44,198 were greater than the state ($38,690). During the 40-year period, average wage and salary disbursements fell at an average annual rate of 2.0 percent (adjusted for inflation), whereas average non-farm proprietors' income grew annually by 2.0 percent. In 2011, federal government jobs paid the highest wages at $64,977 and leisure and hospitality jobs paid the lowest at $13,462. The highest numbers of jobs were in state government with 6,537 and agriculture, forestry, fishing and hunting jobs had the fewest at 160 jobs. The second highest paying jobs were in mining at $62,992. The second highest numbers of jobs were in education and health services at $4,735.

Powell

From 1970 to 2010, annual total personal income in Powell County increased $73.5 million in real ($2010) terms. The average annual real growth rate of 1.6 percent was slower than the state and national rates. The income category whose share of the total gained the most was non-labor income, which went from 30 percent in 1970 to 46

percent in 2010, with even higher percentages than this between the late 1970s and 2005. In those 40 years, non-labor sources grew at an average annual rate of 3.9 percent, outpacing labor sources which grew at a 0.6 percent rate. The labor income category whose share of the total shrank the most was mining, which went from 17.9 percent in 1990 to 5.3 percent in 2000. Of the new income in the 1970 to 2005 period, 62 percent was from non-labor sources. In 2005, 57 percent of transfer payments were from age-related sources (retirement, disability, insurance payments and Medicare). That year, welfare represented 7.2 percent of transfer payments and 1.6 percent of total personal income. This was up slightly from 1970 and up slightly from 1980 (BEA REIS 2005 Table CA35).

Per capita personal income (PCPI), adjusted for inflation, rose from $17,277 in 1970 to $26,835 in 2010. After this 55 percent growth during the 40-year period, the 2010 per capita personal income in Powell County ($26,835 was substantially lower than the state ($36,160).

Average earnings per job, adjusted for inflation, increased slightly from $32,496 in 1970 to $32,923 in 2010. In 2010, average earnings per job in Powell County at $32,923 were less than the state ($38,690). In 2011, federal government jobs paid the highest wages at $57,269 and leisure and hospitality jobs paid the lowest at $16,302. The highest numbers of jobs were in trade, transportation and utilities with 886 and financial activities jobs had the fewest at 53 jobs. The second highest paying jobs were professional and business services at $35,684. The second highest numbers of jobs were in leisure and hospitality at 273.

Economic Impact Area

From 1970 to 2010, annual total personal income for the economic impact area increased $2.55 billion in real ($2010) terms. The average annual real growth rate of 3.0 percent was higher than the state and national rates. The income category whose share of the total gained the most was non-labor income, which went from 26 percent in 1970 to 38 percent in 2010, with even higher percentages than this between the early 1980s and 2005. In those 40 years, non-labor sources grew at an average annual rate of 2.7 percent, outpacing labor sources which grew at a 1.5 percent rate. The labor income category whose share of the total shrank the most was manufacturing (including forest products), which went from 10.3 percent in 1970 to 4.6 percent in 2010. Of the new income in that period, 44.4 percent was from non-labor sources. In 2005, 60 percent of transfer payments were from age-related sources (retirement, disability, insurance payments and Medicare). That year, welfare represented 7.7 percent of transfer payments and 1.3 percent of total personal income. This was up slightly from 1970 and up slightly from 1980 (BEA REIS 2005 Table CA35).

Per capita personal income (PCPI), adjusted for inflation, rose from $20,873 in 1970 to $37,515 in 2010. After this 80 percent growth during the 40-year period, the 2010 per capita personal income in the economic impact area ($37,515) was higher than the state ($36,160).

Average earnings per job, adjusted for inflation, increased from $39,182 in 1970 to $42,101 in 2010. In 2010, average earnings per job in the economic impact area at $42,101 were higher than the state ($38,690). During the 40-year period, average wage and salary disbursements fell at an average annual rate of 1.1 percent (adjusted for inflation), whereas average non-farm proprietors' income grew annually by 2.4 percent. In 2011, mining jobs paid the highest wages at $85,342 and leisure and hospitality jobs

paid the lowest at $13,283. The highest numbers of jobs were in trade, transportation and utilities with 9,362 and agriculture, forestry, fishing & hunting jobs had the fewest at 290 jobs. The second highest paying jobs were in natural resources at $66,960. The second highest numbers of jobs were in leisure and hospitality at $8,995.

Economic Diversity and Natural Resource Dependency

One measure of economic success and resilience is economic diversity, or the lack of specialization. Some communities that are heavily reliant on only a few industries are economically vulnerable to disruptions. The EPS Economic Diversity Index documents one measure of specialization based on employment data from the 2000 Census. For this index, the number of employees in each two-digit industry is first divided by the total number of employees in the county. This fraction is then squared for the given industry. Results for all industries in the county are then summed. This means that the more even the distribution of employees across all possible industries the smaller the score; where small scores imply greater diversity and large scores imply specialization.

Listed from least to most specialized, Silver Bow County scored 177, Jefferson County scored 264, Lewis and Clark County scored 276, Deerlodge County scored 403 and Powell County scored 421 (versus a median of 961 for all 3, 209 US counties). The main reasons Deerlodge County is more specialized than peer counties is overspecialization in both the healthcare and social service and the accommodation and food services sectors, in addition to under representation of the manufacturing (5.1 compared to 14.1 percent for the US) and the professional, scientific and technical services. Powell County shares similar economic characteristics and is far more reliant on the agriculture, forestry, fishing and hunting sector (14.4 percent compared to 1.5 percent) and the public administration sector (17.6 percent compared to 4.8 percent).

Collectively, these five counties scored 187. In general, the economic impact area is far less reliant on manufacturing (only 4 percent compared to 14.1 percent) and more reliant on public administration (13 percent compared to 4.8 percent) relative to the US. The economic impact area is slightly more reliant than the US on both the health care and social assistance (13.5 percent compared to 11.2 percent) and the accommodation and food services (8.0 percent compared to 6.1 percent) sectors.

Wildland dependency data (Gebert and Odell 2006), based on the percentage of total labor income (employee compensation and proprietor income) earned in five resource areas (timber, mining, grazing, recreation and wildlife and federal wildland related employment), is available in Table 168 for the five analysis area counties. The portion of labor income earned in economic sectors associated with each resource area was calculated for 1993 and 2003, as was the change that decade. Although these numbers cannot support thorough trend analysis, as they are only two snapshots in time, they do provide some important information.

Table 168: Wildland Dependency by Resource for 2003 and Between 1993 - 2003.

County	Grazing	Timber	Mining	Federal Wildland Government	Recreation and Wildlife	Primary	Indirect	Total
Deerlodge 2003	0.67	0.09	1.75	2.15	0.00	4.66	3.68	8.35
Change 1993-2003	-.04	-0.07	0.97	-0.46	0.00	0.04	1.69	1.74
Siver Bow 2003	0.17	0.07	5.86	0.81	0.00	6.91	3.61	10.52
Change 1993-2003	-0.15	0.04	-1.84	-0.28	0.00	-2.24	-8.57	-10.81
Jefferson 2003	1.45	1.14	13.8	1.05	2.63	20.07	26.75	46.82
Change 1993-2003	-2.07	0.56	-8.68	0.17	-1.47	-11.5	9.15	2.34
Lewis and Clark 2003	0.15	0.12	1.52	0.6	0.96	3.35	1.43	4.78
Change 1993-2003	-0.56	-0.11	-2.75	-0.23	-1.22	-4.88	-4.39	-9.27
Powell 2003	2.27	15.25	0.71	1.73	5.5	25.47	17.97	43.44
Change 1993-2003	-2.04	4.59	0.53	0.07	-0.94	2.21	6.71	8.92

(Source: Gebert and Odell, 2006).

For example, Jefferson County was the 9th most wildland dependent county in Montana in 2003, with nearly half (46.8 percent) of labor income earned in sectors primarily or indirectly supportive of the five resource areas. Jefferson County was also the fourth most mining dependent Montana county that year, even after the percentage of direct dependency on mining had actually decreased by nearly 9 percent since 1993. Powell County was the next most wildland dependent county of the group during 2003. In that county, timber in addition to recreation and wildlife comprised the majority of the primary wildland dependence. Mining was Silver Bow County's greatest share of primary dependence during 2003, which was down roughly 2 percent from 1993. Deerlodge County was the most dependent on Federal Wildland Management (2.2 percent) of the five counties, during 2003, after mining's share of primary dependence fell from the 1993 level. And although mining was also the highest category of primary wildland dependence (1.5 percent) for Lewis and Clark County, it was one of the least wildland dependent counties in the state during 2003, after primary dependence on each of the resource categories fell from 1993 levels.

The OHV User Community

A recent report estimated that national participation rates in OHV sports may have peaked during 2003 and those US residents over 16 years of age who rode OHVs averaged roughly 28 days per year of motorized recreation between 2005 and 2007. In Montana, between 1999 and 2007, an estimated 28.7 percent of residents 16 years and older (the 95 percent confidence interval was 25.2 to 32.2 percent) participated in off-

highway vehicle recreation. This ranked Montana residents 6th among all states for the participation rate and amounted to approximately 219,000 participants, who collectively represent roughly half of one percent of all US participants (Cordell et al 2008). Cordell et al (2008) described some OHV user demographics by region:

"*The West had the highest OHV participation rate (28 percent) of all the regions especially among young people where more than 40 percent under age 30 were OHV users. This was more than two-and-a-half times the rate of people over age 50 (15 percent). Males living in the West were more likely to participate just as in the other regions, but in this region, the female rate of 23 percent was considerably higher than the female rate in other regions. American Indians (32 percent) and Whites (31 percent) led participation among racial and ethnic groups, but Hispanics in the West (24 percent) participated at a much higher rate than Hispanics in the two eastern regions and also at a rate higher than the Midwest Hispanic rate. All but the lowest income category participated at 20 percent or higher. People in all income groups between $25,000 and $150,000 participated at more than a 30 percent rate. Similarly, all education classes, but post-graduates, participated at more than 25 percent. Still, post-graduates in the West participated at considerably higher rates than their counterparts elsewhere in the country. More than one in three non-metropolitan residents participated in OHV recreation as compared with about one in four metropolitan residents saying they participated in OHV recreation.*"(Cordell et al. 2008, p.29)

"*Interestingly, the West, which led all regions with 28 percent of people 16 and older participating, had the next-to-smallest average annual days of OHV use with 23.2 days for participants, ahead of only the Pacific. Differences by age group were slight, but the highest average was for the 51 years and older age group. That was not true for either of the eastern regions or the Midwest. Male activity days were about six days higher than for females, however, data were not sufficient to estimate days by all income classes. High school graduates (26.1) and people with bachelor's degrees (23.7) led other educational attainment groups by a slender margin. Another interesting result for this region is the large difference in average days by non-metropolitan residents (35.3) compared to metropolitan dwellers (19.1). This is probably an indication of the convenient and ready access to OHV opportunities on public land in the rural West.*" (Cordell et al. 2008, p.36)

Cordell et al. (2008) also compared participation rates between OHV users and the general public based on responses to the national survey on recreation and the environment (NSRE). They describe participation rates for each of the 47 outdoor recreation activities across five OHV user segments and the general public. What they found is that, "*As a whole, OHV users are more active in every single recreation activity relative to the general U.S. population age 16 and older. For some activities, OHV users participate at more than twice the national rate. In particular, OHV users were about three times more likely to participate in the three types of hunting–big game, small game and migratory bird–than was the general public.*" (Cordell et al. 2008, p.41)

The National Survey on Research and Environment research described above estimates recreation occurring statewide on all land ownerships. Another statistically valid recreation study, National Visitor Use Monitoring, conducted by the Forest Service estimates participation rates and spending for various activities specifically on the Helena National Forest. The NVUM numbers indicate that during fiscal year 2003, 9.0 percent of Helena National Forest visitors participated in off-highway vehicle (OHV)

recreation, 27.3 percent participated in driving for pleasure and 2.6 percent participated in snowmobiling. These percentages are all smaller than the following activities with the highest participation rates, viewing natural features (48 percent), viewing wildlife (47.5 percent), hiking walking/hiking (39.5 percent), relaxing (36.0 percent) and hunting (30.1 percent). When visitors were asked to claim a primary activity, 2.4 percent claimed OHV use, 1.1 percent claimed driving for pleasure and 0.9 percent claimed snowmobiling. In general, spending by all Helena National Forest visitors was below the average for visitors to all national forests.

Economics, Environmental Consequences

Introduction

The assessment of economic impacts attempts to identify potential effects that Forest Service travel planning may have on local, county and regional economic systems. In particular, this analysis is used to address the questions:

1) Would changes in the management of the National Forest for recreation and the amount of change in the motorized/non-motorized designation of Forest roads and trails be large enough or significant enough to cause measurable economic changes?
2) Is the economy of the local area diverse enough and robust enough that the proposed changes will be insignificant or will they be felt in very specific segments of the local economy?

A short description of each alternative and how it might impact the economy is provided. When looking at potential impacts, consider the total (direct, indirect and induced) response coefficients for economic impacts associated with any increase or decrease of 1,000 party trips for each activity presented in Table 169.

All Forest Service employment and programs generally contribute roughly one to three percent of the jobs and income in the economic impact areas of the Northern Region (Montana and Northern Idaho national forests). The small change in type and quantity of use in the Divide Travel Plan area would likely do little to affect county-level economic indicators (i.e., total employment, total personal income, average annual unemployment rate, wildland dependency) for the five-county area. However, impacts that do occur may be felt strongly by a few vendors and service providers. The 2003 county percentages of economic dependence on recreation and wildlife (ranging from 0 to 5.5 percent) may decline slightly in the short-term. This could be considered a normal part of the shifts in economic dependence, typical among highly natural resource dependent counties. Curtailment of motorized activity in multiple locations across the Northern Region could cumulatively have stronger long-term impacts on jobs and income than is expected from each individual travel plan decision alone.

Effects Common to All Action Alternatives

Economic Response Coefficients by Activity Type

Table 169 displays the estimated employment and labor income response coefficients (employment and labor income per 1,000 party trips) for local and non-local motorized and non-motorized activities. The response coefficients indicate the number of full and

part-time jobs and dollars of labor income per 1,000 party trips by activity type. The response coefficients are useful in:

1. understanding the economic effects tied to a given use level;
2. understanding projected employment effects for various use scenarios described in other sections of this NEPA documentation; and
3. understanding the differences in employment effects by activity type.

All job response coefficients per 1,000 additional or fewer party trips are in the range of 0.3 to 3.6 jobs. Although there are small differences between activity types, there are roughly one to three national forest visits for each party visit. As shown in Table 169, the economic responses tied to local visitation are generally lower than for non-local visitation. This is a result of local visitors spending less per visit in comparison to non-local visitors. Additionally, economic responses vary widely by activity type. Based on response coefficients, the strongest employment effect modeled is tied to non-local overnight snowmobiling, followed closely by non-local overnight cross-country skiing. However, the fiscal year 2003 National Visitor Use Monitoring data for the Helena National Forest shows very little snowmobiling or cross country skiing. There are only roughly 30 non-local cross country day trips, 92 non-local overnight trips and roughly 168 non-local overnight snowmobiling party trips each year, where the visitors are using the Helena National Forest. Of the local day response coefficients, snowmobiling provides the highest response coefficients, followed by local OHV/other motorized day use and then by local day horseback riding, fishing, hunting, cross country skiing, all other activities, nature related, driving for pleasure and hiking/walking and bicycling. In general, economic effects associated with any change in management vary mainly by the total amount of spending and by the type of activity, but it cannot be generalized that motorized or non-motorized activities contribute more or less to the local economy on a per visit basis because the number of visits per party group also vary across activities.

Table 169: Total Employment and Labor Income Response Coefficients by Activity Type.

	Employment (Jobs / 1,000 Party Trips)		**Labor Income ($ / 1,000 Party Trips)**	
Non-motorized Use	**Day Total**	**Overnight Total**	**Day Total**	**Overnight Total**
Local Backpacking	NA	1.304	NA	$28,814
Non-local Backpacking	NA	1.362	NA	$30,093
Local Hiking / Walking	0.340	1.132	$8,077	$24,940
Non-local Hiking / Walking	0.621	2.457	$13,363	$51,203
Local Bicycling	0.340	1.132	$8,077	$24,940
Non-local Bicycling	0.621	2.457	$13,363	$51,203
Local Cross-country Skiing	0.548	2.143	$11,747	$43,773
Non-local Cross-country Skiing	0.785	3.570	$16,839	$72,932
Local Other Non-motorized	0.340	1.132	$8,077	$24,940
Non-local Other Non-motorized	0.621	2.457	$13,363	$51,203
Motorized Use				
Local OHV	0.762	1.345	$17,887	$29,578
Non-local OHV	0.896	2.241	$20,992	$49,289
Local Driving for Pleasure	0.418	1.216	$9,692	$24,768
Non-local Driving for Pleasure	0.599	2.027	$13,889	$41,277
Local Snowmobiling	1.105	2.147	$26,175	$44,945
Non-local Snowmobiling	1.555	3.578	$37,180	$74,904
Local Other Motorized Act.	0.762	1.345	$17,887	$29,578
Non-local Other Motorized Act.	0.896	2.241	$20,992	$49,289

Sources: National Visitor Use Monitoring Report, Helena National Forest FY 2003, IMPLAN 2007.
Note: Labor Income is reported in 2009 Dollars.

Effects Common to Alternatives 2 and 3

The potential recreational displacement noted in the recreation section of this document may impact individual vendors and service providers in the analysis area economy. However, detailed quantified speculation of changes to tourism and recreation visitation in the five economic impact area counties would be required to estimate the direct and multiplier (indirect and induced) economic impacts. This data is not available. Some substitute recreation and travel opportunities persist inside and near the analysis area suggesting that any changes to the miles of roads and trails affected by the decision will have minimal impact on the overall economy of these five counties. Although the lands affected by the Divide Travel Management decision are only a small part of the recreation and tourism in these counties (compared with abundant boating, hiking, outfitting, hunting and fishing opportunities in areas like the

Lake Helena, Holter Lake, Canyon Ferry Reservoir, Big and Little Blackfoot Rivers, Missouri River, the headwaters of the Clark Fork River, the Jefferson River, the Boulder River, the southern portion of the Bob Marshall Wilderness Complex, the Elkhorns, the Flint Creek Range, Homestake Pass, Great Divide Ski Area and other nooks of the Divide country), these lands have been increasingly difficult to access due to recent loss of public land access via private lands. The exact economic impacts of travel management decisions would be hard to isolate from other cumulative effects of similar land management and travel planning efforts occurring in this portion of Montana.

Alternative 1, No Action

Since no changes would occur, the current economic contribution from all summer and winter recreation is expected to persist into the future under this alternative.

Alternative 2

Major changes under Alternative 2, would be:

- 2 fewer miles of roads would be open to highway legal vehicles, with no restrictions;
- 74 fewer miles of roads would be closed to motorized vehicle yearlong including over-snow motorized vehicles;
- 11 fewer miles of trails would be open to vehicles 50 inches or less in width, no restrictions;
- 112 additional miles of roads would be closed to wheeled vehicles yearlong, open to over-snow motorized vehicles December 2nd to May 15th;
- 2 additional mile of trails would be closed to motorized vehicles yearlong; and
- 6 miles of non-system roads would be closed to motorized vehicles yearlong.

Specifically, this alternative would change the trail management in Sweeny Creek where the designated trail system would be open from May 16th to October 14th for vehicles less than 50 inches in width and would be closed to over-snow motorized vehicles except on open or designated routes. In the Limburger Spring/Kading/Elliston area, the connection between Road 314 and 1870 would be open to motorized use May 16th to October 14th and would be open to over-snow motorized vehicles from December 2nd to May 15th. Road 314-J3 would be open October 15th to December 1st and would be open to over-snow motorized vehicles from December 2nd to May 15th. Road 314-J1 would be open yearlong to motorized vehicles with no seasonal restrictions. Trails 501, MTR's 503, 502, 1868 and road 1871-002 would be open to wheeled vehicles less than 50 inches in width from May 16th to October 14th and would be open to over-snow motorized vehicles from December 2nd to May 15th. Near Negro Mountain, Road 1857-A1 would be open from May 16th to October 14th and would be open to over-snow motorized vehicles from December 2nd to May 15th. In the Ontario Creek drainage – A connection for vehicles less than 50 inches in width would be open from the 495-D1 road to the 4104-A1 road from May 16th to October 14th and would be open to over-snow motorized vehicles from December 2nd to May 15th. A portion of the Continental Divide National Scenic Trail – Roads 1802-B2, 335-B2 and 136-D1 would be closed to wheeled vehicles and would be open to over-snow motorized vehicles from December 2nd to May 15th. Regarding big game rifle season access, Roads 335-A1 & A2, 1856 and 314-J3 would be open to motorized use October 15th to December 1st.

Regarding winter use – additional winter closures are proposed in the Sweeny Creek and Hahn Creek areas, as well as lower elevation west facing slopes Clarks Canyon north to Threemile Creek. Those areas that remain open would be open to over-snow motorized vehicles from December 2nd to May 15th. This alternative for the most part does away with the concept of having roads closed to over-snow motorized use in areas that would be open for that use.

In general, these changes are not expected to cause noticeable negative economic impacts, which could occur through reductions below current contributions that motorized recreation make to the economic impact area. However, the few small changes could generate some additional non-motorized opportunities and possibly some new positive economic recreation impacts associated with increased non-motorized recreation in the impact area resulting from new closures to motorized use.

Alternative 3

Major changes under Alternative 3, would be:

- 24 fewer miles of roads open would be to highway legal vehicles, with no restrictions;
- 64 fewer miles of roads would be closed to motorized vehicle yearlong including over-snow motorized vehicles;
- No miles (12 fewer miles) of trails would be open to vehicles 50 inches or less in width, no seasonal restrictions;
- 156 additional miles of roads would be closed to wheeled vehicles yearlong, open to over-snow motorized vehicles December 2nd to May 15th;
- 19 additional miles of trails would be closed to motorized vehicles yearlong; and
- 7 miles of non-system roads would be closed to motorized use yearlong.

Specifically, this alternative would change management in Sweeny Creek by closing existing routes yearlong to motorized vehicles, including over-snow motorized vehicles except on open or designated routes. It would close Limburger Spring/Kading – Little Blackfoot Road (RD 227) just past the Kading Campground and 227-E1 would be closed to wheeled motorized use yearlong and would be open to over-snow motorized vehicles from December 2nd to May 15th. Road 314 would be closed yearlong to wheeled vehicles past the gate in Section 7 and would be open to over-snow motorized vehicles from December 2nd to May 15th. Roads 314-J1 and J3 would also be closed yearlong to wheeled vehicles and would be open to over-snow motorized vehicles from December 2nd to May 15th. Trails 501, MTR's 503, 502 and 1868 and road 1871-002 would be closed yearlong to wheeled vehicles and would be open to over-snow motorized vehicles from December 2nd to May 15th. Negro Mountain – 1857 D2 and 1859 D4 and E1 would also be closed and would be open to over-snow motorized vehicles from December 2nd to May 15th. In the Ontario Creek drainage – The connection from 495-D1 and 4104-A1 would be closed to wheeled vehicles and would be open to over-snow motorized vehicles from December 2nd to May 15th. Regarding big game rifle season access – Routes 335-A1 and A2, 1856 and 314-J3 would be closed yearlong to wheeled vehicles and would be open to over-snow motorized vehicles from December 2nd to May 15th. A portion of the Continental Divide National Scenic Trail, roads 1802-B2, 335-B2 and 136-D1 would be closed to wheeled vehicles and would be open to over-snow motorized vehicles from December 2nd to May 15th.

Regarding winter use – That area of the Divide south of MacDonald Pass to approximately the Hahn Creek Road would be closed to motorized over-snow travel. There would also be winter closures in the Sweeny Creek and Hahn Creek areas, as well as lower elevation west facing slopes Clarks Canyon north to Threemile Creek. Those areas that remain open have a season of December 2nd to May 15th for over-snow travel.

In general, these changes could cause some negative economic impacts, by reducing current contributions that motorized recreation currently make to the economic impact area. On the other hand, there would be some additional non-motorized opportunities and possible new positive economic recreation impacts associated with increased non-motorized recreation in the impact area resulting from new closures to motorized use.

Alternative 4

Major changes under Alternative 4, would be:

- 21 fewer miles of roads open would be to highway legal vehicles, with no restrictions;
- 60 fewer miles of roads would be closed to motorized vehicle yearlong including over-snow motorized vehicles;
- No miles (16 fewer miles) of trails would be open to vehicles 50 inches or less in width, no seasonal restrictions;
- 139 additional miles of roads would be closed to wheeled vehicles yearlong, open to over-snow motorized vehicles December 2nd to May 15th;
- 20 additional miles of trails would be closed to motorized vehicles yearlong; and
- 6 miles of non-system roads would be closed to motorized use yearlong.

Specifically, this alternative would change management in Sweeny Creek by closing existing routes yearlong to motorized vehicles, including over-snow motorized vehicles except on open or designated routes. It would close Limburger Spring/Kading – Little Blackfoot Road (RD 227) just past the Kading Campground and 227-E1 would become a non-motorized trail. Road 314 would be open yearlong to wheeled vehicles past the gate in Section 7 from May 16th to October 14th and open to over-snow motorized vehicles from December 2nd to May 15th. Roads 314-J1 and J3 would also be closed yearlong to wheeled motorized vehicles and would be open to over-snow motorized vehicles from December 2nd to May 15th. Trails 501, MTR's 503, 502, 1868 and road 1871-002 would be closed yearlong to wheeled vehicles and would be open to over-snow motorized vehicles from December 2nd to May 15th. Negro Mountain – 1857 D2 and 1859 D4 and E1 would also be closed. In the Ontario Creek drainage - 495-D1 would be open to wheeled vehicles yearlong, including over-snow motorized vehicles once stream crossings are improved. Road 4104-A1 would be open to wheeled motorized vehicles 50 inches or less in width from May 16th to October 14th. Regarding big game rifle season access – Routes 335-A1 and A2 would be open to highway legal vehicles from October 15th to December 1st and would be open to over-snow vehicles from December 2nd to May 15th. Routes 1856 from the gate and 314-J3 would be closed yearlong to wheeled vehicles and would be open to over-snow motorized vehicles from December 2nd to May 15th. A portion of the Continental Divide National Scenic Trail, roads 1802-B2, 335-B2, 1802 and 136-D1 would be closed to wheeled vehicles.

Regarding winter use – That area of the Divide Travel Planning Area south of MacDonald Pass to approximately the Hahn Creek Road would be closed to motorized over-snow

travel. There would also be winter closures in the Sweeny Creek and Hahn Creek areas, as well as lower elevation west facing slopes Clarks Canyon north to Threemile Creek. Those areas that remain open have a season of December 2nd to May 15th for over-snow travel.

Alternative 4 would permit wheeled motorized vehicle travel within 300 feet of designated system routes, including roads and trails (unless signed otherwise) as long as:

1) No new permanent routes are created by this activity;
2) No damage to existing vegetation, soil, or water resource occurs;
3) Travel off-route does not cross streams; and
4) Travel off-route does not traverse riparian or wet areas.

This small change could maintain motorized use in some areas, as people use motorized vehicles to facilitate many other activities (e.g. berry picking, fishing, fire wood gathering, etc.) moderating any negative economic impacts associated with curtailment of motorized recreation opportunities.

In general, these changes could cause some negative economic impacts, by reducing current contributions that motorized recreation currently make to the economic impact area. On the other hand, there would be some additional non-motorized opportunities and possible new positive economic recreation impacts associated with increased non-motorized recreation in the impact area resulting from new closures to motorized use.

Alternative 5

This alternative is designed to increase motorized loop trail opportunities and reduce the short spur and redundant parallel routes. It also improves big game security and addresses resource concerns relative to erosion and sedimentation from roads and stream crossings. Consideration was given to further align the Continental Divide National Scenic Trail (CDNST) with National Standards. If this alternative is selected, the wheeled motorized vehicle routes and areas would be identified on a map as part of the record of decision for this travel plan. In addition, a Motor Vehicle Use Map (MVUM) would be produced and available to the public for this planning area.

Major changes under Alternative 5, would be:

- 127 fewer miles of roads open would be to highway legal vehicles, with no restrictions;
- 25 fewer miles of roads would be closed to motorized vehicle yearlong including over-snow motorized vehicles;
- 8 fewer miles of roads open to highway legal vehicles December 2nd to October 14th (02-Res), open to over-snow motorized vehicles December 2nd to October 14th;
- 4 fewer miles roads open to highway legal vehicles May 16th to December 1st, open to over-snow motorized vehicles December 2nd to May 15th;
- 3 more miles roads open to highway legal vehicles May 16th to October 14th, open to over-snow motorized vehicles December 2nd to May 15th;

- 125 more miles of roads closed to wheeled motorized vehicles yearlong, open to over-snow motorized vehicles December 2nd to October 14th;
- 8 fewer miles of roads open to wheeled motorized vehicles June 1st to August 31st, open to over-snow motorized vehicles December 1st to August 31st;
- 7 fewer miles of roads of roads open to wheeled motorized vehicles May 16th to April 14th, open to over-snow motorized vehicles, no seasonal restrictions;
- 5.5 fewer miles of trails open to vehicles 50 inches or less in width May 16th to October 14th;
- 47.3 more miles of trails open to vehicles 50 inches or less in width May 16th to August 31st;
- 2.5 more miles of trails open to vehicles 50 inches or less in width, no seasonal restriction;
- 19 more miles of trails closed to motorized vehicles yearlong;
- 16 fewer miles of open non-system roads and trails;
- 5 more miles of non-system roads, closed to motorized vehicles yearlong;
- 13.5 more miles of CDNST non-motorized (closed to wheeled motorized vehicles);
- 10.6 fewer miles of CDNST open to wheeled motorized vehicles;
- 1.1 fewer miles of CDNST located in an area open to over-snow motorized vehicles;
- 14.5 more miles of CDNST (old trail) proposed to be re-routed; and
- 4.2 more miles of proposed non-motorized trail in an area that allows over-snow motorized use.

Design Features Specific to Alternative 5:

Seasonal Trail (route) Dates

All motorized trails with seasonal use open to wheeled motorized vehicles 50 inches and less in width would be open from May 16th to August 31st with the exception of the Lava Mountain connector trail # 4009-A1 which would be open from May 16th to October 14th. There are approximately 14.5 miles of motorized trails that would have no seasonal restrictions.

Kading-Limburger Springs Area

National Forest System Route (NFSR) #227 would remain open to Kading Campground. Beyond Kading Campground, NFSR #227-E1 would become part of non-motorized trail 329. The trailhead parking area on NFSR #227 past Kading Campground where the route would change to non-motorized use would be expanded to accommodate day use vehicles and horse trailers. Motorized Trail #501 would remain open to motorized vehicles of 50 inches and less in width from May 16th to August 31st. Motorized Trails #502, #503 and #504 in the Kading/Limburger Springs area would be closed to wheeled motorized use yearlong.

Over-snow motorized travel would be allowed in areas north and west of NFSR #227 from December 2nd to May 15th. Refer to the alternative 5 map for more detailed over-snow motorized travel in this area.

Sweeny Creek Area

With exception of the Priest Pass Road, all routes in the Sweeny Creek area would be closed yearlong to motorized use including over-snow vehicles.

Continental Divide National Scenic Trail (CDNST)

NFSR #136-D1 would be closed to wheeled motorized vehicles yearlong. Approximately, one mile of the CDNST trail located north of NFSR #136 and just south and east of Meyers Hill, would be rerouted and designated as a non-motorized section of the CDNST. Refer to the CDNST map for information on motorized and non-motorized segments of the CDNST.

Larabee Crossing and Golden Anchor Crossing – Little Blackfoot Area

The crossing at Larabee (227-D1) would be closed to wheeled motorized travel. In addition, a foot/stock bridge would be constructed to connect to the non-motorized Larabee Trail #359. A trailhead would be designated nearby on NFSR #227.

The stream crossing located on Golden Anchor NFSR #4100 is currently a ford crossing. This alternative would replace the ford crossing with a bridge, bottomless culvert or structure installed to accommodate wheeled motorized vehicles 50 inches in width and less and over-snow motorized vehicles. The ford would remain open until the structure is in place or two years from the start of the implementation phase of this project, whichever is less. If a structure is not installed during this timeframe, the ford crossing would be closed to vehicle travel until a structure is in place. The area beyond this crossing would remain open to wheeled vehicles 50 inches in width and less in addition to over-snow motorized vehicles.

Unauthorized Routes

Alternative 5 would designate approximately 1.4 miles of identified unauthorized routes to be added to the Forest Transportation System. All routes, including unauthorized routes, not identified or included in this alternative, as well as any future created routes, would be considered closed and would be physically closed without additional NEPA.

Parking

Parking would be limited up to 30 feet from the edge of a designated route.

Access to Dispersed Campsites up to 70 feet from a designated route

Parking and motor vehicle use associated with dispersed camping would be limited to no more than 70 feet from the edge of a designated route as long as:

- No new permanent routes are created by this activity;
- No damage to existing vegetation, soil, or water resources (i.e., damage to live trees and shrubs, rutting and eroding of stream banks or bare soil);
- Travel off-route does not cross streams;
- Travel off-route does not traverse riparian or wet areas; and
- Vehicles travel to dispersed campsites would be limited to no closer than 30 feet of a stream or body of live water.

Access to Dispersed Campsites further than 70 feet from a designated route

Dispersed campsites located more than 70 feet from the edge of a designated route that are identified on the alternative 5 map would remain open for dispersed camping and

parking associated with dispersed camping. The five items identified under the access to dispersed campsites up to 70 feet from a designated route section are applicable for this as well.

Other Features

NFSR #314 would be open to wheeled motorized vehicles 50 inches in width and less from May 16th to August 31st, past the gate in Section 7.

NFSRs #314-J1 and #314-J3 would be closed yearlong to motorized travel.

NFSR #1870 and NFSR #1871-A2 are currently closed yearlong; however, alternative 5 would open them to wheeled motorized vehicles 50 inches and less in width from May 16th to August 31st. This route would connect to NFSR #1871 to create a loop trail. The road spurs within this area that dead-end would be closed yearlong to wheeled motorized vehicles. NFSR #1868 would be closed to wheeled motorized use yearlong

Two fords on NFSR # 495-D1 would remain open to motorized vehicles to provide access to motorized Trail 4101-A1 which will be open to vehicles 50 inches and less in width from May 16th to August 31st.

Approximately ½ mile of NFSR #1805-A1 (accessed from NFSR #1805) would be open to wheeled highway legal vehicles from May 16th to October 14th; a motorized vehicle trailhead would be developed at this location where it would connect to a one-mile loop trail open to wheeled motorized vehicles 50 inches and less in width from May 16th through October 14th.

In general, these changes could cause some positive and some negative economic impacts, by adding seasonal restrictions to some motorized activities while making some areas more attractive for loop riding and over-the-snow activities. It is harder to predict the impact to current contributions that motorized recreation currently make than it is to predict impacts from non-motorized activities, where there would likely be some additional opportunities and possible new positive economic recreation impacts associated with increased non-motorized recreation in the impact area resulting from new closures to motorized use.

Cumulative Effects

Cumulative Effects in the Divide Travel Plan area include past, present and reasonably foreseeable actions. The cumulative effects analysis area boundary for the unroaded analysis is the same as the project area boundary.

Roads and trails are being proposed for opening/closing, along with timing restrictions. None of the actions are ground disturbing. As described below, the effects would be common to all of the action alternatives.

Direct effects expected by alternative are described above and would potentially impact the economic contributions from various types of recreation and place explorationists and miners under different amounts of additional administrative burden required in prospecting, exploration and small scale mining activities. However, cumulatively, these effects are expected to be small.

Recreational Opportunities

To address resource damage problems and user conflicts, and to transition to access networks that are affordable to maintain, travel planning on other national forest

system lands and Department of Interior lands is changing the amount and type of opportunities for motorized use. Although many jurisdictions are reducing overall motorized access mileages, many are attempting to offer improved loop routes and provide desirable terrain to access. Non-motorized use is expected to increase in many areas and motorized use is expected to decrease. The combination of changes in opportunities and the effects from the Divide Travel Plan area may change the composition of the recreating public and the contributions that motorized and non-motorized users make to local economies.

Livestock grazing

Cattle grazing provides jobs and other economic benefits to the economic impact area. This would have a beneficial cumulative effect.

Noxious Weed Treatments

Noxious weed treatment would provide jobs and other economic benefits to the economic impact area. Additionally, it would restrict noxious weeds from out-competing native vegetation, which would prevent loss of cattle forage. Without noxious weed management, grazing permittees may incur costs to provide supplemental feed. Noxious weed treatment would have a beneficial cumulative effect.

Road and Trail Maintenance

Road maintenance would provide jobs and other economic benefits, including payments for gasoline and food, to the economic impact area. The Forest Service utilizes private contractors to perform maintenance activities such as road blading, cleaning ditches and culverts, and installing culverts. Contractors are also used for trail maintenance, construction, and reconstruction. These activities would have a beneficial cumulative effect.

Hazard Tree Removal and Private Timber Harvest

Hazard tree removal and private timber harvest, thinning, and hauling would contribute to the economic impact area by providing direct jobs and other economic contributions, including payments for lodging (for non-local contractors), gasoline, food, meals, and other items to the economic impact area. These activities would have beneficial cumulative effects. Similarly, tree planting, pre-commercial thinning, and collection of other forest products would also provide jobs and other economic benefits to the economic impact area.

Private Roads/Special Use Permit Roads

Recreational users and those engaging in mining related activity would contribute to the economic impact area by providing jobs and other economic benefits including payments for lodging (for non-local clients), gasoline, food, meals, and other items. This would have a beneficial cumulative effect. The limited use of crushed stone and construction sand and gravel from the Forest would provide jobs and other economic benefits to the economic impact area. This would have a beneficial cumulative effect.

Conclusions

In general, the economic impact area profiled in this section appears fairly healthy with positive population growth during the 1990s, increases in employment and real personal income and substantial increases in per capita personal income during the period from 1970 to 2005. All counties have winter unemployment rates roughly twice

that of the annual low, occurring in September or October. Change is a constant in many areas, especially those dependent on natural resources. Undulations in both the labor and the growing portion of non-labor income may generate some instability for many of the economic indicators used to proxy economic well-being. The influence of the global economic recession will be difficult to discern from any changes caused by travel management when using some of these variables. The community in this economic impact area is certainly getting older and National Survey of Recreation and Environment OHV research indicates this may lead to lower participation rates, but greater days of use per year for users as people age. Trends, like growth in service sector employment and income found in these counties, are shared by most peer counties across the Rocky Mountain west. These growth trends are largely driven by population growth of both permanent and seasonal residents and therefore changes in travel management in the Divide Travel Plan area are unlikely to have a noticeable impact on economic indicators for the five-county economic impact area. Even though changes in use attributable to the alternatives outlined in the recreation report are difficult to estimate, even large changes in use would have little effect on the overall economy of the five-county area. Although a few vendors and service providers may be impacted based on site-specific changes to wheeled and snow machine recreation opportunities, substitute recreation and motorized travel opportunities within a short drive would likely moderate the negative impacts to many of these businesses and travel management changes may promote additional business opportunities in the long term.

Environmental Justice and Civil Rights

None of the alternatives restrict or alter opportunities for subsistence hunting and fishing by Native American tribes. Tribes holding treaty rights for hunting and fishing on the Helena National Forest are included on the project mailing list and have the opportunity to provide comments on this project.

The data suggests that any changes to the miles of roads and trails affected by the decision will have minimal impact on the overall economy of these five counties. Implementation of any of the action alternatives would not likely adversely affect minority or low-income populations.

CHAPTER 4. CONSULTATION AND COORDINATION

Preparers and Contributors

The Forest Service consulted the following individuals, Federal, State and local agencies, tribes and non-Forest Service persons during the development of this environmental assessment:

ID TEAM MEMBERS:

IDT Leader – Erin Fryer
Engineering – Eric Barclay, Pam Hergett
Recreation – Roy Barkley, Dave Payne, Curt Kuoyno
Hydrology – Dave Callery, Lexi Landers
Wildlife – Brent Costain, Denis Pengroth
Fisheries – Archie Harper

Special Uses – Mark Hunting, Matt McGiffen
Geology – Beth Ihle, Hans Oaks
Planning Forester – Tim Lahey
Soils – David Marr, Jennifer Ryan, Cara Farr
Heritage – Arian Randall
Economics – Keith Stockmann
GIS – Ann Sullivan, Laura Burns
Writer Editor – Liz Van Genderen

FEDERAL, STATE and LOCAL AGENCIES:

Montana Fish Wildlife and Parks
Montana Fish & Wildlife Conservation Trust
Lewis & Clark County Commission
Montana Historical Society
Montana Department of Environmental Quality
US Advisory Council on Historic Presevation
US Department of Agriculture, APHIS PPD/EAD
US Natural Resource Conservation Service
US National Agricultural Library
US Army Engineer Northwest Division
US Environmental Protection Agency (EPA) Region 8 (Denver Office)
US EPA Region 8 (Montana Office)
US Naval Operations, Energy and Environmental Readiness Division
US OEPC
US Northwest Power Planning Council
US Coast Guard
US Federal Aviation Administration
US Federal Highway Administration
US Department of Energy
US Department of Agriculture
US EPA Office of Federal Activities

TRIBES:

Confederated Salish/Kootenai Tribal Council
Confederated Salish/Kootenai Tribes
Crow Tribal Historic President Office
Blackfeet Tribal Business Council
Blackfeet Tribal Historic President Office
Nez Perce Tribal Historic President Office

OTHERS:

Capital Trail Vehicle Association
Kip Hanna
Jesse Chadwick
John Gatchell
Dell Thomas
Cleve and Ellen Johnson
Dan Backberg
Eve Byron
Robert Kauska
Mike Newhouse
Helena Hunters and Anglers
Bob Wing
Harlan Coverdell
Terry Wing
Lois McDaniel
Charlie McCarthy
Doug Backberg
Alice Elliott
Harlan Coverdell
Erich Weber
Lois McDaniel
Sara Taubman
Daniel Vallance
Gary Ingman
Milt Knuckles

Don Gordon
Robert Ayres
Steve Platt
Ric Foster
John Holter
Bernie and Jodi Nowak
Dennis Milburn
Robert Kolar
Bob Redpatch
Clay Scott
Gary Peterson
Ray Schell
Terry Beaver
Scott Rickman
Richard Cary
Billy Chistiansen
Charlie Dickert
Guy Kitchen
Jerry Kockler
Gary Barker
Tom Kilmer
Deb Peterson
Chris Williams
Kevin Wall
Clint W Romney
Carl Tanber
Ken Conrad
Darrell Vallance
Bill Thomas
Gayle Joslin
Mark Good
Jim Posewitz
Doug and Doris Crachy
Bill Maloit
Jeff Janke
Bob Braico
Bill Badgett
Dale Gardner
Lonnie and Gene Grandy
Neil and Darlene Horne
Mike Lindquist
Steve Pierce
Bill Pierce
Dave Newman
John Senecal
Chrissy Augley
Katie Jerstad
Jay Laughlin
Joe Pennington
Lynn James
James R. Wolf
Pat Wagman
Nancy Pitblado
Davie Rockwell
Bill Thomas
Guy Stoner
Chris Lake
Tim and Geri Burton
Mike Spotorno
Charles Nemec
Gail and Arch Hewitt
Mary Ann Guggenheim
and Jan Donaldson
Jeremy and Ruth Massee
MTVRA-BRC
Paul Edwards
Hank and Karen Hudson
Michael Spotomo
Emmett Purcell
Edward C. Darfler
John Mott MD
Jim Heckel
Donna Deutsch
Julie Muscutt
George and Karen Marble
Jeff Jahnke
Aaron Parrett
Alden and Rebecca Beard
Ben Long
Mack Long
Carl Wambach
Karole Lee
Dr. David Schneider
Dave Schell
Defender's of Wildlife
Joe Nister
Patricia Helvey
Eugene Johnson
Ryan Rauscher
Fred Bailey
Julie Cunningham
Bill Hallinan
Joe Weigan (MFWP)
Bernie and Joe Nowak
Fred Irby
Tom and Lois McDaniel
Janine Stewart
Charlie and Kristi O'Leary
Bob Sanders
Dave Carroll
Diane Tipton
Debbie Klein
Michael Garrity
Sara Jane Johnson
MT Snowmobile
Association
Dick Artley
Northern Rockies/ EJ
Limited
Matt Barnes
Matthew Bishop
Mark Lawler
Sharon Rose

Distribution of the Environmental Impact Statement ___

This environmental impact statement has been distributed to individuals who specifically requested a copy of the document. In addition, copies have been sent to the Federal agencies, federally recognized tribes, State and local governments, and organizations representing a wide range of views regarding the Divide Travel Plan.

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